

Instruction Manual for

SWINGER



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"SWINGER"

2 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.

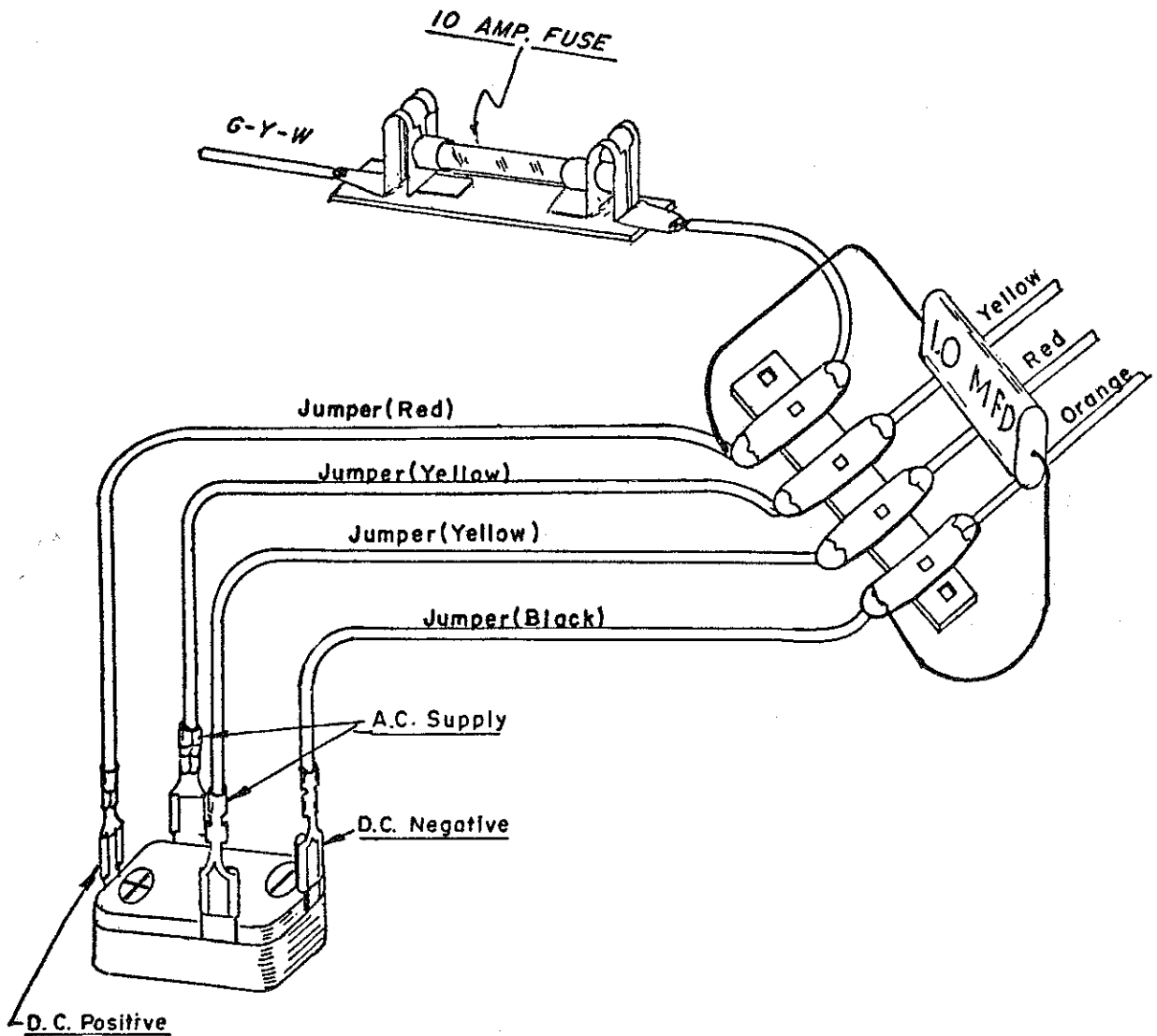
"ON GREEN" TARGET LITES UP GREEN JET BUMPERS TO SCORE 100.

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!

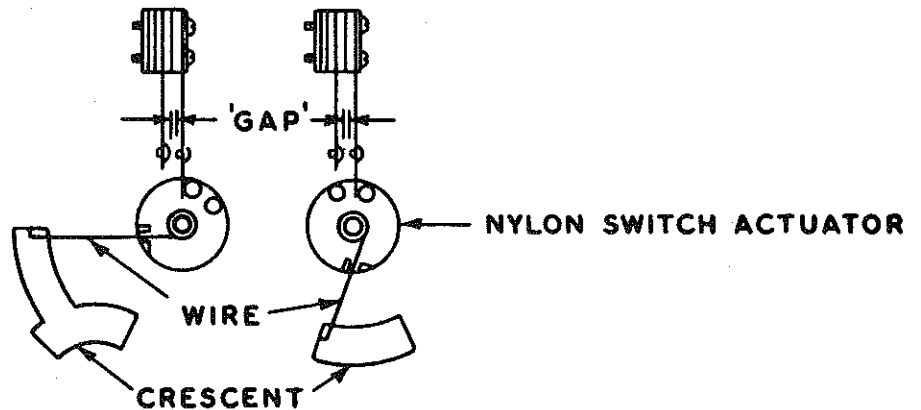
The playboard on this machine has an improved finish with excellent wearing properties. Do not under any circumstances clean the board with water, water soap solutions or harsh abrasives. Avoid such things as steel wool, kitchen cleansers or abrasive hand soap. Water will weaken the adhering of the paint 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.

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.

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.

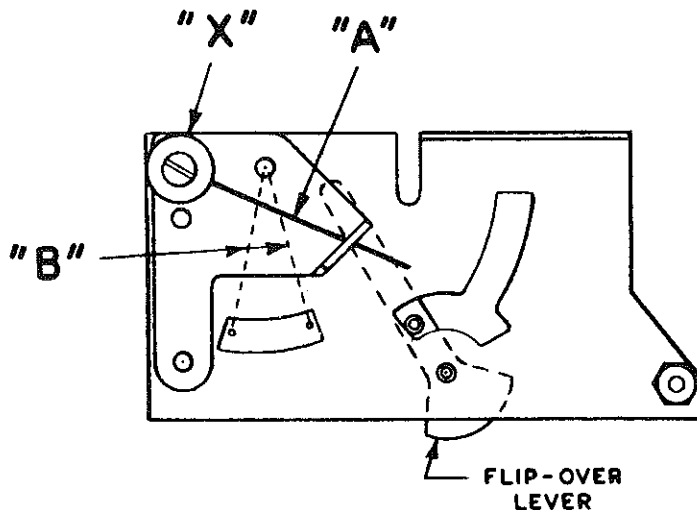
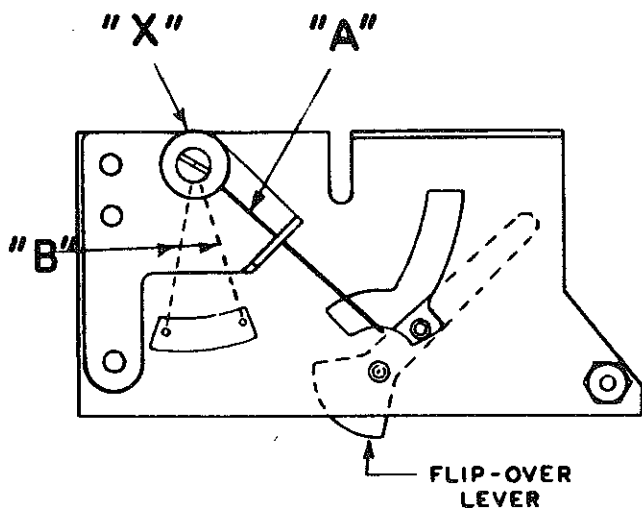
FOR 1 COIN - FOR 1 PLAY

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:

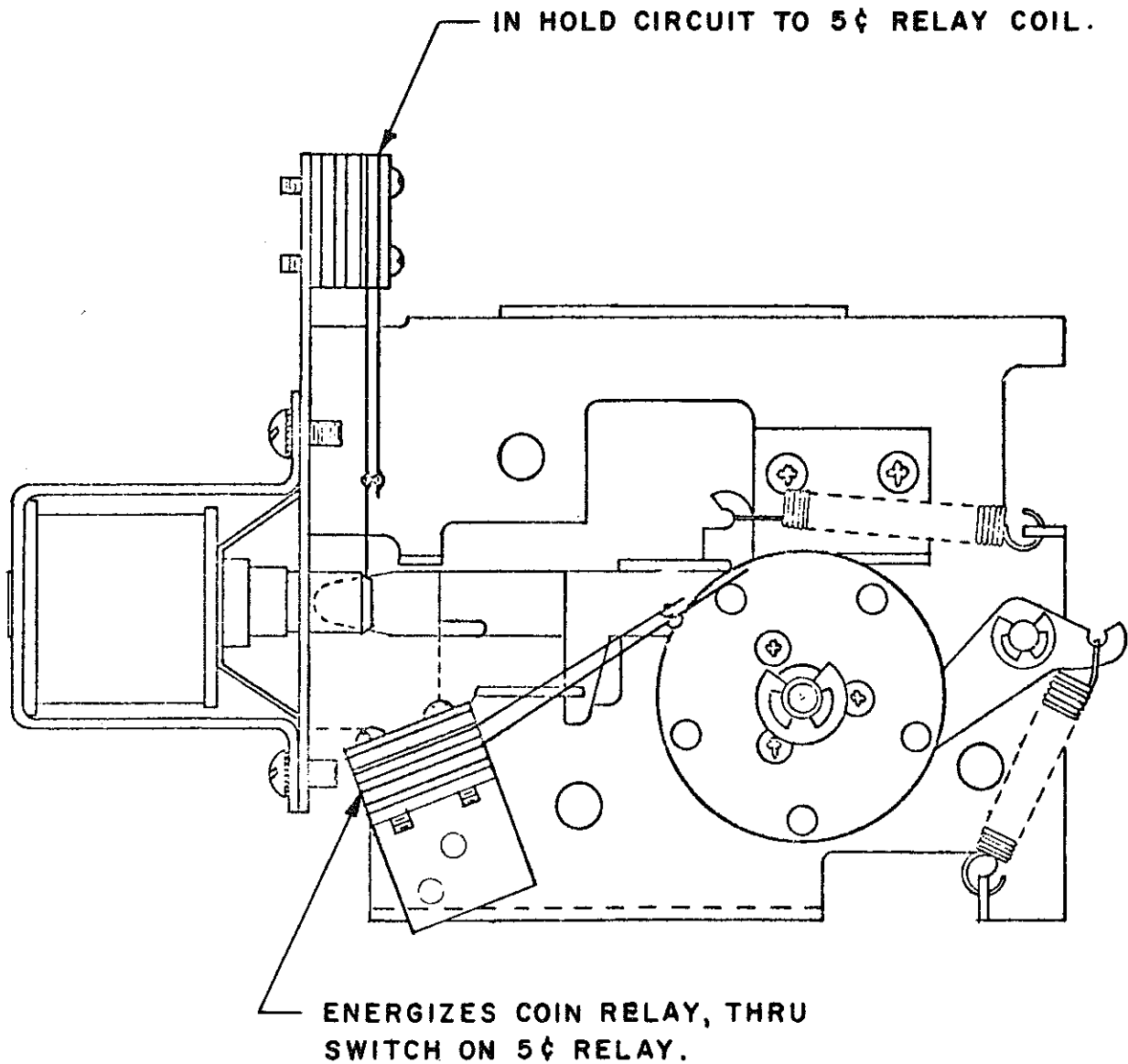
To change from 1 coin play to 2 coin play or vice versa - loosen screw "X" and move screw, bushing & wire form "A" to position as required - shown in Figure 1 position as required - shown in Figure 1 or Figure 2.

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.

ALTERNATOR UNIT

LOCATED ON MECHANISM PANEL .

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



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

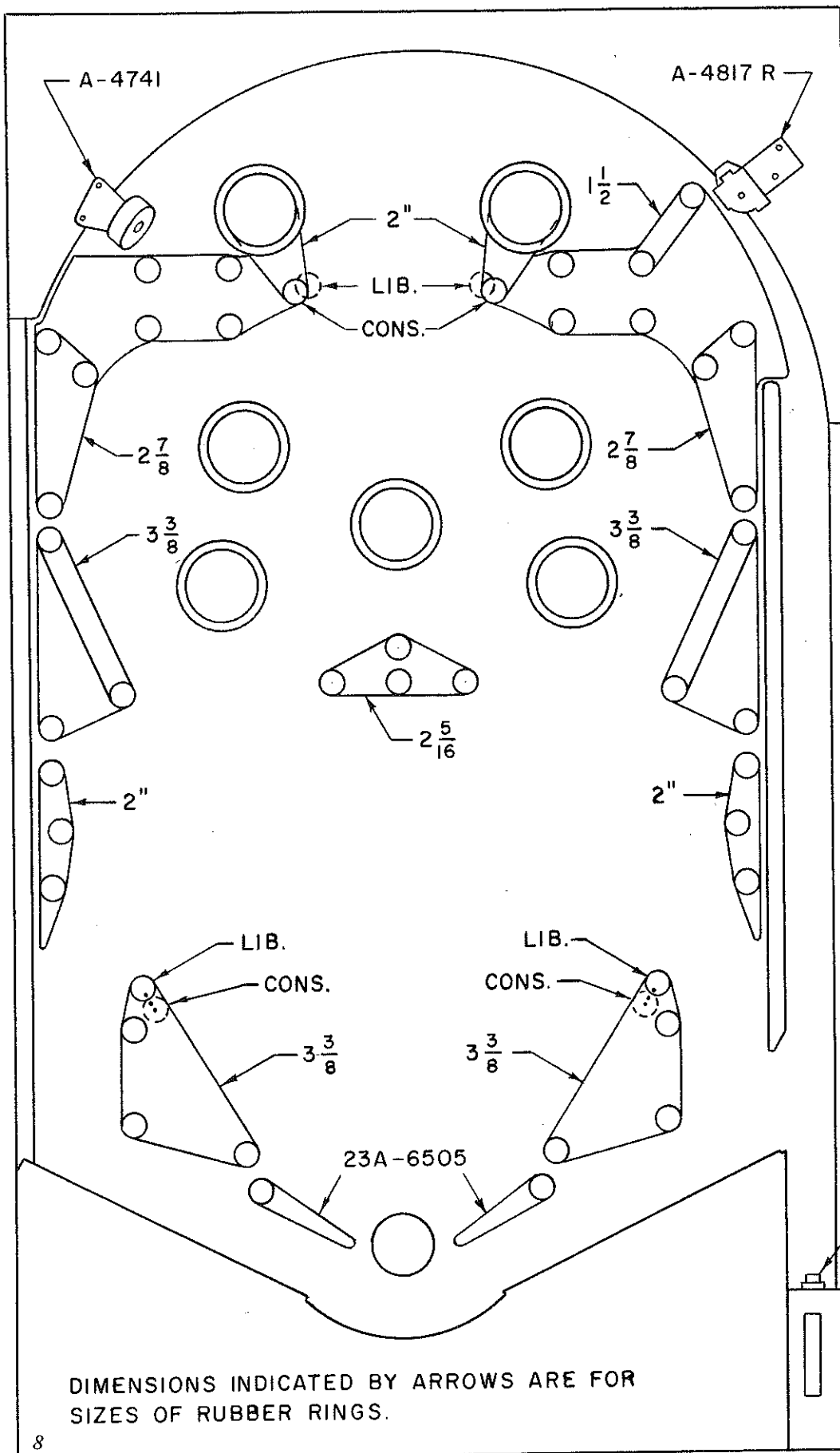
WHEN ORDERING PARTS ALWAYS SPECIFY NAME OF UNIT, GAME AND SERIAL NUMBER, IN ADDITION TO A CLEAR DESCRIPTION OF THE PART AND PART NUMBER IF POSSIBLE.

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
ADVANCE	C-6414	B-7456-2	A-6401	14A-7805
TENS	B-7253	A-6294	3C-7272	(60) CYCLE
HUNDREDS	-----	-----	3C-7272	14A-7806
THOUSANDS	B-7253	A-6294	3C-7272	(50) CYCLE
10 THOUSANDS	B-7253	A-6294	3C-7272	SWINGING TARGET MOTOR
SWING REEL	B-7253	A-6294	3C-7272	14A-7745
ALTERNATOR	-----	-----	3C-7272	(50-60 CYCLE)

"SWINGER" — 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.

23A-6327 BALL SHOOTER
RUBBER TIP

DIMENSIONS INDICATED BY ARROWS ARE FOR
SIZES OF RUBBER RINGS.

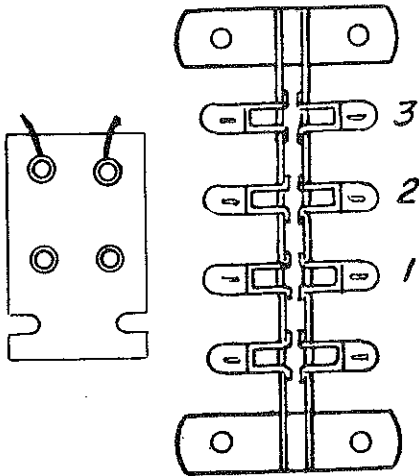
NOTICE:

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

NUMBER	DESCRIPTION	LOCATION
14 A-7745	SWINGING TARGET MOTOR-50/60 CYCLE	PLAYFIELD
14 A-7805	SCORE MOTOR - 60 CYCLE	MECH. PANEL
14 A-7806	SCORE MOTOR - 50 CYCLE	MECH. PANEL
15 A-6771	TRANSFORMER - 60 CYCLE	MECH. PANEL
15 A-6782 -1	TRANSFORMER - 50 CYCLE	MECH. PANEL
B 6396	PLAY METER (Coil XM 27-675)	MECH. PANEL
<u>SOLENOID COILS</u>		
A 22-550	MATCH UNIT STEP UP	INSERT
	BALL COUNT UNIT STEP UP	INSERT
	BALL RELEASE COIL	PLAYFIELD
	ADVANCE UNIT STEP UP	PLAYFIELD
A1-22-550	BALL RETURN COIL	PLAYFIELD
A 23-600	REPLAY UNIT STEP UP	INSERT
A2-23-750	KNOCKER	CABINET
A2-26-1025	CHIME COILS ... (3 req'd.)	CABINET
B 26-800	SCORE DRUM UNIT ... (8 req'd.)	INSERT
	REPLAY UNIT RESET	INSERT
	BALL COUNT UNIT RESET	INSERT
	ALTERNATOR UNIT	MECH. PANEL
	SWING REEL UNIT	INSERT
FL 20-300/28-400	FLIPPER COILS ... (2 req'd.)	PLAYFIELD
G 23-750	KICKER COILS ... (2 req'd.)	PLAYFIELD
	DISAPPEARING POST (LATCH COIL)	PLAYFIELD
	EJECT COIL	PLAYFIELD
	JET BUMPER COILS ... (5 req'd.)	PLAYFIELD
M 24-350	TRIPLE BONUS RELAY	PLAYFIELD
<u>RELAY COILS</u>		
M1-31-1500	COIN LOCKOUT	DOOR
M 29-1000	DISAPPEARING POST (TRIP)	PLAYFIELD
	2ND COIN RELAY (TRIP)	MECH. PANEL
	GAME OVER RELAY (TRIP)	MECH. PANEL
	SCORE RESET RELAY	INSERT
M 29-1100	10 POINT RELAY	INSERT
	100 POINT RELAY	INSERT
	1,000 POINT RELAY	INSERT
	3,000 RELAY	PLAYFIELD
	5,000 RELAY	PLAYFIELD
	POST RELAY	PLAYFIELD
	SPECIAL REEL RESET RELAY	PLAYFIELD
	CENTER TARGET RELAY	PLAYFIELD
	5¢ RELAY	MECH. PANEL
	10¢ RELAY	MECH. PANEL
	25¢ RELAY	MECH. PANEL
	BONUS RELAY	PLAYFIELD
	DELAY RELAY	PLAYFIELD
	BREAK RELAY	PLAYFIELD
	BALL TROUGH RELAY	PLAYFIELD
M 30-1300	BALL RETURN RELAY	PLAYFIELD
	SET UP RELAY	PLAYFIELD
M 30-1400	ON YELLOW RELAY	PLAYFIELD
	ON GREEN RELAY	PLAYFIELD
Z 27-1000	COIN RELAY	MECH. PANEL
	REPLAY RELAY	MECH. PANEL
	RESET RELAY	MECH. PANEL
	EJECT RELAY	MECH. PANEL
	2ND COIN RELAY (LATCH)	MECH. PANEL
	GAME OVER RELAY (LATCH)	MECH. PANEL
	OUTHOLE RELAY	MECH. PANEL
Z 28-1150	EXTRA BALL RELAY	MECH. PANEL
	TILT RELAY	MECH. PANEL
	GATE RELAY	PLAYFIELD
	PLAYER RELAY	INSERT
Z 28-1200	BALL INDEX RELAY	MECH. PANEL
Z 29-1250	LOCK RELAY	MECH. PANEL

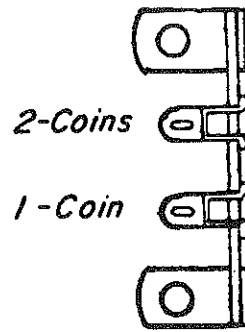
ADJUSTMENTS ON MECHANISM PANEL

10¢ Adjustment



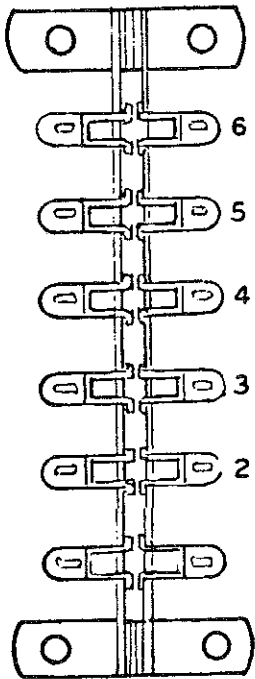
PROVIDES
1, 2 OR
3 PLAYS
FOR ONE
COIN.

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



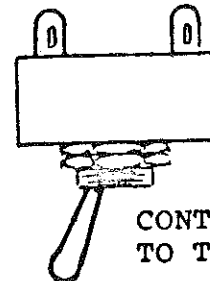
ON

OFF

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

MASTER ON-OFF SW.

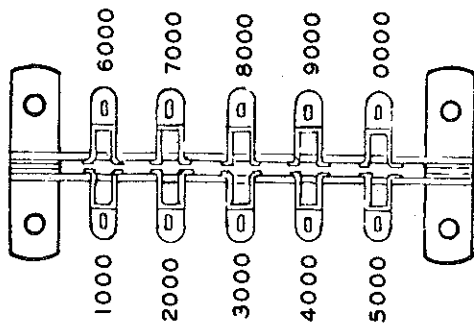
(Located under front of
Cabinet)



CONTROLS POWER
TO TRANSFORMER

ADJUSTMENTS IN BACKBOX

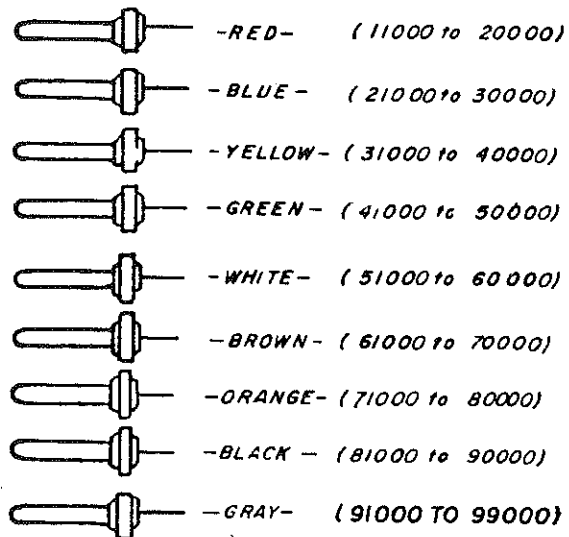
Hi-Score Adjustment



Insert plugs into 10 Point Female at desired positions.

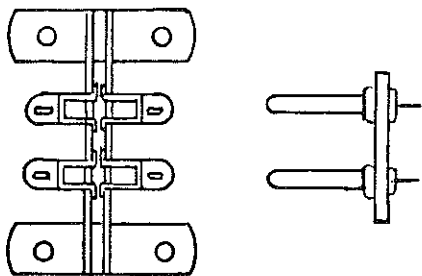
Examples:

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



No. of Balls Adjustment

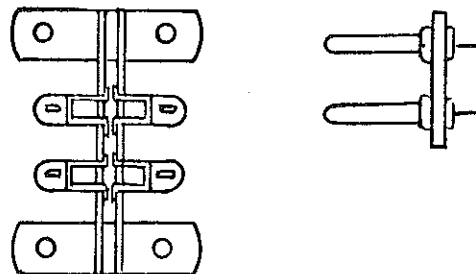
3 BALL — 5 BALL



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

NUMBER MATCH ADJUSTMENT

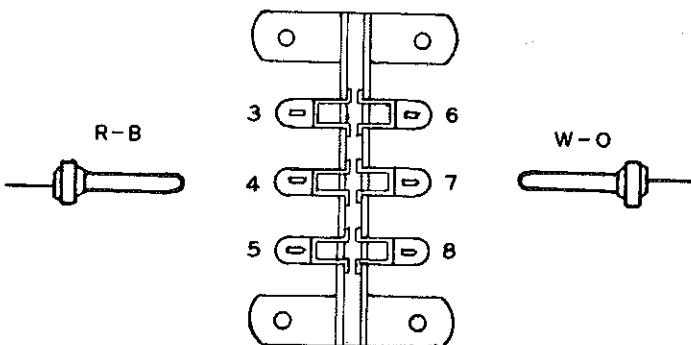
ON — OFF



IN "ON" POSITION, NUMBER MATCH LITE WILL APPEAR WHEN GAME IS OVER. IF THIS NUMBER MATCHES THE LAST TWO DIGITS OF POINT SCORE, A REPLAY IS AWARDED.
 IN "OFF" POSITION, NUMBER MATCH IS IN-OPERATIVE.

SWING REEL ADJ.

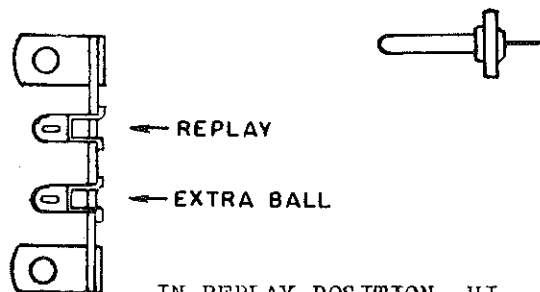
EXTRA BALLS — REPLAYS



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

PHONE TIP WITH WHITE-ORANGE WIRE WILL AWARDED REPLAY.

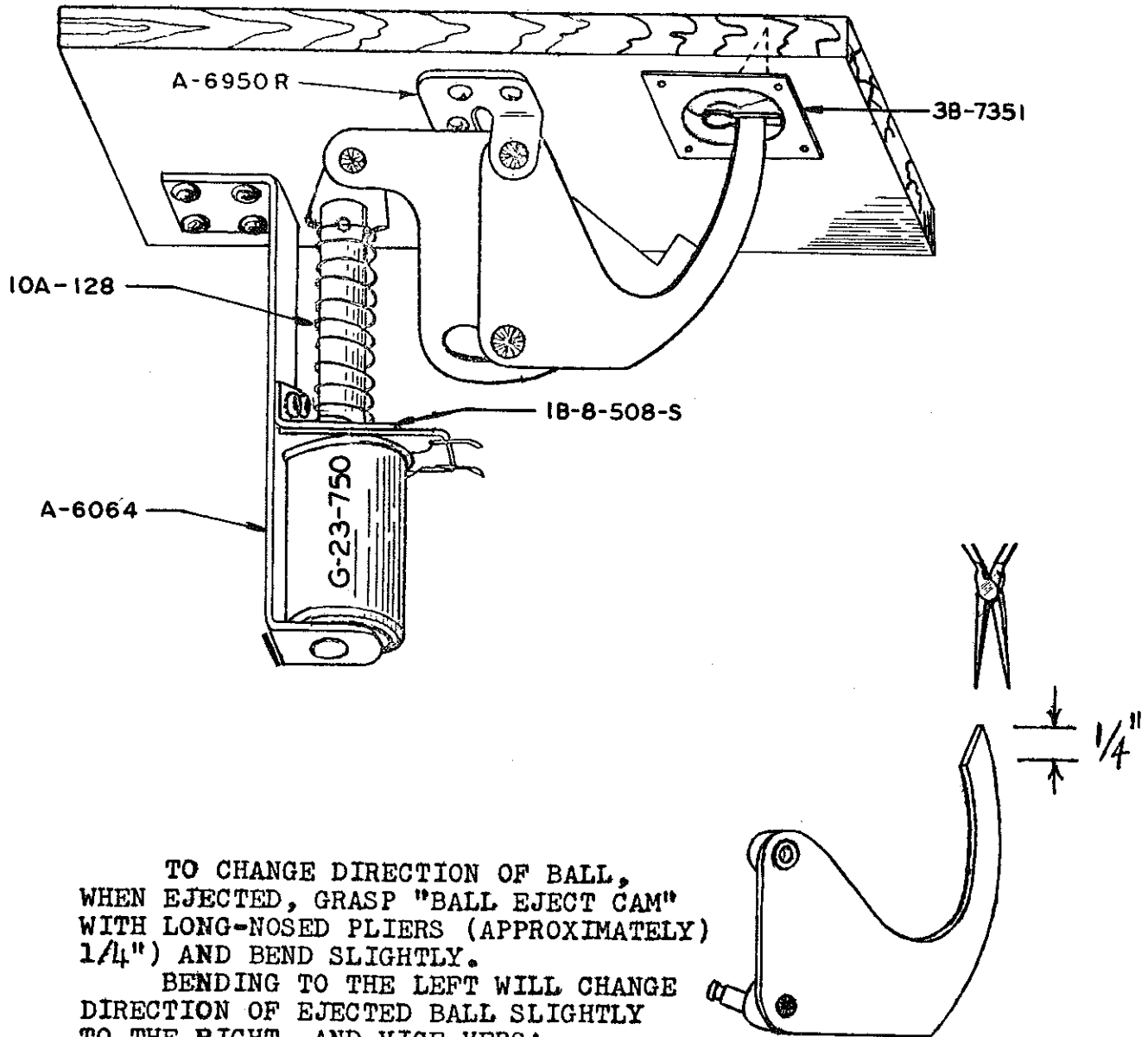
REPLAY-EXTRA BALL ADJ.



IN REPLAY POSITION, HI-SCORES AWARDED REPLAYS.
 IN EXTRA BALL POSITION, HI-SCORES AWARDED EXTRA BALL.

BALL EJECT CAM UNIT

B-7472-1 L&R



TO CHANGE DIRECTION OF BALL,
WHEN EJECTED, GRASP "BALL EJECT CAM"
WITH LONG-NOSED PLIERS (APPROXIMATELY
1/4") AND BEND SLIGHTLY.

BENDING TO THE LEFT WILL CHANGE
DIRECTION OF EJECTED BALL SLIGHTLY
TO THE RIGHT, AND VICE-VERSA.

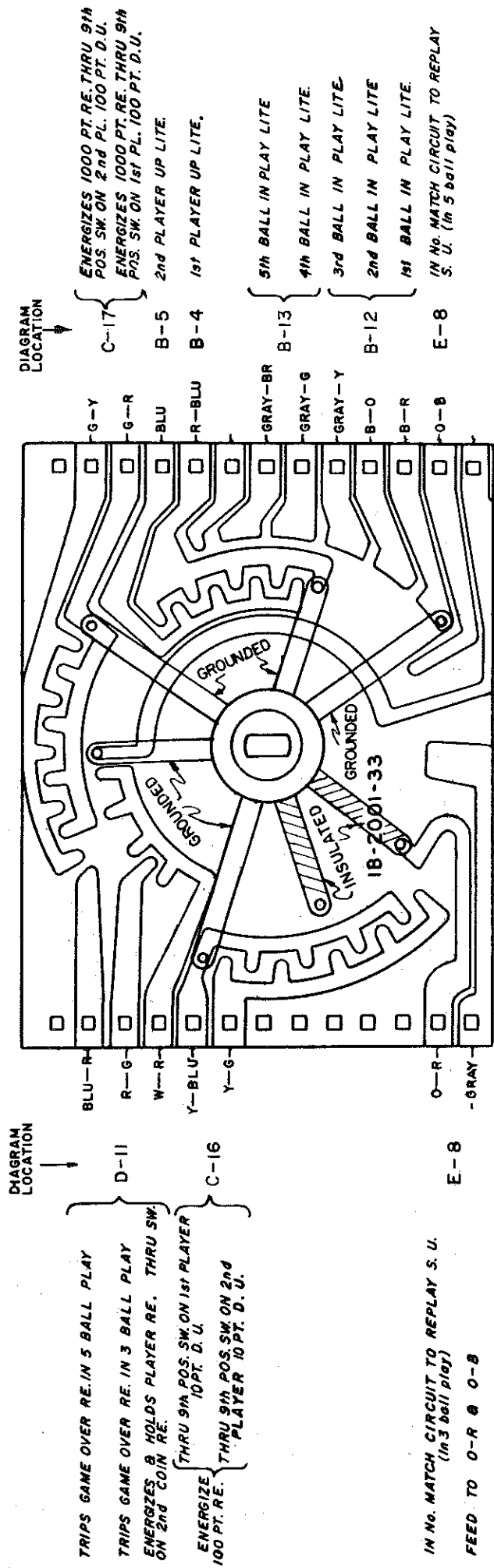
CAUTION

IF BEND IS TOO GREAT, IT MAY
CAUSE A BIND WHEN "BALL EJECT CAM"
IS RESTING IN PART #3B-7351.

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.

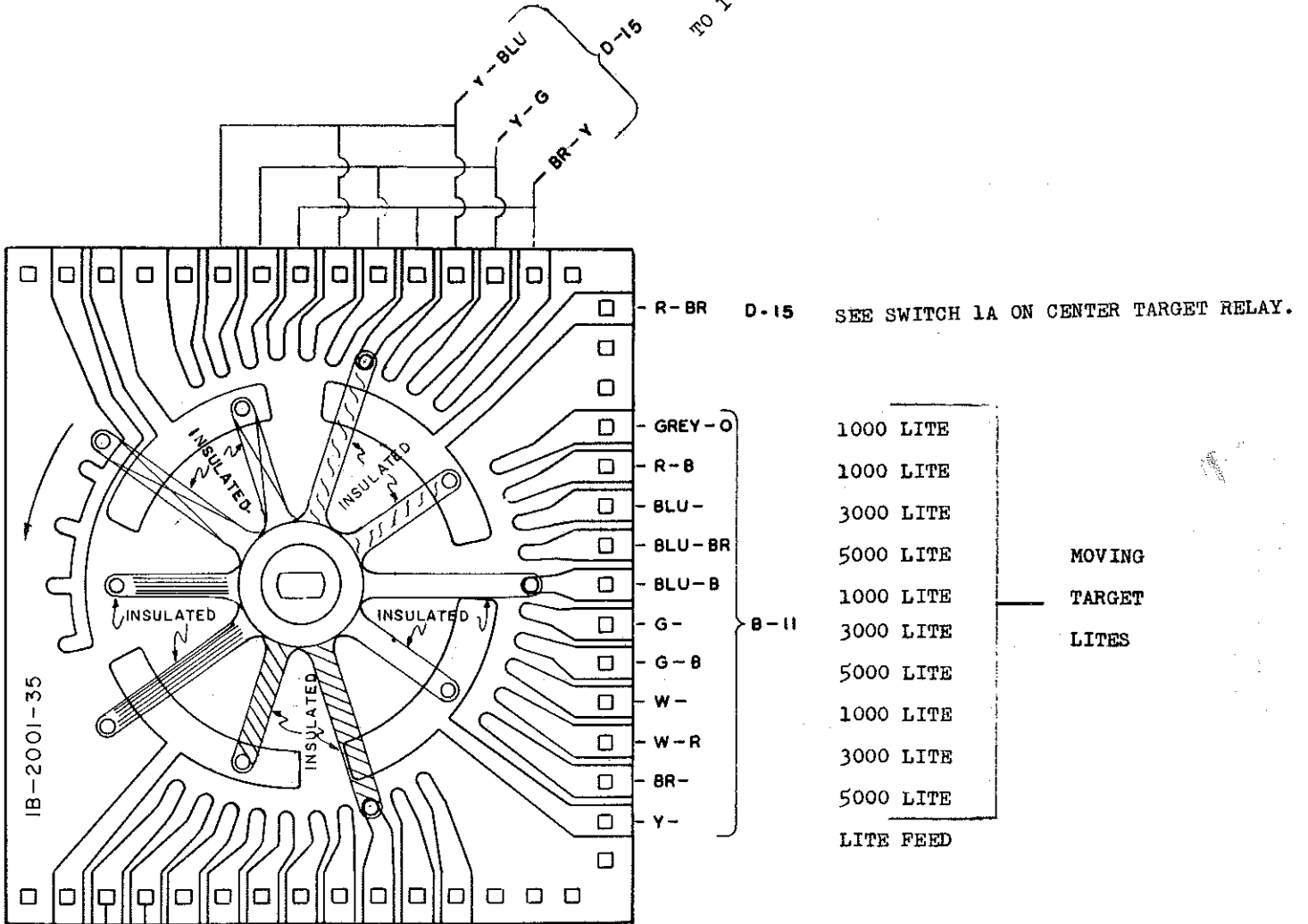
VIEW LOOKING AT WIPER FINGERS, WITH WIPER IN RESET POSITION.



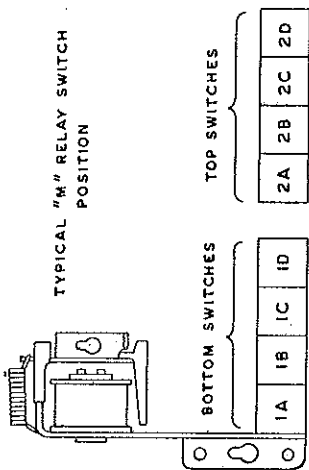
ADVANCE UNIT

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.



VIEW LOOKING AT WIPER FINGER SIDE.



LOCK RELAY

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

EJECT RELAY

IS ENERGIZED BY EJECT SWITCH, THRU INDEX CAM SWITCH B.

RESET RELAY

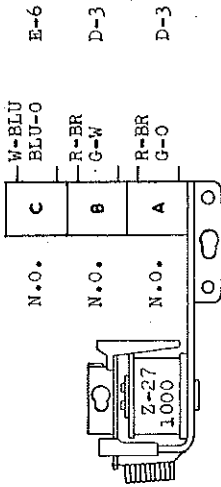
IS ENERGIZED BY COIN RELAY, THRU SWITCH D ON GAME-OVER RELAY.

RELAYS & SWITCHES LOCATED ON MECHANISM PANEL

SWITCH TYPE	DIAGRAM LOCATION	
N.C. F	D-4	IN CIRCUIT TO "SPECIAL REEL RESET RELAY".
G- B-Y		
N.C. E	D-12	ENERGIZES GAME-OVER RELAY (TRIP COIL).
-Y- BLU-R		
N.O. D	C-1	OPENS CIRCUITS TO SWINGING TARGET MOTOR.
G- PURPLE		
N.O. C	A-2	6 VOLTS FROM TRANSFORMER LITES.
BR-Y-W G-Y-W		
N.O. B	A-2	6 VOLTS FROM TRANSFORMER LITES.
BLU-Y-W G-Y-W		
N.O. A	D-5	HOLD CIRCUIT TO THIS RELAY, THRU KICK-OFF SWITCH.
B-O O-B		
N.O. F	D-4	PULSES SPECIAL SWING REEL DRUM UNIT AT SCORE MOTOR CAM SWITCH 1C.
B-G G-B		
N.O. E	C-11	PULSES 100 OR 1000 POINT RELAY, THRU NUMBER MATCH UNIT DISC.
-O- GREY-W		
N.O. D	C-5	RUNS SCORE MOTOR.
O-G -Y-		
N.O. C	D-6	IN CIRCUIT TO REPLAY S.U. OR EXTRA BALL RELAY, THRU SPECIAL SWING REEL D.U. DISC.
B-R GREY-Y		
N.O. B	D-4	ENERGIZES EJECT COIL AT SCORE MOTOR CAM SWITCH 1D.
BR-BLU BLU-B		
N.O. A	D-4	IN HOLD CIRCUIT TO THIS RELAY.
-R-BR R-W		
M&B E	E-6	CLOSES TO ENERGIZE BALL COUNT RESET COIL AND 2ND COIN RELAY AND GAME-OVER RELAY LATCH COILS.
B-BLU BLU-O O-BLU		
N.C. D	E-11	OPENS CIRCUITS TO PLAYFIELD SWITCHES AND SCORING RELAYS.
R-Y-W BLU-Y-W		
N.C. C	C-3	OPENS CIRCUIT TO REPLAY RELAY, DURING RESET CYCLE.
BR-R W-GREY		
N.O. B	C-5	RUNS SCORE MOTOR.
G-O -Y-		
N.O. A	D-5	IN HOLD CIRCUIT TO THIS RELAY, THRU (8) DRUM UNIT ZERO SWITCHES.
BLU-BR BLU-W		

REPLAY RELAY

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



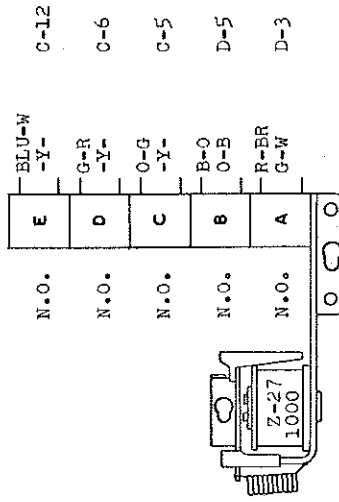
ENERGIZES REPLAY UNIT RESET COIL AT SCORE MOTOR CAM SWITCH 1A.

ENERGIZES COIN RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

COIN RELAY

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



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

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

RUNS SCORE MOTOR.

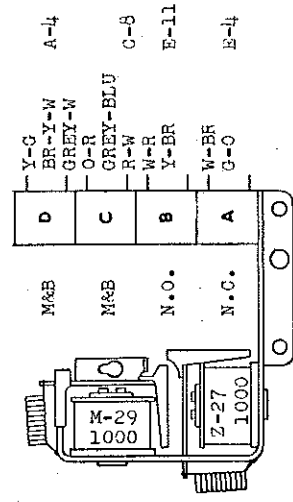
ENERGIZES LOCK RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

2ND COIN RELAY

INTERLOCK

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



OPENS TO "1 CAN PLAY" LITE AND CLOSES TO "2 CAN PLAY" LITE.

IN CIRCUIT TO PULSE BALL COUNT S.U. --- ALSO IN NUMBER MATCH CIRCUIT.

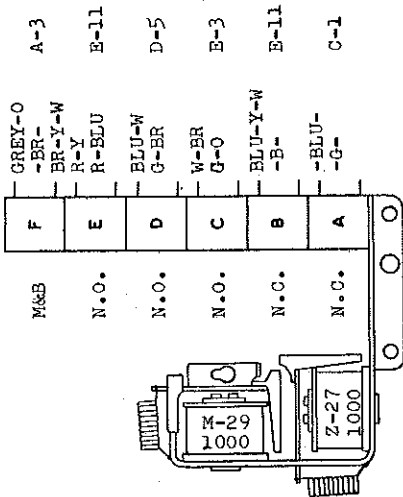
ENERGIZES PLAYER RELAY, THRU BALL COUNT UNIT DISC.

IN CIRCUIT TO REPLAY RELAY.

GAME OVER RELAY

INTERLOCK

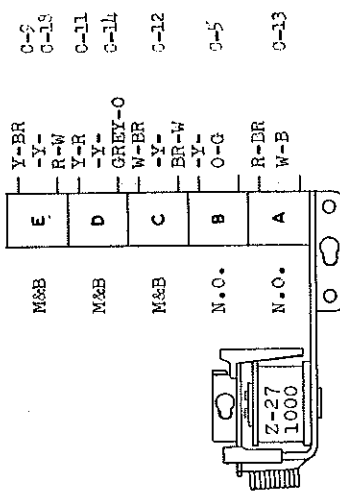
TRIP COIL IS ENERGIZED BY LOCK RELAY OR WIPER ON BALL COUNT DISC---ALSO BY COIN RELAY, THRU BALL COUNT UNIT ZERO SWITCH. LATCH COIL IS ENERGIZED BY SWITCH ON COIN RELAY, THRU SWITCH D ON COIN RELAY, THRU SWITCH E ON RESET RELAY, AT SCORE MOTOR CAM SWITCH 1A.



OPENS TO "BALL IN PLAY" LITES AND CLOSES TO "GAME-OVER" AND NUMBER MATCH LITES.
ENERGIZES POST RELAY.
ENERGIZES RESET RELAY, THRU SWITCH ON COIN RELAY.
IN CIRCUIT TO REPLAY RELAY.
IN SERIES WITH SWITCH D ON RESET RELAY.
OPENS CIRCUIT TO SWINGING TARGET MOTOR.

OUTHOLE RELAY

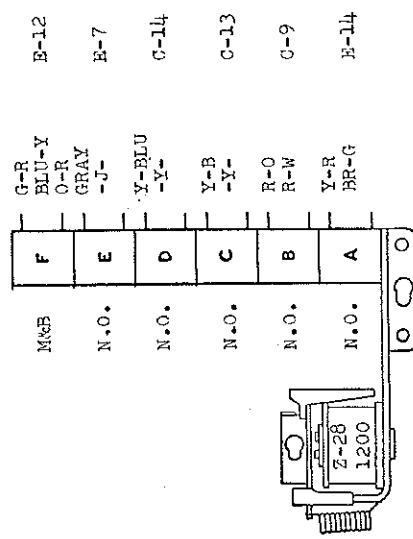
IS ENERGIZED BY BALL TROUGH RELAY, THRU SWITCH ON BONUS RELAY AND CENTER TARGET RELAY.



OPENS IN HOLD CIRCUIT TO "ON GREEN" AND "ON YELLOW" RELAYS, AND CLOSES TO PULSE BALL COUNT S.U.
OPENS IN HOLD CIRCUIT TO BALL INDEX RELAY AND CLOSES TO ENERGIZE DOWN POST RELAY AT CAM SWITCH 1B.
OPENS IN HOLD CIRCUIT TO TILT RELAY AND CLOSES TO BALL RELEASE COIL AT CAM SWITCH 1A.
RUNS SCORE MOTOR.
IN HOLD CIRCUIT TO THIS RELAY.

BALL INDEX RELAY

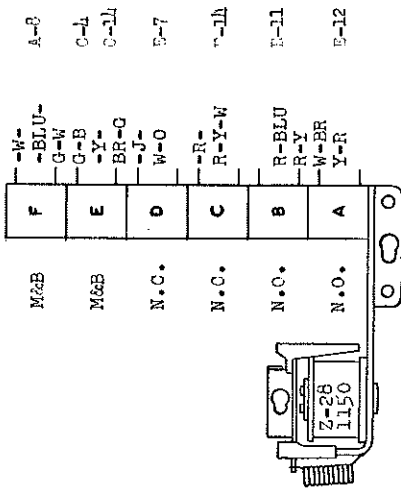
IS ENERGIZED BY 10 POINT, 100 POINT, 1,000 POINT OR TILT RELAYS.



OPENS IN CIRCUIT TO OUTHOLE RELAY AND CLOSES TO CENTER TARGET RELAY.
IN "HI-SCORE" CIRCUIT AND "SPECIAL SWING REEL" CIRCUIT TO REPLAY S.U. COIL.
IN HOLD CIRCUIT TO EXTRA BALL RELAY.
IN CIRCUITS TO BONUS RELAY, DELAY RELAY AND BREAK RELAY.
IN CIRCUIT TO BALL COUNT S.U.---ALSO IN NUMBER MATCH CIRCUIT.
IN HOLD CIRCUIT TO THIS RELAY.

TILT RELAY

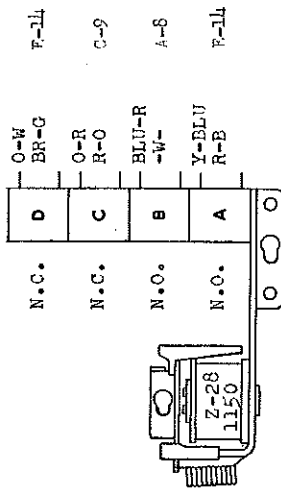
IS ENERGIZED BY VIBRATION TILT SWITCH ON PLAYFIELD, PLUMB BOB TILT OR BALL-ROLL TILT AT LEFT FRONT OF CABINET.



OPENS IN CIRCUIT TO PLAYFIELD LITES AND CLOSES TO TILT LITE.
 OPENS IN CIRCUIT TO "SPECIAL SWING REEL D.U.", AND CLOSES TO ENERGIZE BALL INDEX RELAY.
 IN SERIES WITH SWITCH D ON BALL INDEX RELAY.
 OPENS CIRCUIT TO SWITCHES ON PLAYFIELD AND SCORING RELAYS.
 ENERGIZES POST RELAY.
 IN HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON OUTHOLE RELAY.

EXTRA BALL RELAY

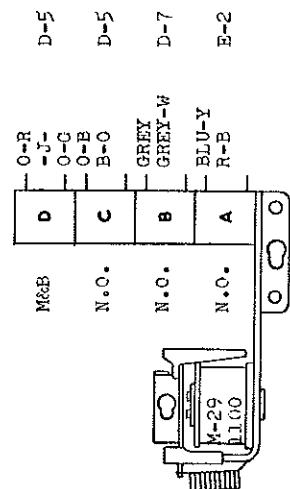
IS ENERGIZED BY SWITCH C ON EJECT RELAY, THRU SPECIAL SWING REEL UNIT DISC---ALSO BY HI-SCORE CIRCUIT. (SEE "RELAY-EXTRA BALL" ADJ. JACK AND "SPECIAL SWING REEL" ADJ. JACK).



IN CIRCUIT TO PULSE BALL INDEX RELAY.
 IN SERIES WITH SWITCH B ON BALL INDEX RELAY.
 TO "SHOOT AGAIN" LITES.
 IN HOLD CIRCUIT TO THIS RELAY.

10¢ RELAY

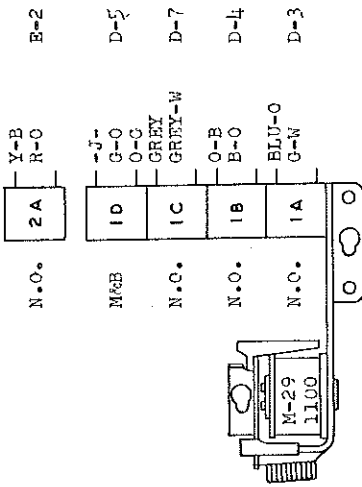
IS ENERGIZED BY 10¢ COIN SWITCH, IF 10¢ ADJUSTMENT JACK IS IN "2PLAYS" OR "3PLAYS" POSITION.



OPENS IN CIRCUIT TO KNOCKER COIL AND CLOSES TO RUN SCORE MOTOR.
 ENERGIZES LOCK RELAY.
 PULSES REPLAY S.U. COIL, THRU IMPULSE CAM SWITCH B.
 IN HOLD CIRCUIT TO THIS RELAY.

25¢ RELAY

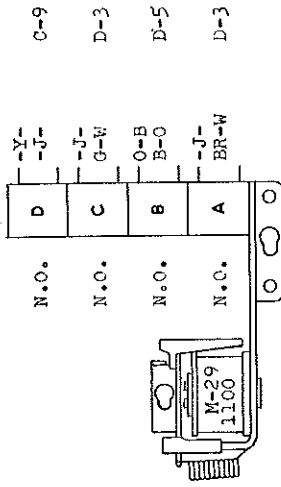
IS ENERGIZED BY 25¢ COIN SWITCH.



IN HOLD CIRCUIT TO THIS RELAY.
 OPENS IN CIRCUIT TO KNOCKER COIL AND CLOSES TO RUN SCORE MOTOR.
 PULSES REPLAY S.U. COIL, THRU IMPULSE CAM SWITCH B.
 ENERGIZES LOCK RELAY.
 ENERGIZES COIN RELAY IN "6 PLAYS FOR 25¢" ADJUSTMENT.

5¢ RELAY

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

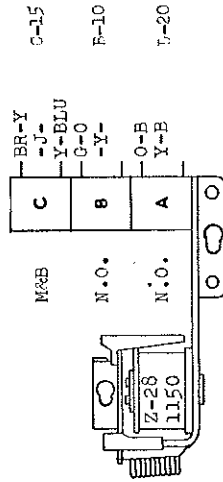


ENERGIZES ALTERNATOR UNIT COIL.
 ENERGIZES COIN RELAY, THRU SWITCH ON ALTERNATOR UNIT.
 ENERGIZES LOCK RELAY.
 IN HOLD CIRCUIT TO THIS RELAY.

LOCATED ON PLAYFIELD

GATE RELAY

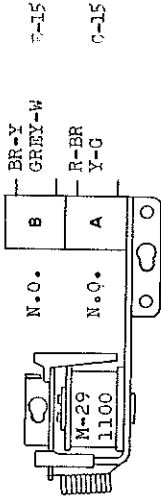
IS ENERGIZED BY CENTER TARGET RELAY, THRU SET*UP RELAY AND ADVANCE UNIT DISC.



OPENS TO 1000 POINT RELAY AND CLOSES TO 3000 RELAY. (THRU RIGHT BOTTOM FOLLOVER SWITCH).
 TO "3000 WHEN LIT" GATE LITE.
 HOLD CIRCUIT TO THIS RELAY, THRU TROUGH SWITCH.

5000 RELAY

IS ENERGIZED BY SWITCH 1A ON CENTER TARGET RELAY, THRU SWITCH 1C ON SET-UP RELAY AND ADVANCE UNIT DISC.

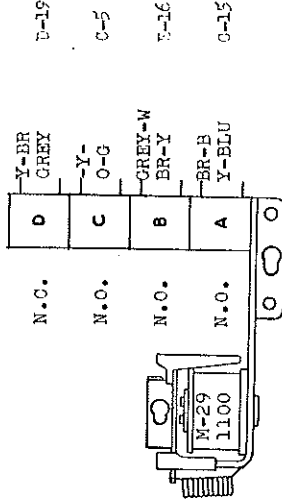


PULSES 1000 POINT RELAY, THRU IMPULSE CAM SWITCH B.
IN HOLD CIRCUIT TO THIS RELAY.

3000 RELAY

IS ENERGIZED BY:

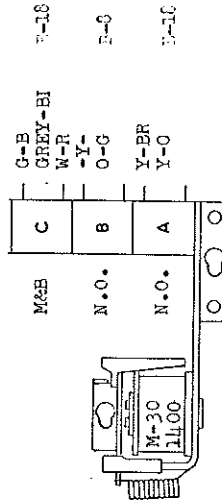
1. CENTER TARGET RELAY, THRU SET-UP RELAY AND ADVANCE UNIT DISC.
2. LEFT OR RIGHT TOP ROLLOVER, THRU NUMBER MATCH UNIT DISC.
3. LEFT BOTTOM ROLLOVER, THRU BALL RETURN RELAY.
4. RIGHT BOTTOM ROLLOVER, THRU GATE RELAY.



IN HOLD CIRCUIT TO BALL RETURN RELAY.
RUMS SCORE MOTOR.
PULSES 1000 POINT RELAY, THRU IMPULSE CAM SWITCH B.
IN HOLD CIRCUIT TO THIS RELAY.

ON GREEN RELAY

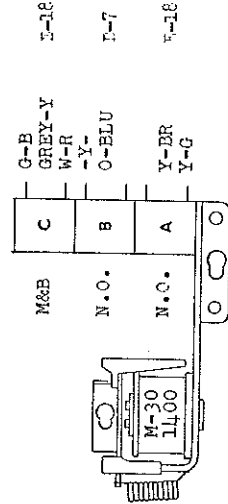
IS ENERGIZED BY "ON GREEN" TARGET SWITCH, AS INDICATED ON PLAYFIELD.



OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSES TO 100 POINT RELAY.
TO LEFT BOTTOM AND RIGHT TOP JET BUMPER LITES.
IN HOLD CIRCUIT TO THIS RELAY.

ON YELLOW RELAY

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



OPENS IN CIRCUIT TO 10 POINT RELAY AND CLOSES TO 100 POINT RELAY.
TO LEFT TOP AND RIGHT BOTTOM JET BUMPER LITES.
IN HOLD CIRCUIT TO THIS RELAY.

CENTER TARGET RELAY

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

SET UP RELAY

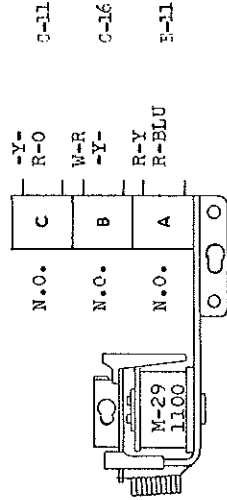
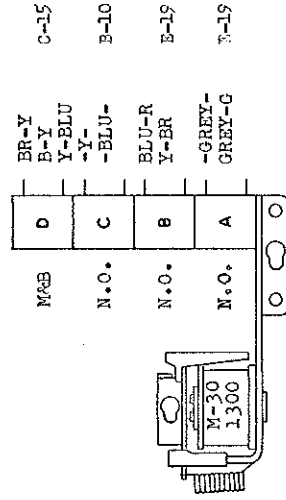
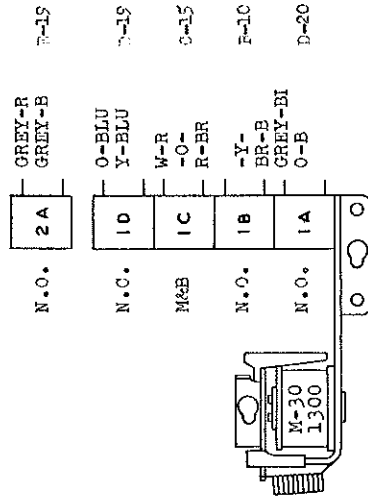
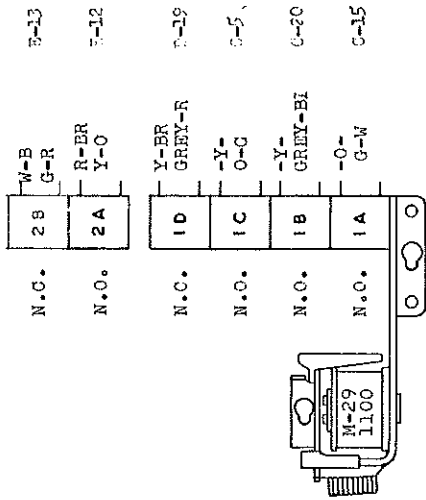
IS ENERGIZED BY LEFT OR RIGHT BOTTOM TARGET SWITCHES. ALSO BY BALL THROUGH RELAY.

BALL RETURN RELAY

IS ENERGIZED BY LEFT OR RIGHT TOP TARGET SWITCHES.

POST RELAY

IS ENERGIZED BY TILT RELAY OR GAME-OVER RELAY OR (2) ROLLOVER BUTTON SWITCHES.



IN CIRCUIT TO OUTHOLE RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

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

RUNS SCORE MOTOR.

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

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

IN HOLD CIRCUIT TO THIS RELAY.

IN CIRCUIT TO ADVANCE UNIT S.U. COIL.

CLOSES IN CIRCUIT TO 1000, 3000 OR 5000 RELAY, THRU ADVANCE UNIT DISC.

TO CENTER TARGET BONUS LITE.

IN CIRCUIT TO GATE RELAY, THRU ADVANCE UNIT DISC.

OPENS IN CIRCUIT TO 1000 POINT RELAY AND CLOSES TO 3000 RELAY (THRU LEFT BOTTOM ROLLOVER SWITCH).

TO "3000 WHEN LIT" BALL RETURN LANE LITE.

PULSES BALL RETURN SOLENOID, THRU LEFT BOTTOM ROLLOVER SWITCH.

HOLD CIRCUIT TO THIS RELAY. THRU BALL RETURN E.O.S. SWITCH OR SWITCH ON 3000 RELAY.

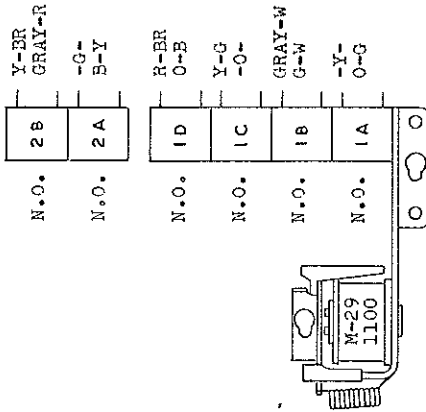
ENERGIZES DOWN POST SOLENOID.

PULSES 100 POINT RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

SPECIAL REEL RESET RELAY

IS ENERGIZED BY BALL THROUGH RELAY, THRU INDEX CAM SW. G OR ZERO SWITCH ON SPECIAL SWING REEL DRUM UNIT.



D-19 IN HOLD CIRCUIT TO SET-UP RELAY.

D-4 IN HOLD CIRCUIT TO THIS RELAY.

C-12 IN HOLD CIRCUIT TO CENTER TARGET RELAY.

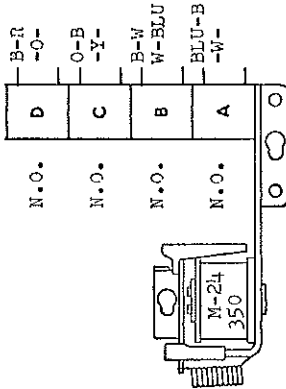
E-13 IN CIRCUIT TO BONUS RELAY.

E-4 IN CIRCUIT TO PULSE SPECIAL SWING REEL DRUM UNIT TO ZERO.

C-5 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.



E-13 ENERGIZES DELAY RELAY, THRU CAM SWITCH 4E.

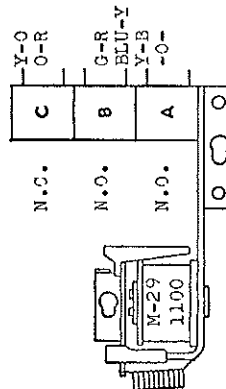
C-12 IN SERIES WITH SWITCH 1D ON SPECIAL REEL RESET RELAY.

E-14 ENERGIZES BREAK RELAY AT CAM SWITCH 5B.

A-13 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".



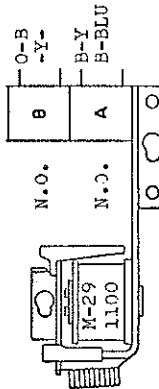
E-12 OPENS IN CIRCUIT TO ENERGIZE CENTER TARGET RELAY.

D-13 IN SERIES WITH SWITCH 2B ON CENTER TARGET RELAY.

E-13 IN HOLD CIRCUIT TO THIS RELAY, THRU SWITCH ON BALL INDEX RELAY.

DELAY RELAY

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

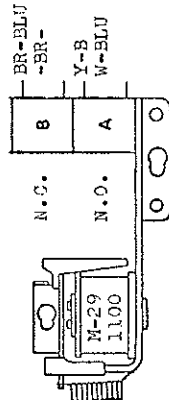


C-12 IN SERIES WITH SWITCH 1D ON SPECIAL REEL RESET RELAY.

E-13 HOLD CIRCUIT TO THIS RELAY, THRU CAM SWITCH 6A.

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.

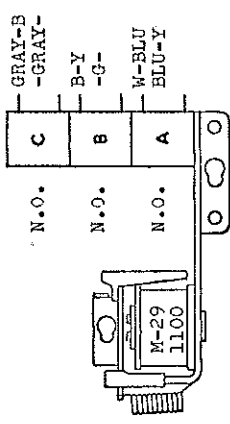


A-13 OPENS CIRCUIT TO TRIPLE BONUS RELAY.

C-14 HOLD CIRCUIT TO THIS RELAY, THRU SWITCH C ON BALL INDEX RELAY.

BALL TROUGH RELAY

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

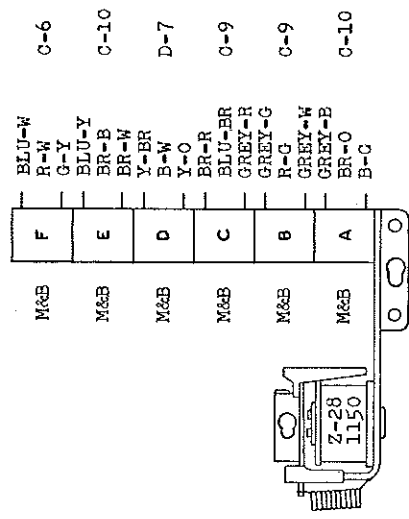


D-19 ENERGIZES SET-UP RELAY THRU INDEX CAM SWITCH C.
 D-4 IN CIRCUIT TO "SPECIAL REEL RESET RELAY".
 C-12 IN SERIES WITH SWITCH F ON BALL INDEX RELAY.

LOCATED IN BACKBOX

PLAYER RELAY

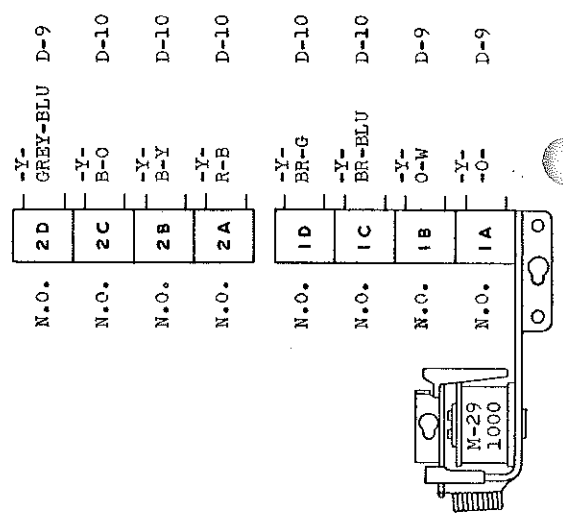
IS ENERGIZED BY 2ND COIN RELAY, THRU BALL COUNT UNIT DISC.



C-6 IN HI-SCORE CIRCUIT TO REPLAY S.U., THRU HI-SCORE ADJUSTMENT JACK.
 C-10 TO 10,000 DRUM UNIT COILS, THRU 9TH POSITION SWITCH ON 1,000 POINT DRUM UNITS.
 D-7 IN SERIES WITH SWITCH F ON THIS RELAY.
 C-9 OPENS IN CIRCUIT TO 1ST PLAYER 10 POINT DRUM UNIT AND CLOSURES TO 2ND PLAYER 10 POINT D.U.
 C-9 TO 100 POINT DRUM UNIT COILS.
 C-10 TO 1,000 POINT DRUM UNIT COILS.

SCORE RESET RELAY

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

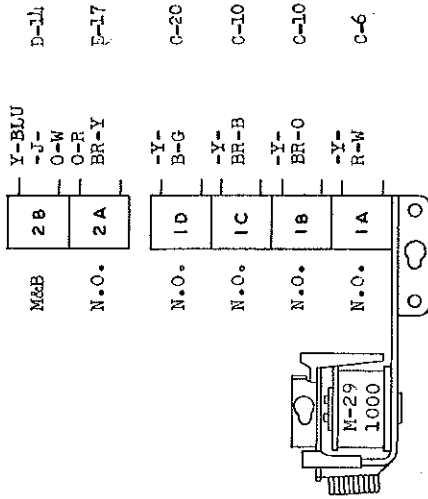


D-9 PULSES 2ND PLAYER 10 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
 D-10 PULSES 2ND PLAYER 1,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
 D-10 PULSES 1ST PLAYER 1,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
 D-10 PULSES 2ND PLAYER 100 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
 D-10 PULSES 2ND PLAYER 10,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
 D-10 PULSES 1ST PLAYER 10,000 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
 D-9 PULSES 1ST PLAYER 100 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
 D-9 PULSES 1ST PLAYER 10 POINT DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

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.



D-14 OPENS IN HOLD CIRCUIT TO EXTRA BALL RELAY AND CLOSES TO ENERGIZE BALL INDEX RELAY.

E-17 IN HOLD CIRCUIT TO THIS RELAY.

PULSES CHIME COIL.

IN SERIES WITH SWITCH E ON PLAYER RELAY.

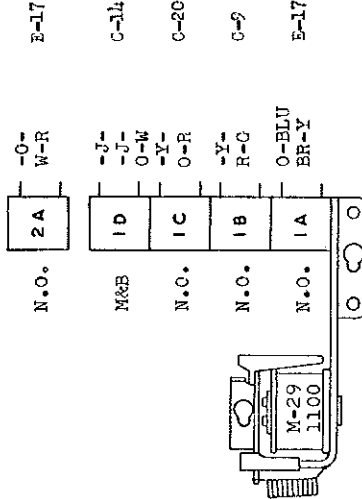
IN SERIES WITH SWITCH A ON PLAYER RELAY.

IN SERIES WITH SWITCH D ON PLAYER RELAY.

100 POINT RELAY

IS PULSED BY:

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



E-17 IN HOLD CIRCUIT TO THIS RELAY.

C-14 OPENS IN HOLD CIRCUIT TO EXTRA BALL RELAY AND CLOSES TO ENERGIZE BALL INDEX RELAY.

PULSES CHIME COIL.

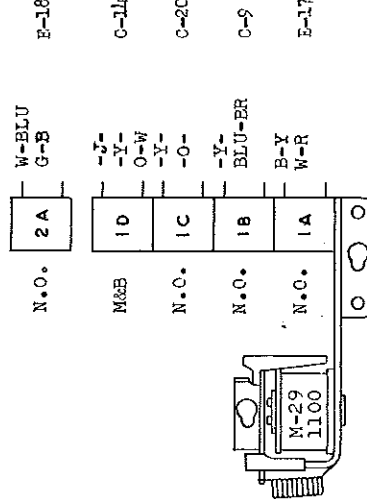
IN SERIES WITH SWITCH B ON PLAYER RELAY.

E-17 PULSES 1,000 POINT RELAY, THRU 9TH POSITION SWITCH ON 100 POINT DRUM UNITS, AND BALL COUNT DISC.

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.



E-18 IN HOLD CIRCUIT TO THIS RELAY.

C-14 OPENS IN HOLD CIRCUIT TO EXTRA BALL RELAY AND CLOSES TO ENERGIZE BALL INDEX RELAY.

Energizes NUMBER MATCH S.U. COIL.

IN SERIES WITH SWITCH C ON PLAYER RELAY.

E-17 PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCH ON 10 POINT DRUM UNITS, AND BALL COUNT DISC.

