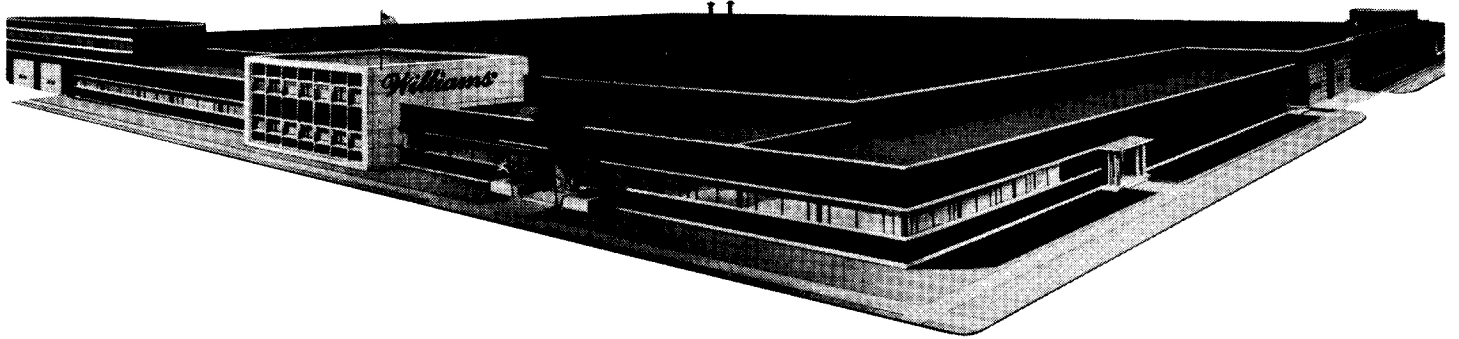


*For 4 days
I will have*

Instruction Manual

for

GAY 90'S



Williams[®] ELECTRONICS, INC.
SUBSIDIARY OF THE SEEBURG CORPORATION

3401 N. California Ave.
Phone 267-2240

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

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.

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 ALTERING COIN CHUTES EQUIPPED WITH A FLIP-OVER DEVICE.

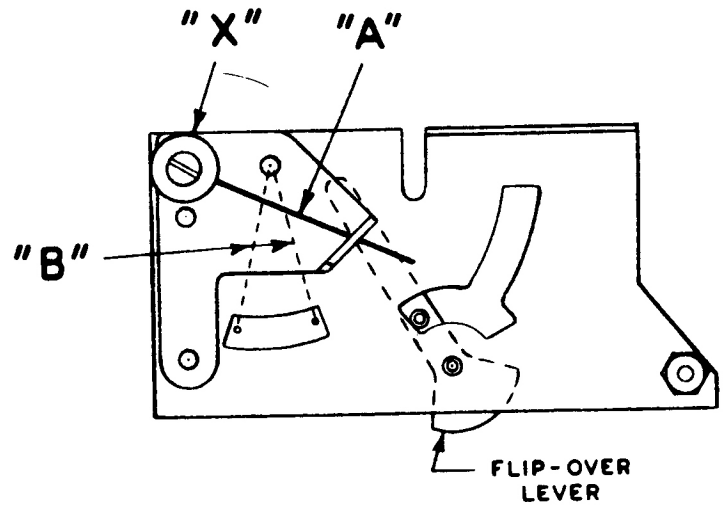
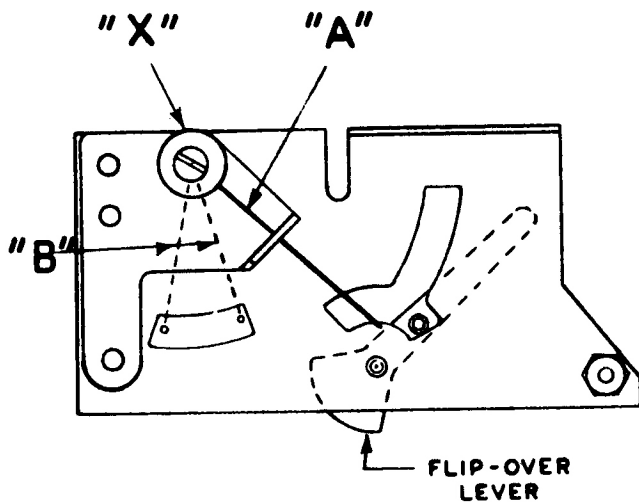
FOR 1 COIN - FOR 1 PLAY

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.

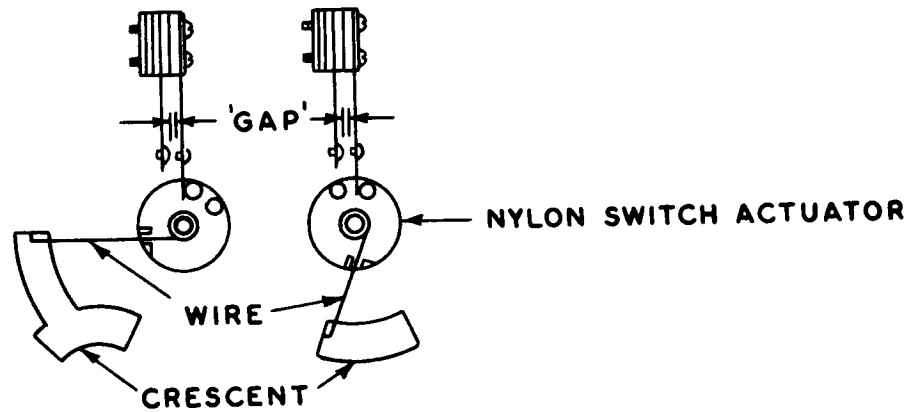
NOTE:

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.

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.

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.

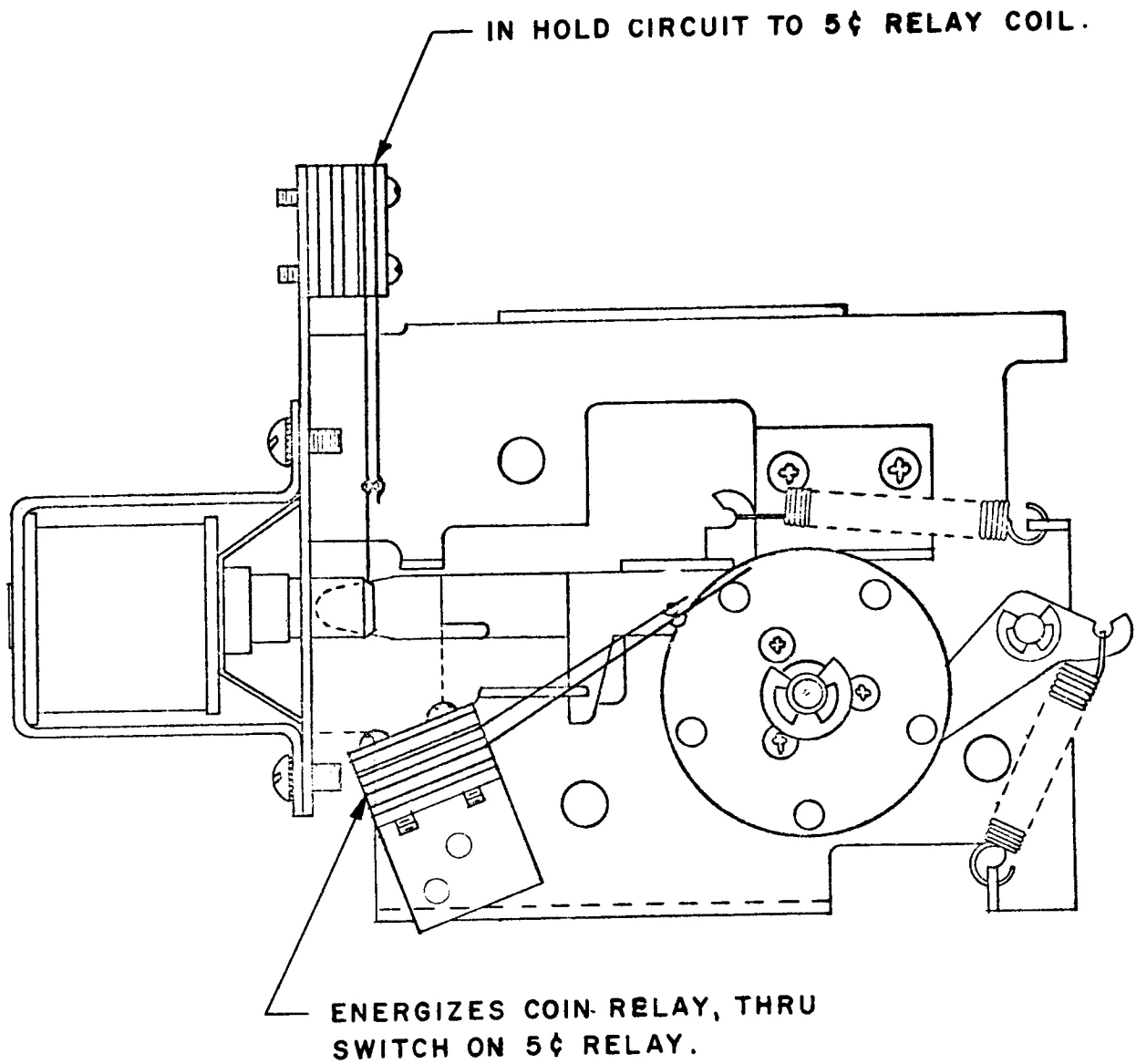
UNIT PARTS LIST

UNIT NAME	CONTACT DISC	WIPER ASSEMBLY	RATCHET GEAR ASSEMBLY	MOTORS
REPLAY	-----	-----	A-6400	
BALL COUNT	C-6932	C-6520	A-6402-5	
MATCH	C-6879	C-6520	A-6401	
TARGET ADVANCE	C-6417	C-6520	A-6401	14A 7805
HOLE ADVANCE	C-6417	C-6520	A-6402-9	(60 CYCLE)
PLAYER	C-6417	C-6521	A-6405-3	
COIN	C-6896	C-6520	A-6402-3	14A 7806
O-9	A-7195	A-6294	3C-7272	(50 CYCLE)
TENS	-----	-----	3C-7272	
HUNDREDS	A-7195	A-6294	3C-7272	
THOUSANDS	A-7195	A-6294	3C-7272	
ALTERNATOR	-----	-----	3C-7272	

ALTERNATOR UNIT

LOCATED ON MECHANISM PANEL.

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



"GAY 90's" 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
14 A 7805	SCORE MOTOR - 60 CYCLE	MECH. PANEL
14 A 7806	SCORE MOTOR - 50 CYCLE	MECH. PANEL
14 A 7745	SWINGING TARGET MOTOR (115 VOLTS)	PLAYFIELD
15 A 6771	TRANSFORMER - 60 CYCLE	MECH. PANEL
15 A 6773	TRANSFORMER - 50 CYCLE	MECH. PANEL
B 6396	PLAY METER (COIL XM 27-675)	MECH. PANEL

SOLENOID COILS

A 22-550	MATCH UNIT STEP UP	INSERT
	BALL RELEASE COIL	PLAYFIELD
	HOLE ADVANCE STEP UP	PLAYFIELD
	TARGET ADVANCE STEP UP	PLAYFIELD
	PLAYER UNIT STEP UP	INSERT
	COIN UNIT STEP UP	MECH. PANEL
A 23-600	BALL COUNT UNIT STEP UP	MECH. PANEL
	REPLAY UNIT STEP UP	INSERT
A2-23-750	LARGE BELL	CABINET
	KNOCKER	CABINET
B 26-800	SCORE DRUM UNIT ... (16 req'd.)	INSERT
	PLAYER UNIT RESET	INSERT
	REPLAY UNIT RESET	INSERT
	HOLE ADVANCE UNIT RESET	PLAYFIELD
	BALL COUNT UNIT RESET	MECH. PANEL
	COIN UNIT RESET	MECH. PANEL
	ALTERNATOR UNIT	MECH. PANEL
FL 21-375/ 28-400	FLIPPER COILS ... (2 req'd.)	PLAYFIELD
G 22-550	JET BUMPER COILS ... (3 req'd.)	PLAYFIELD
	DROP TARGET COILS ... (2 req'd.)	PLAYFIELD
G 23-650	EJECT COIL	PLAYFIELD
G 23-600	SHOOTER COIL	PLAYFIELD
G 23-750	KICKER COILS ... (2 req'd.)	PLAYFIELD
	DISAPPEARING POST (LATCH COIL)	PLAYFIELD

RELAY COILS

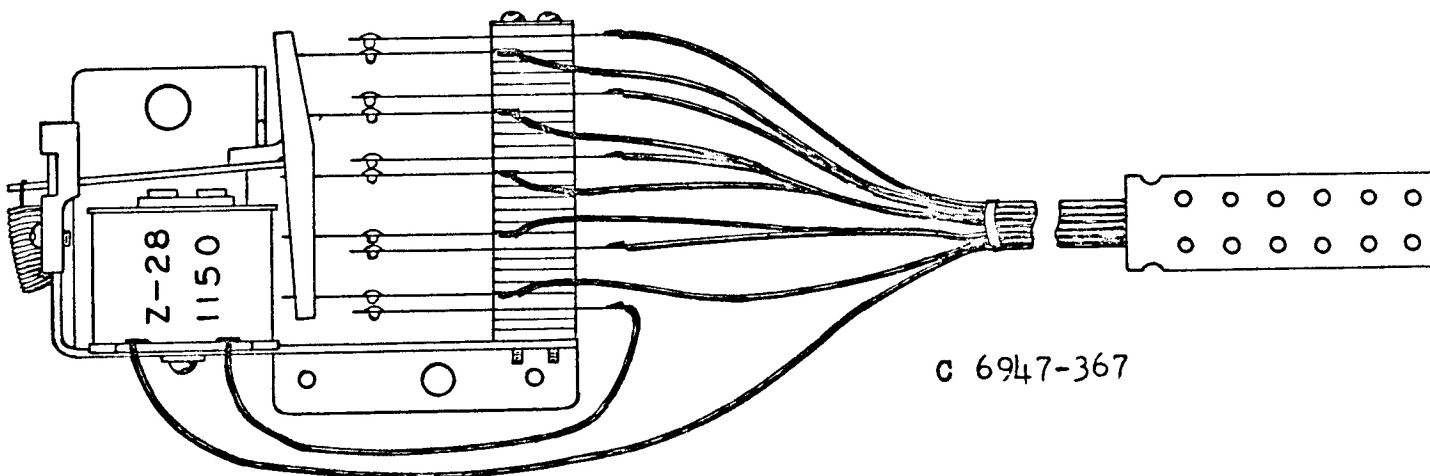
M1-31-1500	COIN LOCKOUT	DOOR
M 30-1400	SPECIAL RELAY	PLAYFIELD
M 29-1000	DISAPPEARING POST (TRIP)	PLAYFIELD
	GAME OVER (TRIP)	MECH. PANEL
	1st & 2nd SCORE RESET RELAY	INSERT
	3rd & 4th SCORE RESET RELAY	INSERT
M 29-1100	1 POINT RELAY	INSERT
	10 POINT RELAY	INSERT
	100 POINT RELAY	INSERT
	5¢ RELAY	MECH. PANEL
	10¢ RELAY	MECH. PANEL
	25¢ RELAY	MECH. PANEL
	200 RELAY	PLAYFIELD
	POST RELAY	PLAYFIELD
	ADVANCE RELAY	PLAYFIELD
	SHOOTER RELAY	PLAYFIELD
	CENTER TARGET RELAY	PLAYFIELD
	NO. 1 BUMPER RELAY	PLAYFIELD
	NO. 2 BUMPER RELAY	PLAYFIELD
	NO. 3 BUMPER RELAY	PLAYFIELD
Z 27-1000	PLAYER RESET RELAY	MECH. PANEL
	OUTHOLE RELAY	MECH. PANEL
	RESET RELAY	MECH. PANEL
	REPLAY RELAY	MECH. PANEL
	EJECT RELAY	MECH. PANEL
	GAME OVER RELAY (LATCH)	MECH. PANEL
	COIN RELAY	MECH. PANEL
Z 28-1150	TILT RELAY	MECH. PANEL
	LOCK RELAY	MECH. PANEL
	LEFT GATE RELAY	PLAYFIELD
	RIGHT GATE RELAY	PLAYFIELD
Z 28-1200	BALL INDEX RELAY	MECH. PANEL

"GAY 90'S"

"EXTRA BALL" RELAY ASSEMBLY INSTALLATION

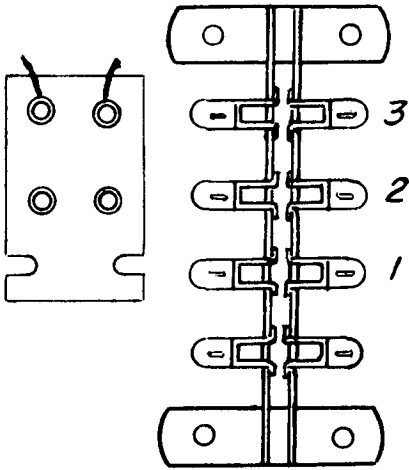
(AVAILABLE ON REQUEST)

1. SET NUMBER MATCH "ON-OFF" SWITCH (LOCATED IN BACK BOX) TO THE "OFF" POSITION.
2. REMOVE THE NUMBERED REEL FROM THE REPLAY UNIT AND APPLY THE REPLAY WINDOW MASK.
3. MOUNT THE EXTRA BALL RELAY NEXT TO PLAYER RESET RELAY. REMOVE SHORTING PLUG FROM 12-WAY SOCKET AND INSERT PLUG FROM EXTRA BALL RELAY ASSEMBLY. RETAIN SHORTING PLUG AND NUMBERED REEL FOR FUTURE USE IF GAME IS CONVERTED TO REPLAY FEATURE.
4. REMOVE SCORE CARDS FROM BOTTOM ARCH AND REPLACE WITH APPROPRIATE "EB", EXTRA BALL, CARDS.
5. THE GAME IS NOW READY FOR CHECKOUT. AN EXTRA BALL WILL BE GIVEN IN PLACE OF REPLAYS. A MAXIMUM OF ONE EXTRA BALL FOR EACH BALL BEING PLAYED. WHEN EXTRA BALL IS MADE, A LITE AT THE BOTTOM OF GAME INDICATES "SAME PLAYER SHOOTS AGAIN". A LITE IN THE BACK BOX ALSO LITES, LITING UP "SAME PLAYER SHOOTS AGAIN".
6. GAMES EQUIPPED WITH DOUBLE COIN CHUTE AND 25¢ RELAY WILL NOT BE AFFECTED BY THE CONVERSION. CREDITS FOR THE 25¢ COIN WILL BE ADDED IN THE CONVENTIONAL MANNER.
7. WHEN ORDERING "EXTRA BALL" RELAY KIT, ORDER BY PART NO. C 6947-367.
8. SUGGESTED SCORE CARDS:
5 BALL PLAY - 367 EB-1 3 BALL PLAY - 367 EB-2
9. "200" HOLE SPECIAL.



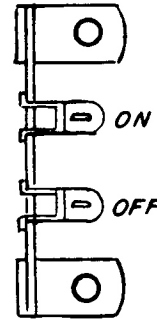
ADJUSTMENTS ON MECHANISM PANEL

10¢ Adjustment



PROVIDES
1, 2 OR
3 PLAYS
FOR ONE
COIN.

Motor Service Jack

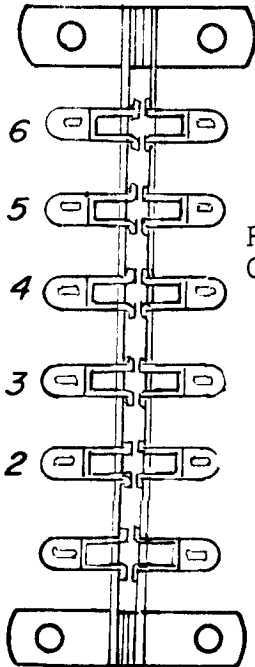


INSERT PHONE TIP IN
'OFF' POSITION - CAMS
CAN BE TURNED BY
HAND TO CHECK

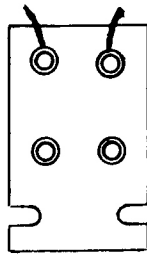


ADJUSTMENT OF
SWITCHES.

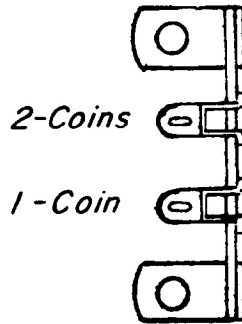
25¢ Adjustment



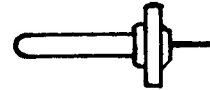
PROVIDES 2, 3, 4, 5
OR 6 PLAYS FOR 25¢.



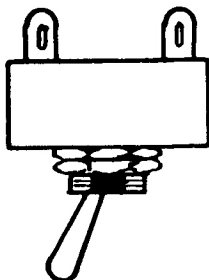
5¢ Adjustment



IN "2 COINS FOR 1
PLAY", CIRCUIT TO
COIN RELAY PASSES
THRU
SWITCH
ON ALTER-
NATOR
UNIT.



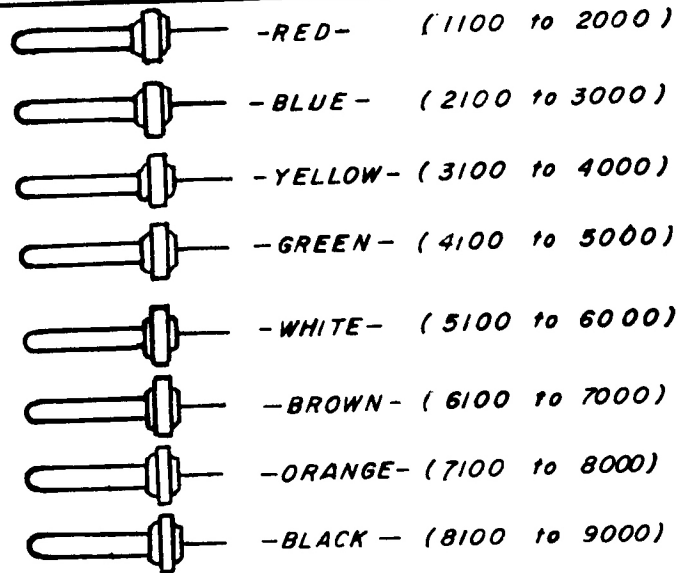
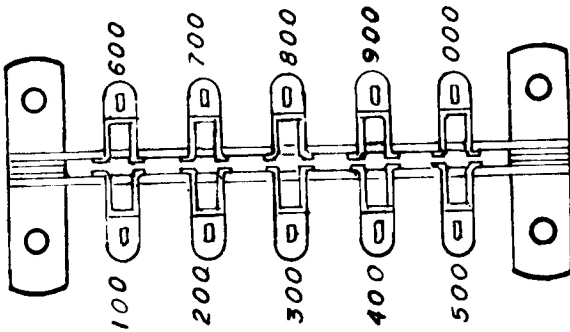
Located under front of Cabinet



Master On-Off Switch

CONTROLS POWER TO
TRANSFORMER

ADJUSTMENTS IN BACKBOX

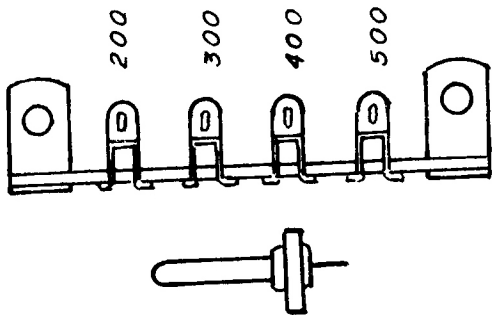


HI-Score Adjustment

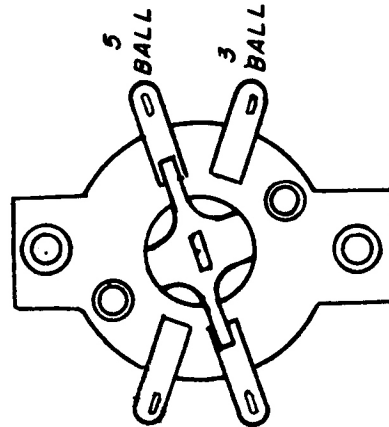
Insert plugs into 10 Point Female at desired positions.

Examples:

Yellow wire into 300 position scores at 3300.
 Yellow wire into 000 position scores at 4000.



EJECT HOLE WILL LITE FOR "SPECIAL" AT 200, 300, 400 OR 500.

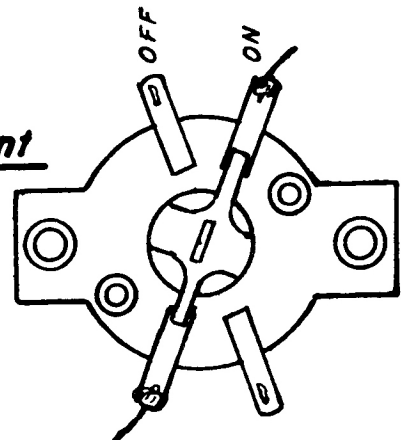


No. of Balls Adjustment

This switch changes 3 Ball to 5 Ball play, or vice versa.

Number Match Adjustment

In "ON" position, number match lite will appear when game is over. This number will match the last number in point score, on the average, once every ten games. In "OFF" position, Number Match is inoperative.



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.

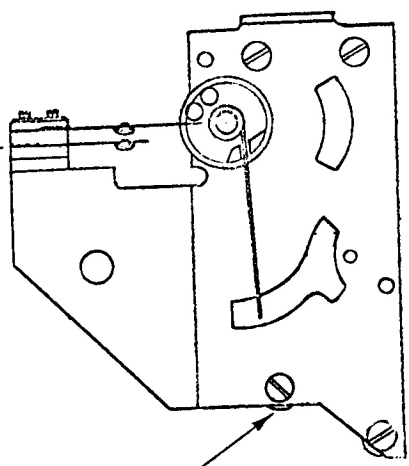
STEP-UP Levers, Ratchets, Cams, Shafts and other sliding or oscillating parts should be very lightly greased with special Coin Machine Lubricant (supplied with machine) not oftener than every six months. The bakelite discs (biscuits) on the Motor Units and Step-up Units will require lubrication with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

4. RELAY and SWITCH ADJUSTMENT

Where relay adjustments are called for, before bending blades, in all cases, on any machine, make certain that the screws holding the switch stacks are down very tightly. This is suggested because the plastic spacers in the switch stacks have occasionally shrunk by drying out, causing a poor adjustment.

- CONVERTING FROM (10¢-25¢) PLAY TO (2/25¢ - 2/25¢) PLAY
- REPLACE 10¢ COIN CHUTE WITH 25¢ COIN CHUTE.
- REPLACE 10¢ COIN INSERT PLATE WITH (1A-421S) 25¢ COIN INSERT PLATE.
- REPLACE 10¢ IDENTIFICATION PLATE WITH (16C-8640-100) 2 PLAYS-QUARTER.
- REPLACE 10¢ COIN SWITCH WITH 25¢ COIN SWITCH (3M-3)



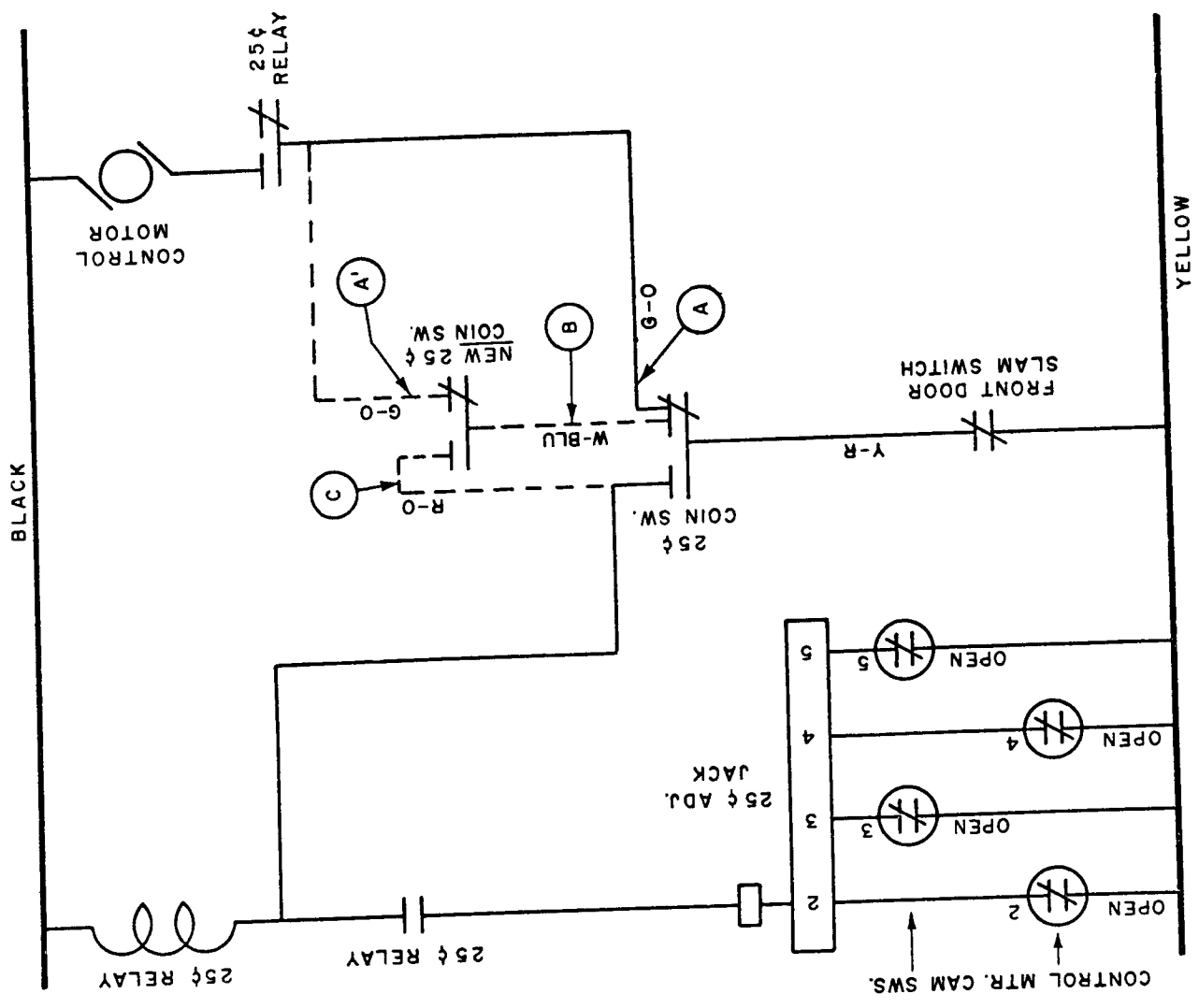
REMOVE MACHINE SCREW AND SPACER IN "COIN TRIP AND SWITCH ASSEMBLY" B-6853, TO ALLOW QUARTER TO PASS THRU.

B-6853 COIN TRIP & SWITCH ASS'Y.

- TO CONVERT FROM (5¢ 5¢ - 10¢ - 25¢) TO (2/25¢ - 2/25¢)
- REPLACE (5¢ 5¢) COIN TRIP AND SWITCH ASSEMBLY WITH B-6853 (10¢) COIN TRIP AND SWITCH ASSEMBLY.
- REPLACE 5¢ COIN CHUTE WITH 25¢ COIN CHUTE.
- REPLACE 5¢ COIN INSERT PLATE WITH (1A-421S) 25¢ COIN INSERT PLATE.
- REPLACE 5¢ IDENTIFICATION PLATE WITH (16C-8640-100) 2 PLAYS - QUARTER.
- MAKE CHANGES ON B-6853 "COIN TRIP AND SWITCH ASSEMBLY" AS SHOWN ABOVE.
- USE PART NO. 16A-8636 (DUMMY COIN ENTRY COVER) ON CENTER CHUTE.

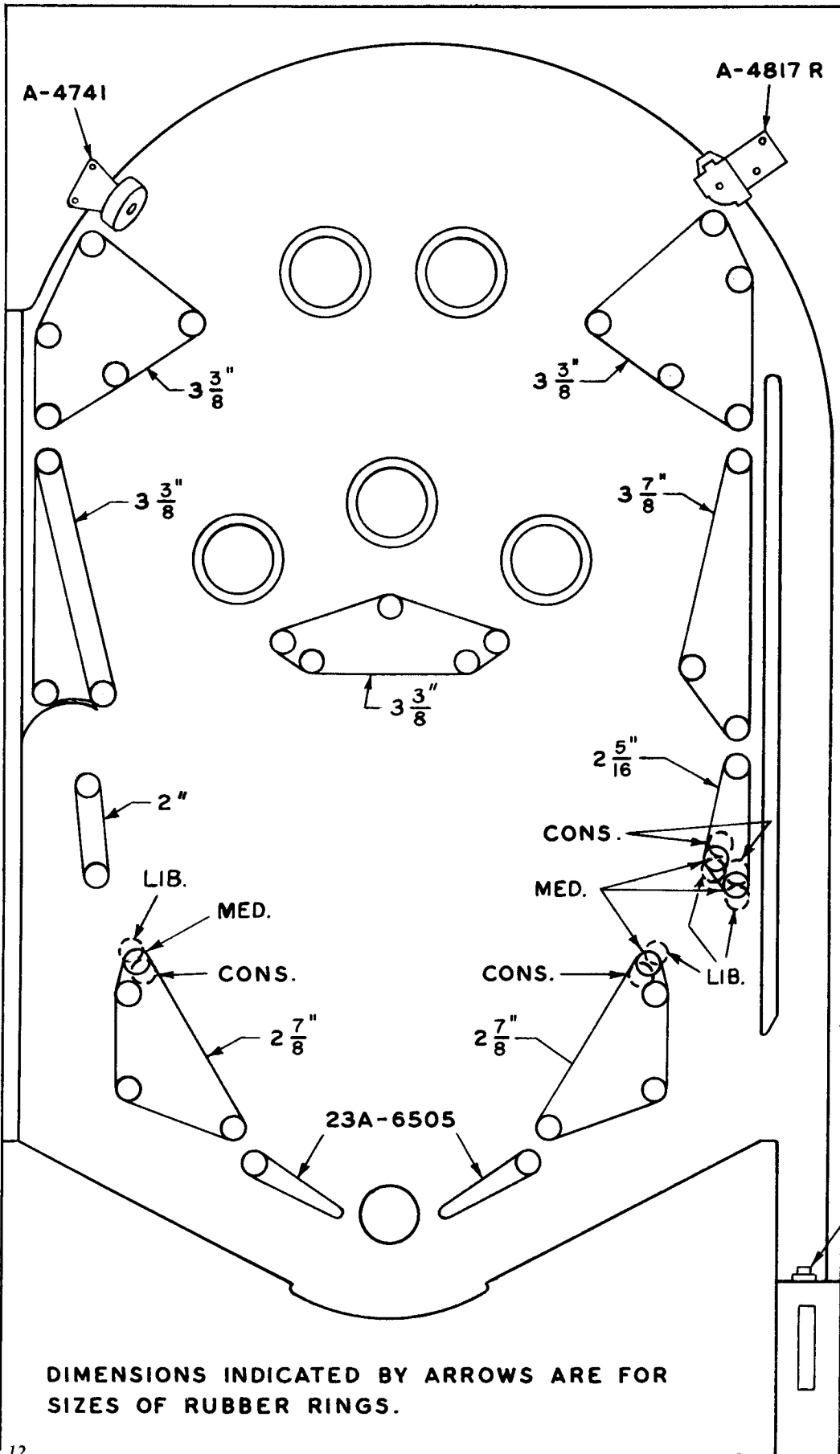
WIRING INSTRUCTIONS

- AT ORIGINAL 25¢ COIN SWITCH, UNSOLDER GREEN-ORANGE WIRE (A) AND TAPE IT. REMOVE TAPE FROM WHITE-BLUE WIRE AND SOLDER IN ITS PLACE.
- AT NEW 25¢ COIN SWITCH, REMOVE TAPE FROM GREEN-ORANGE, WHITE-BLUE AND RED-ORANGE WIRES AND SOLDER AS SHOWN BY DOTTED LINES (A), (B) AND (C).
- INSERT 25¢ ADJUSTMENT JACK INTO "2 PLAYS FOR QUARTER" POSITION.



"GAY 90'S — POST ADJUSTMENT SHEET

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



ABBREVIATIONS :

CONS.-CONSERVATIVE

LIB. - LIBERAL

MED.- MEDIUM

RUBBER RING NUMBERS :

23A-6300	5/16" 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-6309	3 7/8" 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.

"GAY 90'S"

VALUE OF EJECT HOLE IS SHOWN BY "HOLE SCORES" LITES. THESE LITES ARE CONTROLLED BY HOLE ADVANCE UNIT. MAKING TOP CENTER ROLLOVER BUTTON OR HITTING CENTER TARGET WILL ENERGIZE CENTER TARGET RELAY. SWITCHES ON CENTER TARGET RELAY WILL:

- 1.) RUN SCORE MOTOR.
- 2.) PULSE 100 POINT RELAY AT CAM SWITCH 1A.
- 3.) ENERGIZE LEFT GATE RELAY, RIGHT GATE RELAY, OR HOLE ADVANCE S.U. COIL, DEPENDING ON POSITION OF TARGET ADVANCE UNIT.

TARGET ADVANCE UNIT DISC CONTROLS CENTER TARGET LITES, WHICH ARE IN PARALLEL WITH TOP CENTER ROLLOVER BUTTON LITES.

"SPECIAL" LITE, ADJACENT TO EJECT HOLE, IS LIT WHEN SPECIAL RELAY IS ENERGIZED. THIS RELAY WILL ENERGIZE WHEN "HOLE SCORES" LITES ADVANCE TO 200, 300, 400 OR 500, DEPENDING ON POSITION OF ADJUSTMENT JACK. THE END-OF-STROKE SWITCH ON HOLE ADVANCE UNIT IS INCLUDED IN THAT CIRCUIT.

BALL MAKING EJECT SWITCH WILL ENERGIZE EJECT RELAY. THIS RELAY REMAINS LOCKED-IN UNTIL HOLE ADVANCE UNIT ZERO SWITCH OPENS, AND CAM SWITCH 5B OPENS. A REPLAY IS SCORED AT CAM SWITCH 1A, WHEN EJECT RELAY AND SPECIAL RELAY ARE BOTH ENERGIZED.

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.

SUGGESTED SCORE CARDS,

5 Ball Play - 367-21

3 Ball Play - 367-3

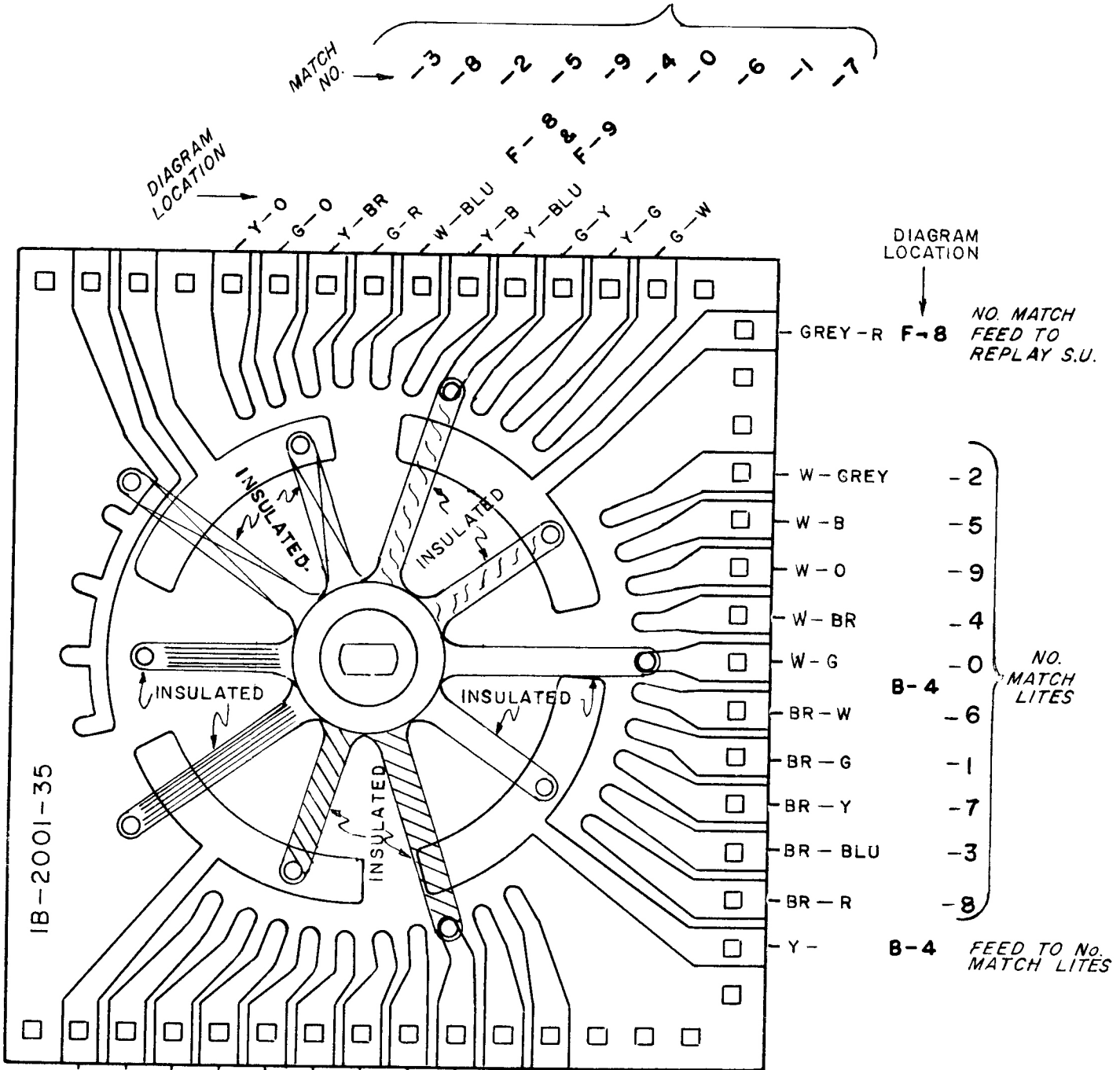
SET EJECT HOLE SPECIAL AT 300.

No. MATCH UNIT

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

View looking at
WIPER FINGER side

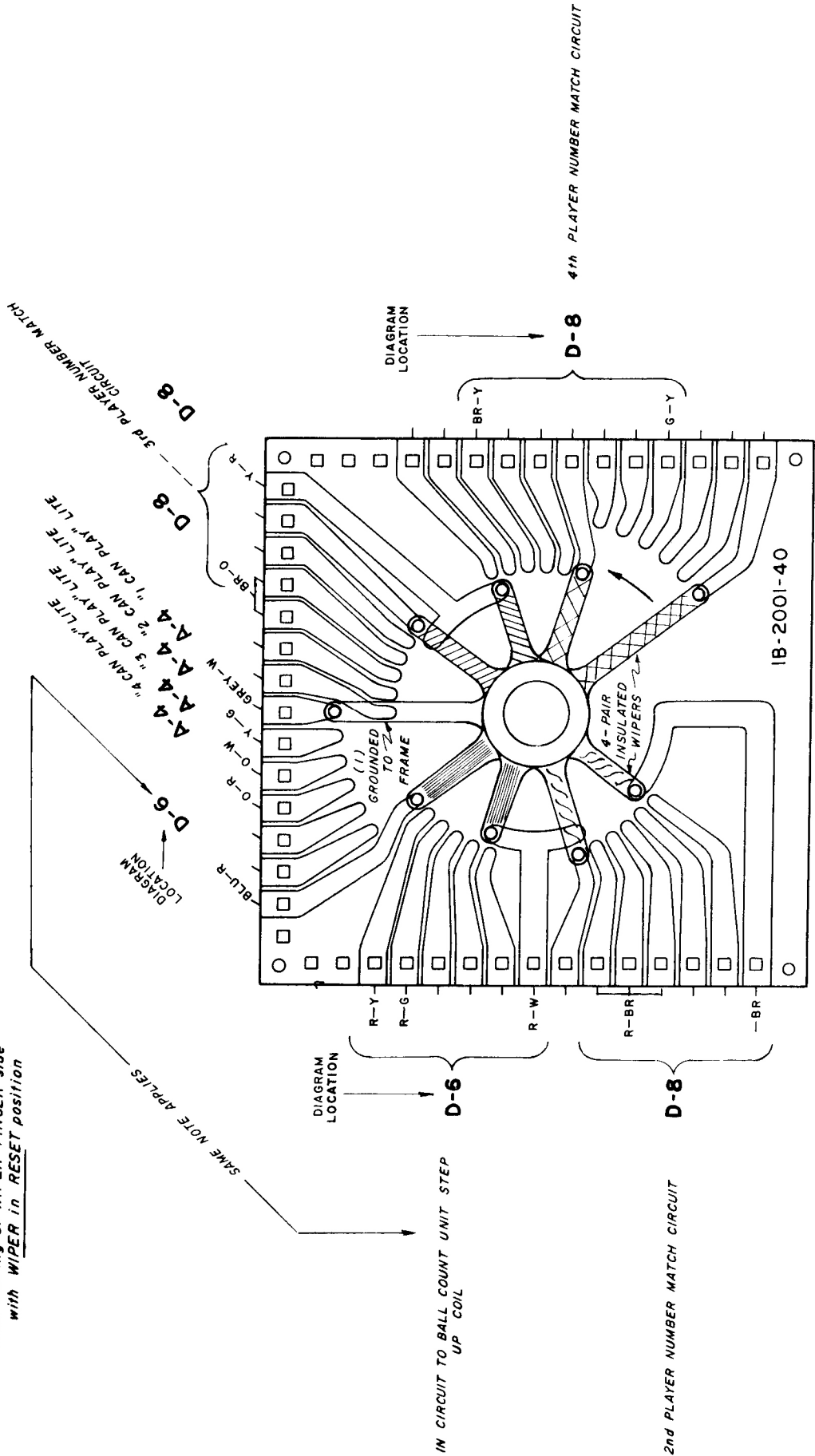
IN No. MATCH CIRCUIT
THESE WIRES COME FROM
THE 1-PT. D.U. DISC OF
ALL FOUR PLAYERS.



COIN S. U. DISC

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

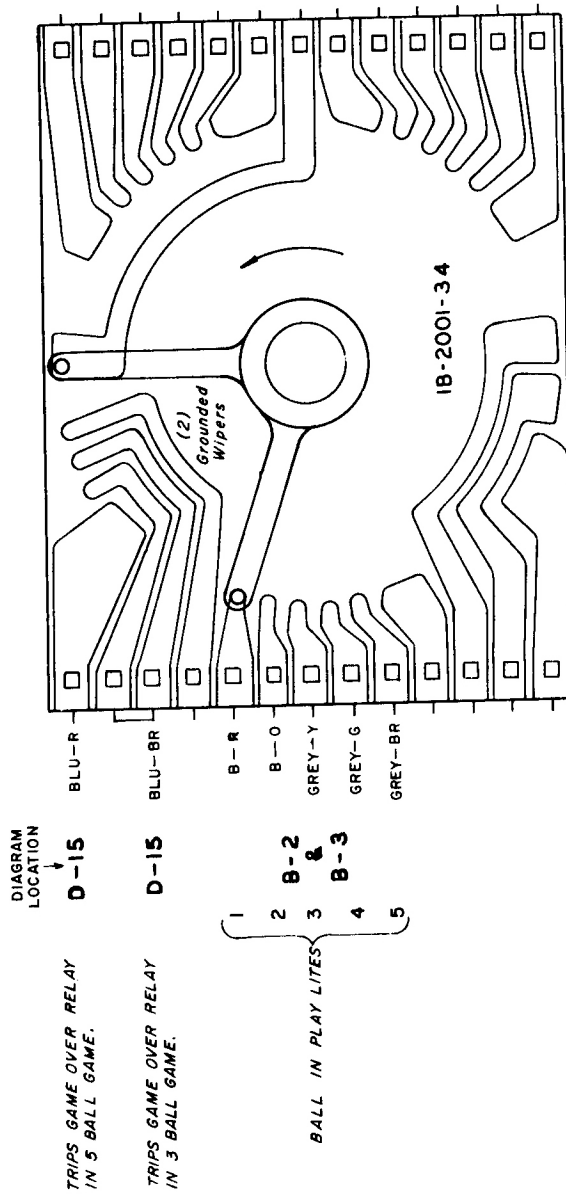
View looking at WIPER FINGER side
with WIPER in RESET position



BALL COUNT UNIT DISC

THIS UNIT RESET AT THE START OF A NEW GAME, (DURING RESET CYCLE). IT ADVANCES ONE STEP EACH TIME THE LAST PLAYER COMPLETES HIS TURN.

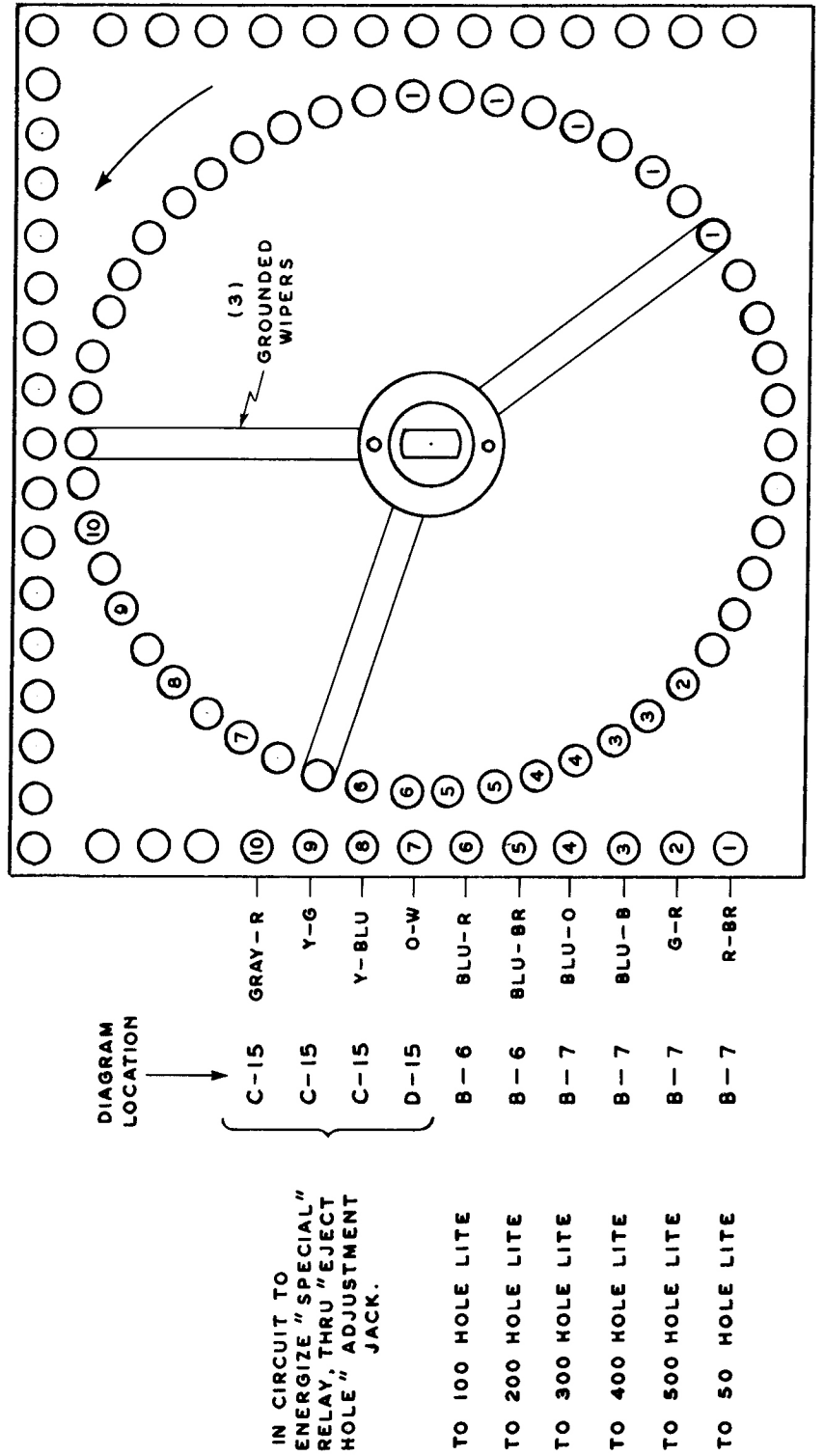
*View looking at WIPER FINGER side
with WIPER in ZERO position.*



HOLE ADVANCE UNIT

THE S. U. COIL IS ENERGIZED BY SWITCH ON CENTER TARGET RELAY, THRU TARGET ADVANCE S. U. DISC. IT IS ALSO PULSED BY 200 RELAY. THIS UNIT RESETS, ONE STEP AT A TIME, BY SWITCH ON OUTHOLE RELAY, RESET RELAY, OR EJECT RELAY.

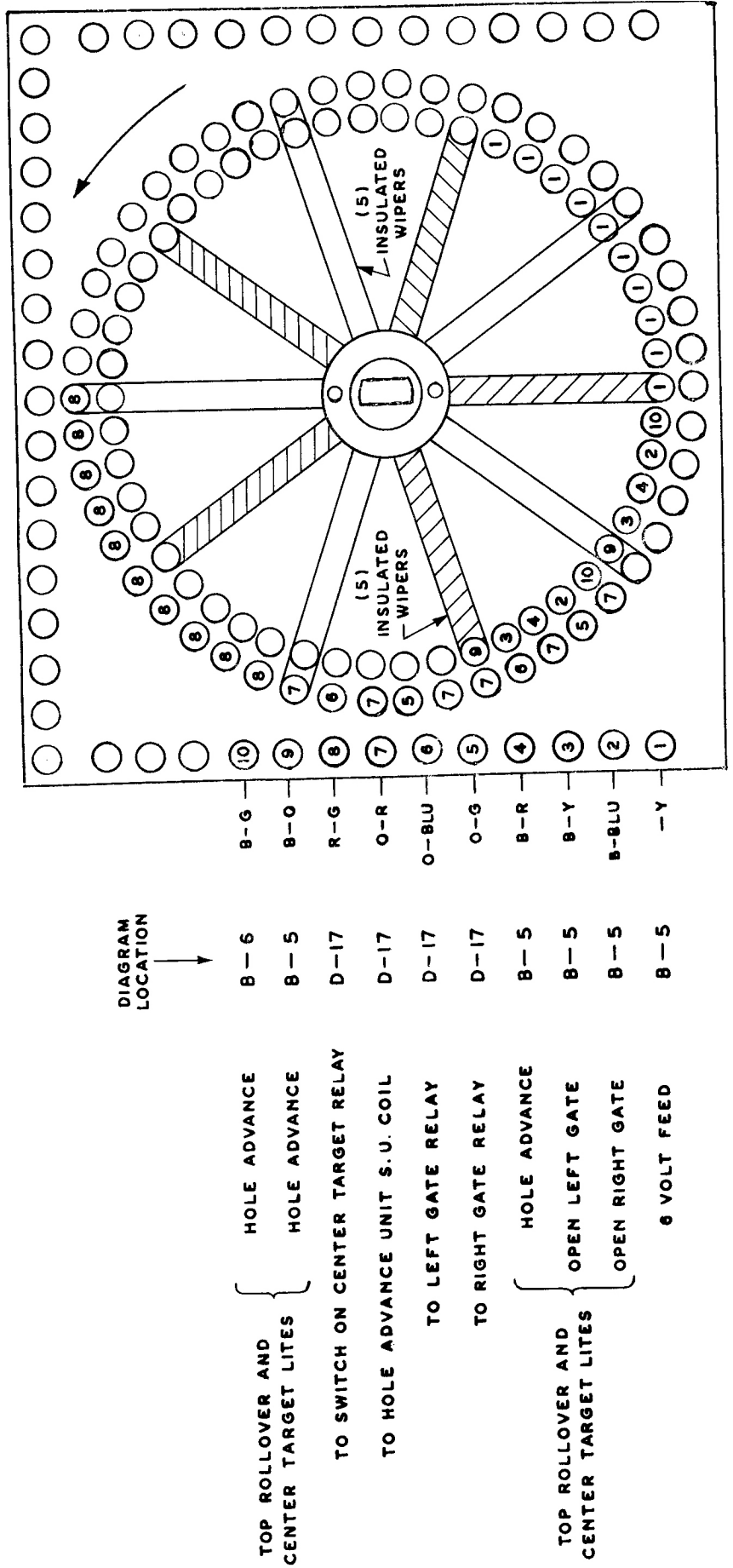
VIEW LOOKING AT WIPER FINGERS
SIDE WITH WIPERS IN ZERO POSITION.



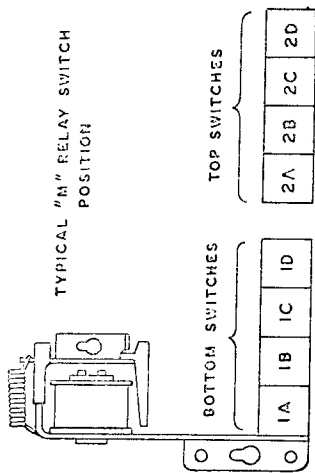
TARGET ADVANCE DISC

THIS IS A CONTINUOUS STEPPING UNIT. IT ADVANCES ONE STEP EACH TIME THE ADVANCE RELAY IS PULSED.

VIEW LOOKING AT WIPER FINGER SIDE.

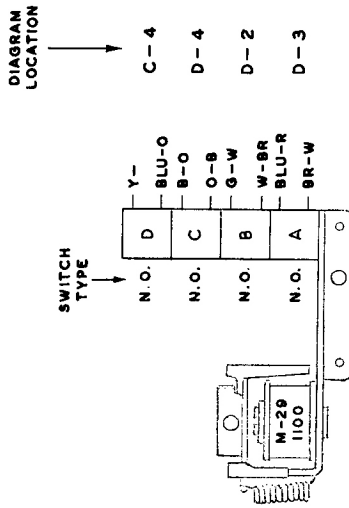


A. C. RELAYS & SWITCHES (ON MECHANISM PANEL)



5¢ RELAY

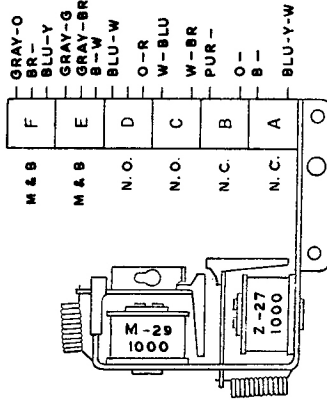
IS ENERGIZED BY 5¢ COIN SWITCH. THIS RELAY IS USED IN GAMES THAT HAVE AN ALTERNATOR UNIT.



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

GAME OVER RELAY (INTERLOCK)

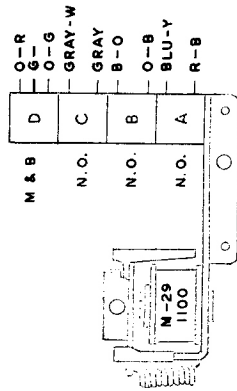
LATCH COIL IS PULSED BY SCORE MOTOR CAM SWITCH 1C. THRU SWITCHES ON COIN RELAY AND RESET RELAY.
TRIP COIL IS PULSED BY WIPER FINGERS ON BALL COUNT UNIT OR BY SWITCH D ON LOCK RELAY. ALSO, DURING RESET CYCLE, BY SWITCH C ON COIN RELAY.



OPENS TO PLAYER UP LITES AND CLOSSES TO GAME-OVER AND NO. MATCH LITES.
OPENS IN HI-SCORE CIRCUIT AND CLOSSES IN NO. MATCH CIRCUIT TO REPLAY STEP-UP COIL.
ENERGIZES RESET RELAY, THRU SWITCH ON COIN RELAY.
IN CIRCUIT TO REPLAY RELAY.
RUNS TARGET MOTOR (110VOLTS)
OPENS CIRCUIT TO ALL PLAYFIELD SWITCHES EXCEPT EJECT HOLE SWITCH.

10¢ RELAY

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

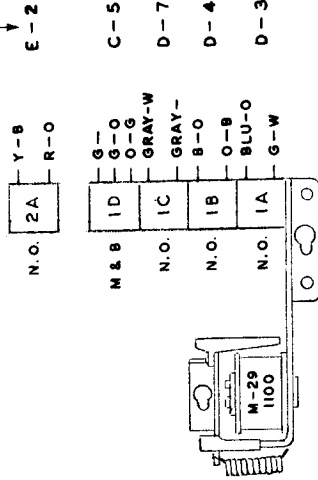


IN CIRCUIT TO KNOCKER COIL---ALSO RUNS SCORE MOTOR.
PULSES REPLAY S.U. COIL, THRU IMPULSE CAM SWITCH B.
ENERGIZES LOCK RELAY.
IN HOLD CIRCUIT TO THIS RELAY.

25¢ RELAY

IS ENERGIZED BY 25¢ COIN SWITCH.

DIAGRAM
LOCATION



IN HOLD CIRCUIT TO THIS RELAY.

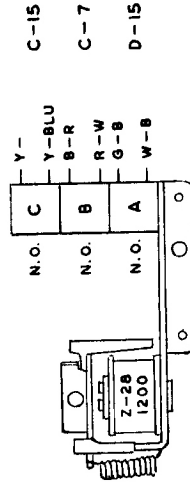
IN CIRCUIT TO KNOCKER COIL---ALSO RUNS SCORE MOTOR.
PULSES REPLAY S.U. COIL, THRU IMPULSE CAM SWITCH B.

ENERGIZES LOCK RELAY.

ENERGIZES COIN RELAY IF ADJUSTMENT JACK IS IN "6 PLAYS FOR 25¢".

BALL INDEX RELAY

IS ENERGIZED BY SWITCH D ON TILT RELAY. IT IS ALSO ENERGIZED BY 1 POINT, 10 POINT OR 100 POINT RELAY.



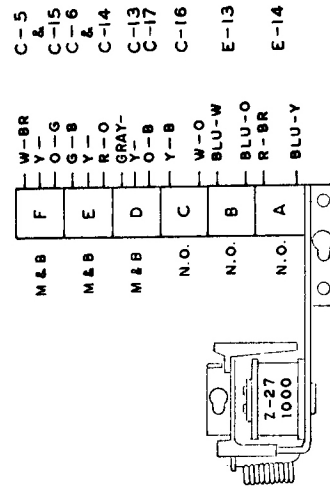
IN CIRCUIT TO EXTRA BALL RELAY.

IN SERIES WITH SWITCH C ON PLAYER RESET RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

OUTHOLE RELAY

IS ENERGIZED BY OUTHOLE SWITCH.



OPENS IN HOLD CIRCUIT TO TILT RELAY AND CLOSSES TO RUN SCORE MOTOR.

IN HOLD CIRCUIT TO BALL INDEX RELAY; CLOSSES IN SERIES WITH SW. B ON BALL INDEX RELAY.

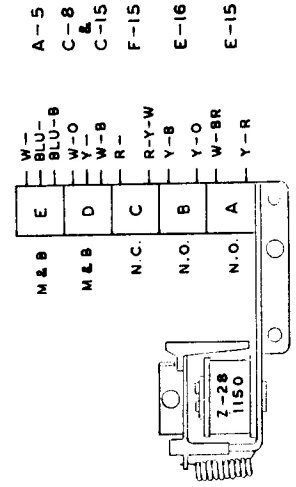
OPENS IN HOLD CIRCUIT TO LEFT GATE RELAY AND CLOSSES IN CIRCUIT TO PULSE RESET COIL ON HOLE ADVANCE UNIT. TO "DOWN POST" COIL.

PULSES BALL RELEASE COIL AT CAM SWITCH 3A.

IN HOLD CIRCUIT TO THIS RELAY.

TILT RELAY

IS ENERGIZED BY TILT SWITCHES.



OPENS CIRCUIT TO PLAYFIELD LITES AND CLOSSES TO TILT LITE.

OPENS IN HI-SCORE CIRCUIT AND CLOSSES TO BALL INDEX RELAY.

OPENS CIRCUITS TO ALL PLAYFIELD SWITCHES EXCEPT OUTHOLE AND EJECT.

TO "DOWN POST" COIL.

IN HOLD CIRCUIT TO THIS RELAY.

PLAYER RESET RELAY

IS ENERGIZED BY BALL COUNT UNIT END-OF-STROKE SWITCH.

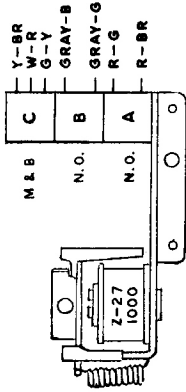
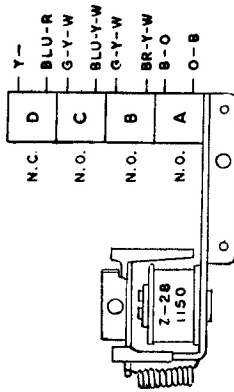


DIAGRAM LOCATION

D-7
OPENS TO PLAYER UNIT S.U. COIL AND CLOSES TO PLAYER UNIT RESET COIL.
F-8
IN NUMBER MATCH CIRCUIT TO REPLAY S.U. COIL.
D-7
IN HOLD CIRCUIT TO THIS RELAY.

LOCK RELAY

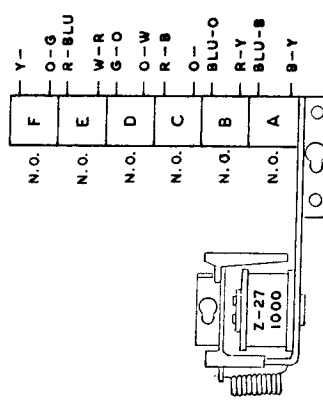
IS ENERGIZED BY 5¢ RELAY, 10¢ RELAY, 25¢ RELAY, COIN RELAY OR LEFT FLIPPER BUTTON



C-15
ENERGIZES GAME-OVER RELAY (TRIP COIL).
A-2
6 VOLTS FROM TRANSFORMER TO LITES.
A-1
6 VOLTS FROM TRANSFORMER TO LITES.
D-4
IN HOLD CIRCUIT TO THIS RELAY.

EJECT RELAY

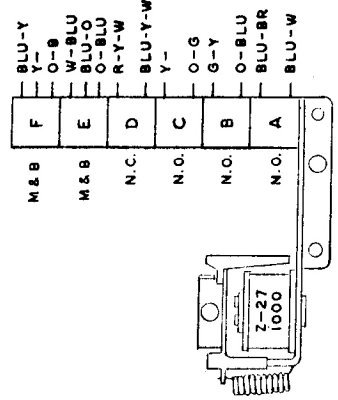
IS ENERGIZED BY EJECT HOLE SWITCH, THRU INDEX CAM SWITCH C.



C-5
RUNS SCORE MOTOR.
E-17
IN CIRCUIT TO PULSE 10 POINT RELAY.
E-13
TO RESET COIL ON HOLE ADVANCE UNIT.
D-17
ENERGIZES REPLAY S.U. COIL, THRU SWITCH ON SPECIAL RELAY.
E-13
IN CIRCUIT TO PULSE EJECT COIL.
D-13
IN HOLD CIRCUIT TO THIS RELAY.

RESET RELAY

IS ENERGIZED BY SWITCH D ON COIN RELAY, THRU SWITCH D ON GAME-OVER RELAY. IT IS THEN HELD IN UNTIL ALL (16) SCORING DRUMS RESET TO ZERO AND SCORE MOTOR REACHES INDEX POSITION.



C-3
&
C-13
OPENS IN CIRCUIT THRU REPLAY BUTTON AND CLOSES TO RESET COIL OF HOLE ADVANCE UNIT.
E-6
ENERGIZES RESET COILS ON BALL COUNT AND COIN UNITS, THRU SWITCH D ON COIN RELAY.
F-14
IN SERIES WITH SWITCH A ON GAME-OVER RELAY.
D-5
RUNS SCORE MOTOR.
E-7
IN CIRCUIT TO RESET COIL ON PLAYER UNIT.
D-6
IN HOLD CIRCUIT TO THIS RELAY, THRU (16) DRUM UNIT ZERO POSITION SWITCHES.

REPLAY RELAY

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

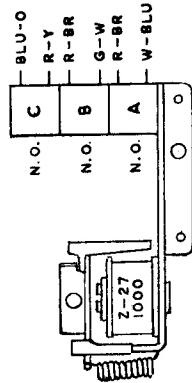
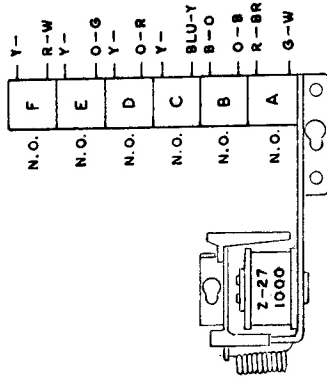


DIAGRAM LOCATION

E-6 TO RESET COIL ON REPLAY UNIT.
 D-3 ENERGIZES COIN RELAY.
 D-3 IN HOLD CIRCUIT TO THIS RELAY.

COIN RELAY

IS ENERGIZED BY COIN SWITCH OR BY REPLAY RELAY.

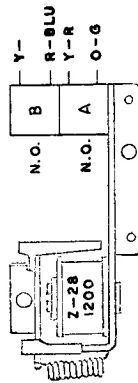


E-14 ENERGIZES "A" AND "B" TARGET COILS.
 C-5 RUNS SCORE MOTOR.
 C-6 IN SERIES WITH SWITCH D ON GAME-OVER RELAY.
 C-15 IN CIRCUIT TO GAME-OVER RELAY (TRIP COIL).
 D-4 ENERGIZES LOCK RELAY.
 D-3 IN HOLD CIRCUIT TO THIS RELAY.

RIGHT GATE RELAY

IS ENERGIZED BY SWITCH C ON CENTER TARGET RELAY, THRU TARGET ADVANCE S.U. DISC.

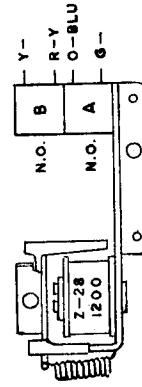
LOCATED ON PLAYFIELD



B-8 TO RIGHT GATE LITE.
 D-17 IN HOLD CIRCUIT TO THIS RELAY.

LEFT GATE RELAY

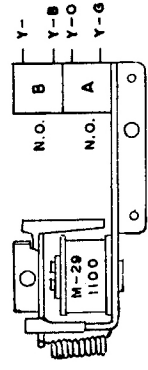
IS ENERGIZED BY SWITCH C ON CENTER TARGET RELAY, THRU TARGET ADVANCE S.U. DISC.



B-7 TO LEFT GATE LITE.
 D-17 IN HOLD CIRCUIT TO THIS RELAY.

POST RELAY

IS ENERGIZED BY LEFT SIDE OR RIGHT SIDE STANDUP SWITCHES.



C-16 ENERGIZES "DOWN POST" COIL.
 E-16 IN HOLD CIRCUIT TO THIS RELAY.

NO. 3 BUMPER RELAY

IS ENERGIZED BY RIGHT JET BUMPER SWITCH.

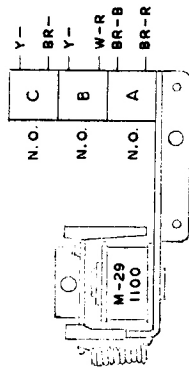
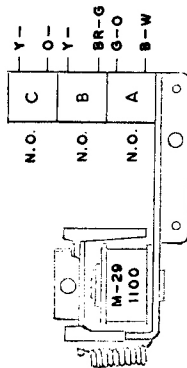


DIAGRAM LOCATION

C-5 ENERGIZES RIGHT JET BUMPER COIL.
 C-18 PULSES 10 POINT RELAY.
 E-19 IN HOLD CIRCUIT TO THIS RELAY.

NO. 2 BUMPER RELAY

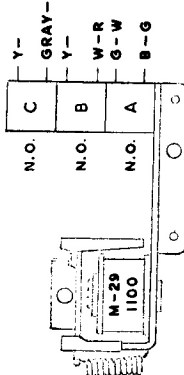
IS ENERGIZED BY CENTER JET BUMPER SWITCH.



C-4 ENERGIZES CENTER JET BUMPER COIL.
 C-18 PULSES 1 POINT OR 10 POINT RELAY.
 E-19 IN HOLD CIRCUIT TO THIS RELAY.

NO. 1 BUMPER RELAY

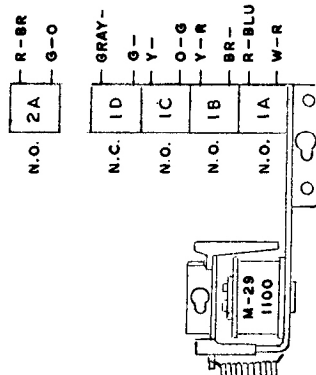
IS ENERGIZED BY LEFT JET BUMPER SWITCH.



C-4 ENERGIZES LEFT JET BUMPER COIL.
 C-18 PULSES 10 POINT RELAY.
 E-19 IN HOLD CIRCUIT TO THIS RELAY.

SHOOTER RELAY

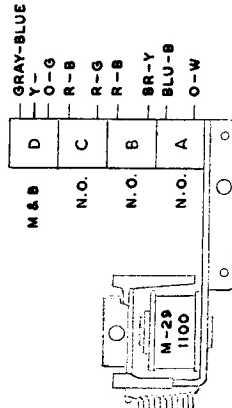
IS ENERGIZED WHEN BALL MAKES SHOOTER SWITCH (LOCATED AT LEFT BOTTOM OF PLAYFIELD).



C-13 IN HOLD CIRCUIT TO THIS RELAY.
 C-17 IN SERIES WITH SWITCH A ON LEFT GATE RELAY.
 D-5 RUNS SCORE MOTOR.
 C-13 ENERGIZES SHOOTER COIL AT CAM SWITCH 4B.
 E-17 PULSES 10 POINT RELAY.

CENTER TARGET RELAY

IS ENERGIZED BY TOP CENTER ROLLOVER BUTTON OR CENTER TARGET SWITCH.



C-5 & C-16 OPENS IN CIRCUIT TO ADVANCE RELAY, AND CLOSES TO RUN SCORE MOTOR.
 D-17 ENERGIZES LEFT OR RIGHT GATE RELAY, OR HOLE ADVANCE S.U.
 D-17 PULSES 100 POINT RELAY.
 E-16 IN HOLD CIRCUIT TO THIS RELAY.

SPECIAL RELAY

IS ENERGIZED BY END-OF-STROKE SWITCH ON HOLE ADVANCE UNIT AND WIPER FINGERS ON HOLE ADVANCE UNIT DISC.

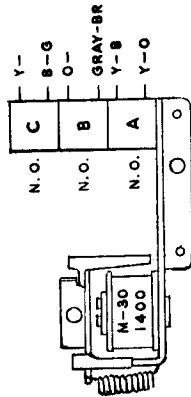


DIAGRAM LOCATION

TO "SPECIAL" LITE.

IN SERIES WITH SWITCH C ON EJECT RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

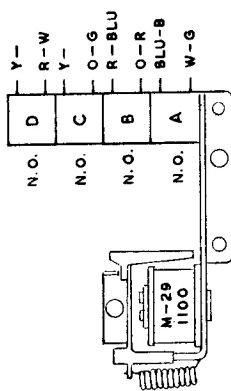
B-6

E-17

F-15

300 RELAY

IS ENERGIZED BY "A" AND "B" TARGET SWITCHES (IN SERIES).



ENERGIZES "A" AND "B" TARGET COILS.

RUNS SCORE MOTOR.

PULSES HOLE ADVANCE S.U. COIL.

IN HOLD CIRCUIT TO THIS RELAY.

E-14

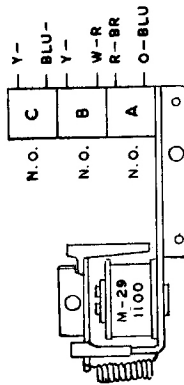
C-5

D-17

E-14

ADVANCE RELAY

IS ENERGIZED BY LEFT SIDE AND RIGHT SIDE STANDUP SWITCHES, AND BY (2) TOP BUMPER SWITCHES.



ENERGIZES TARGET ADVANCE S.U. COIL.

PULSES 10 POINT RELAY.

IN HOLD CIRCUIT TO THIS RELAY.

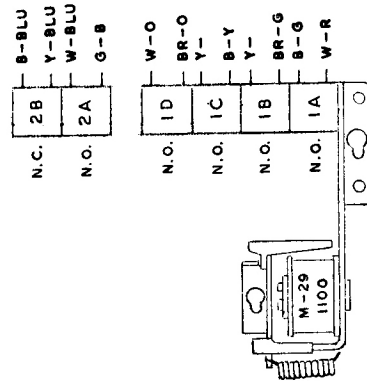
C-16

C-18

E-16

1 POINT RELAY

IS PULSED BY NO.2 BUMPER RELAY, STANDUP SWITCHES AND KICKER SWITCHES.



IN HOLD CIRCUIT TO EXTRA BALL RELAY (WHEN USED.)

IN HOLD CIRCUIT TO THIS RELAY.

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

ENERGIZES NUMBER MATCH S.U. COIL.

ENERGIZES BALL INDEX RELAY.

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

D-15

E-18

C-10

C-20

C-14

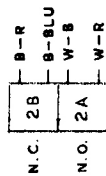
E-18

LOCATED IN BACKBOX

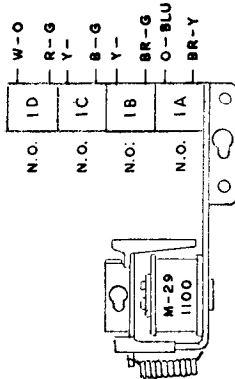
10 POINT RELAY

IS PULSED BY SHOOTER RELAY, EJECT RELAY AND NO.2 BUMPER RELAY.

DIAGRAM LOCATION



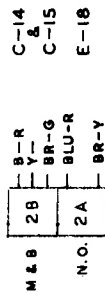
C-15 IN SERIES WITH SWITCH 2B ON 1 POINT RELAY.
E-18 IN HOLD CIRCUIT TO THIS RELAY.



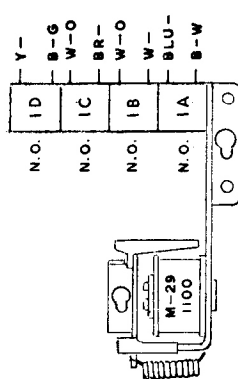
C-11 PULSES 10 POINT DRUM UNITS, THRU DISC ON PLAYER UNIT.
C-20 PULSES LARGE BELL COIL.
C-14 ENERGIZED BALL INDEX RELAY.
E-19 PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCHES ON 10 POINT DRUM UNITS.

100 POINT RELAY

IS PULSED BY LEFT SIDE, LEFT BOTTOM AND RIGHT BOTTOM ROLLERS, LEFT BOTTOM AND RELAY, AND END-OF-STROKE SWITCH ON HOLE ADVANCE UNIT.



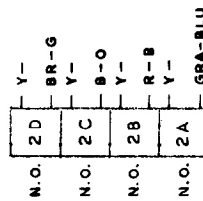
C-14 IN SERIES WITH SWITCH 2B ON 10 POINT RELAY--- ALSO ENERGIZES BALL INDEX RELAY.
E-18 IN HOLD CIRCUIT TO THIS RELAY.



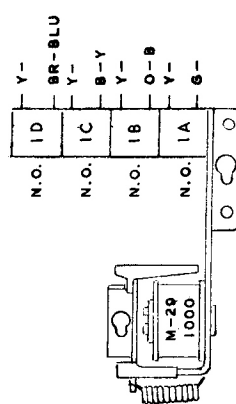
C-20 PULSES LARGE BELL COIL.
C-12 PULSES 1000 POINT DRUM UNITS, THRU 9TH POSITION SWITCHES ON 100 POINT DRUM UNITS.
C-11 PULSES 100 POINT DRUM UNITS, THRU DISC ON PLAYER UNIT.
F-8 IN HI-SCORE CIRCUIT TO REPLAY S.U. COIL.

1ST & 2ND SCORE RESET RELAY

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



E-12 2nd PLAYER 1000 POINT DRUM UNIT
E-11 2nd PLAYER 100 POINT DRUM UNIT
E-11 2nd PLAYER 10 POINT DRUM UNIT
E-10 2nd PLAYER 1 POINT DRUM UNIT



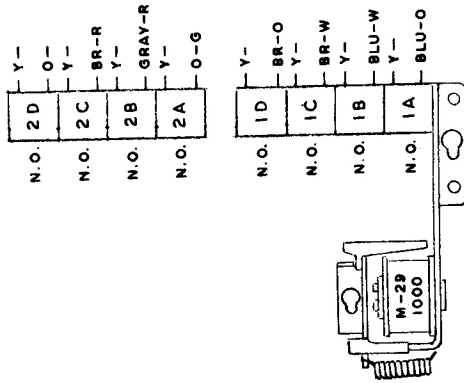
E-12 1st PLAYER 1000 POINT DRUM UNIT
E-11 1st PLAYER 100 POINT DRUM UNIT
E-11 1st PLAYER 10 POINT DRUM UNIT
E-10 1st PLAYER 1 POINT DRUM UNIT

THESE DRUM UNITS ARE PULSED, DURING RESET CYCLE, THRU ZERO SWITCH ON THAT UNIT.

3 RD & 4 TH SCORE RESET RELAY

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

DIAGRAM
LOCATION



E-12	4TH PLAYER 1000 POINT DRUM UNIT
E-12	4TH PLAYER 100 POINT DRUM UNIT
E-11	4TH PLAYER 10 POINT DRUM UNIT
E-11	4TH PLAYER 1 POINT DRUM UNIT
E-12	3RD PLAYER 1000 POINT DRUM UNIT
E-12	3RD PLAYER 100 POINT DRUM UNIT
E-11	3RD PLAYER 10 POINT DRUM UNIT
E-10	3RD PLAYER 1 POINT DRUM UNIT

THESE DRUM
UNITS ARE
PULSED,
DURING
RESET CYCLE,
THRU ZERO
SWITCH ON
THAT UNIT.

SUGGESTED TIPS FOR PEAK COLLECTIONS

1. CLEAN, NEAT EQUIPMENT:

- a. Playfields — clean semi-monthly or sooner if necessary.
- b. Cabinet — same as above.
- c. Glass — ask location to cooperate, clean daily.

2. PROPER WORKING EQUIPMENT:

- a. Replace lite bulbs if blown.
- b. Bring game into shop for periodical adjustment and thorough check-up.
- c. Rubbers — clean or replace often, keeps playfield live.

3. ROTATE GAMES:

- a. Cash box should indicate time for change, however eight weeks is the usual peak player interest.

Remember to keep player interest high - **Rotate, Rotate Rotate**. Playing games is a habit. Don't let your players lose it.

4. SERVICE:

This is your business; carry a good supply of replacement parts such as:

- | | |
|--------------|------------------------------|
| a. fuses | e. Springs |
| b. coils | f. Contact blades & tips |
| c. Rubbers | g. Step-up or actuating arms |
| d. Litebulbs | h. Proper Tools |

Games Out-of-order cannot earn money.

NOTES