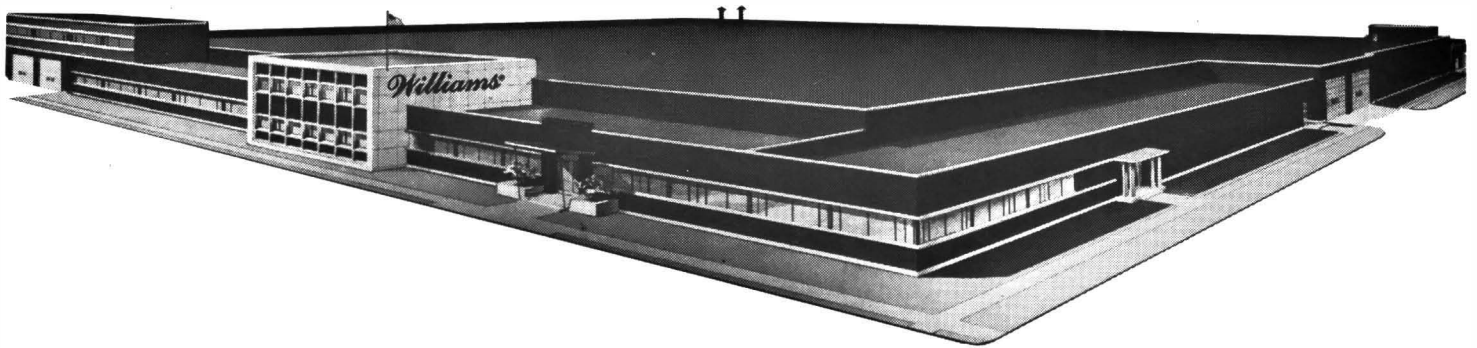


Instruction Manual

for

4 ACES



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

**3401 N. California Ave.
Phone 267-2240**

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

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.**

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	SCORE MOTOR 14A-7805 (60 CYCLE) 14A-7806 (50 CYCLE)
BALL COUNT	C-6878	C-6520	A-6402-10	
LEFT BONUS	C-6417	C-6520	A-6402-20	
RIGHT BONUS	C-6417	C-6520	A-6402-20	
CARD	C-6417	C-6520	A-6402-12	
1-9	-----	-----	3C-7272	
10-90	-----	-----	3C-7272	
100-900	A-7195	A-6294	3C-7272	
1000-9000	A-7195	A-6294	3C-7272	

"4 ACES" COIL & MOTOR 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
15 A 6771-1	TRANSFORMER - 60 CYCLE	MECH. PANEL
15 A 6782	TRANSFORMER - 50 CYCLE	MECH. PANEL
B 6396	24 VOLT METER	MECH. PANEL
	<u>SOLENOID COILS</u>	
A 22-550	LEFT BONUS UNIT S.U. RIGHT BONUS UNIT S.U. BALL UNIT S.U. CARD UNIT S.U.	PLAYFIELD PLAYFIELD INSERT INSERT
A 23-600	CREDIT UNIT S.U.	INSERT
A2-23-750	KNOCKER	CABINET
B 26-800	LEFT & RIGHT BONUS UNITS - SINGLE RESET CREDIT UNIT RESET BALL UNIT RESET DRUM UNITS ... (8 req'd.) CARD UNIT RESET	PLAYFIELD INSERT INSERT INSERT INSERT
C 2-26-800	BELL	CABINET
D 24-1400	BANK RESET	MECH. PANEL
FL 20-300/28-400	BOTTOM FLIPPERS ... (2 req'd.)	PLAYFIELD
FL 21-375/28-400	TOP FLIPPERS ... (2 req'd.)	PLAYFIELD
G 21-400	BALL RELEASE	PLAYFIELD
G 23-750	LEFT KICKER RIGHT KICKER	PLAYFIELD PLAYFIELD
20 A 8991	LEFT MAGNET RIGHT MAGNET	PLAYFIELD PLAYFIELD
M 29-1000	2nd COIN RELAY TRIP SCORE RESET RELAY CHANGE RELAY TRIP 100 POINT	MECH. PANEL INSERT MECH. PANEL INSERT
M 29-1100	LEFT BONUS UNIT ESCAPEMENT RIGHT BONUS UNIT ESCAPEMENT 25¢ RELAY 10¢ RELAY BALL RELEASE RELAY 10 POINT RELAY 1 POINT RELAY LEFT ADVANCE RELAY RIGHT ADVANCE RELAY LEFT REBOUND RELAY RIGHT REBOUND RELAY CARD SPECIAL RELAY	PLAYFIELD PLAYFIELD MECH. PANEL MECH. PANEL PLAYFIELD INSERT INSERT PLAYFIELD PLAYFIELD PLAYFIELD PLAYFIELD MECH. PANEL
M3-30-1400	BUZZER	CABINET
M1-31-1500	LOCKOUT COIL	FRONT DOOR
S 27-500	BONUS RESET RELAY GAME OVER RELAY "A" RELAY "B" RELAY ACE SPACES RELAY ACE HEARTS RELAY ACE DIAMONDS RELAY ACE CLUBS RELAY TILT RELAY LEFT SPECIAL RELAY RIGHT SPECIAL RELAY	RELAY BANK RELAY BANK RELAY BANK RELAY BANK RELAY BANK RELAY BANK RELAY BANK RELAY BANK RELAY BANK RELAY BANK RELAY BANK
Z 27-1000	SCORE MOTOR RELAY START RELAY 2nd COIN RESET RELAY OUTHOLE RELAY CHANGE RESET RELAY LEFT COLLECT RELAY RIGHT COLLECT RELAY COIN RELAY	MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL MECH. PANEL PLAYFIELD PLAYFIELD MECH. PANEL
Z 28-1150	LOCK RELAY SHOOTER RELAY PLAYER RELAY	MECH. PANEL PLAYFIELD INSERT

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.

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

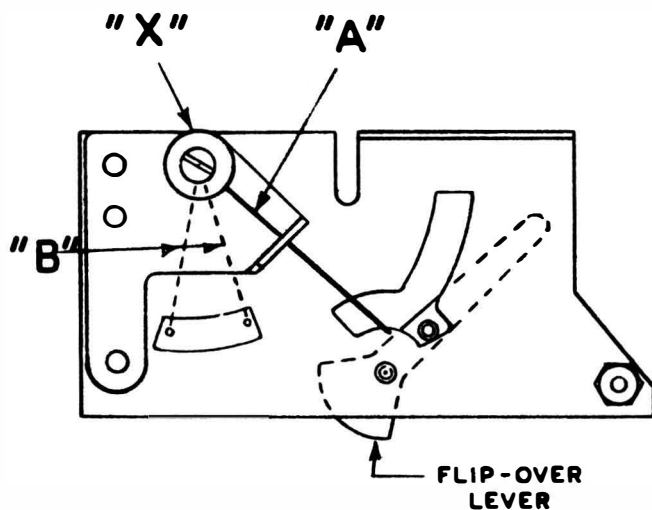
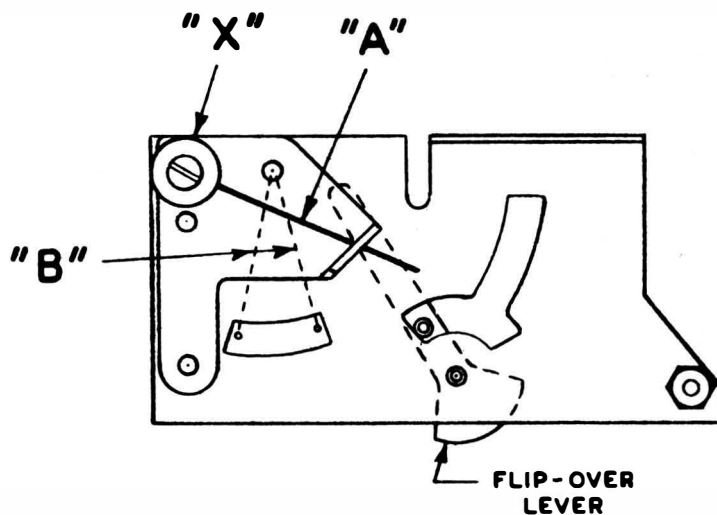


FIGURE 2



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.

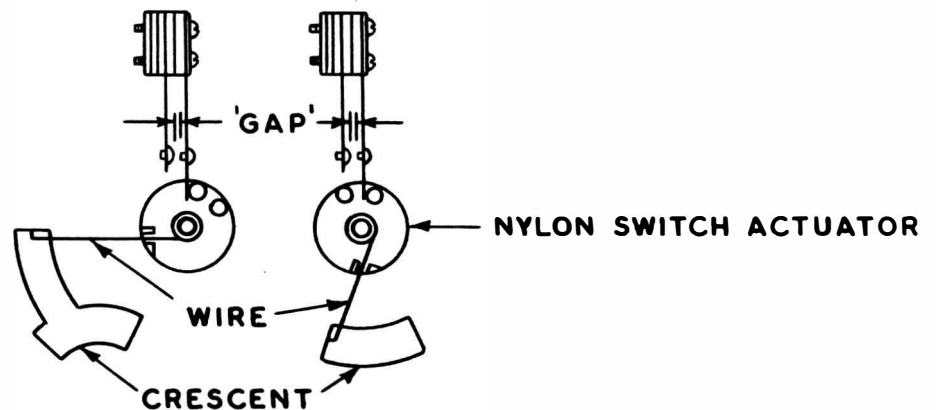
NOTE:

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.

THE POWER TRANSFORMER,

located on panel. Is equipped with a secondary tap. If your game is on location with extremely low line voltage, remove lead from lug marked 24 volt and solder to alternate lug marked "HIGH". This will increase secondary voltage for proper operation.

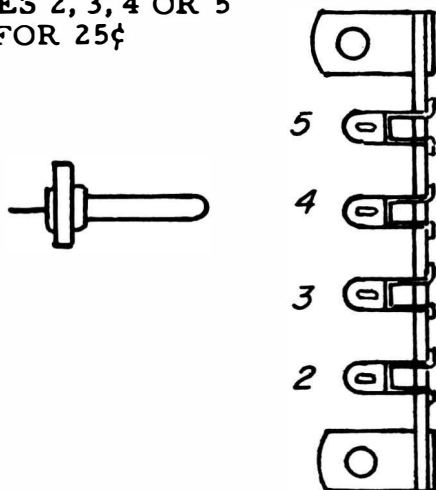
LEG LEVELERS,

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 or decrease scores, raise rear leg levelers to increase pitch.

ADJUSTMENTS ON MECHANISM PANEL

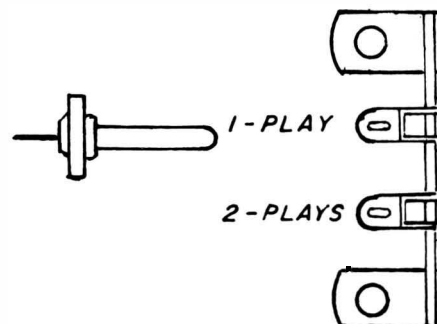
25¢ Adjustment

PROVIDES 2, 3, 4 OR 5
PLAYS FOR 25¢



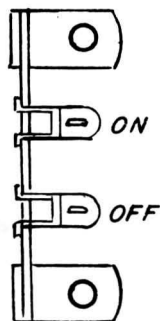
10¢ Adjustment

PROVIDES 1 OR 2
PLAYS FOR 1 COIN



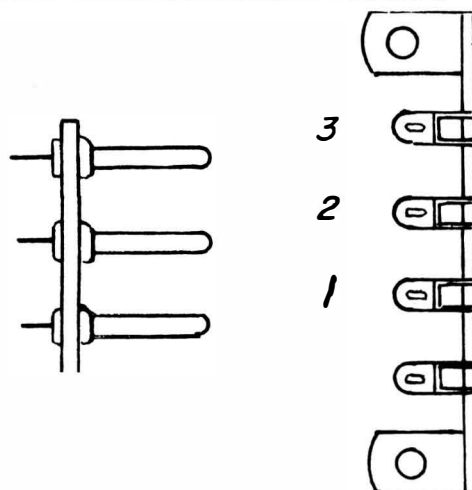
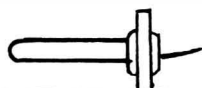
HEART SUIT ADJUSTMENT

Motor Service Jack



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

ADJUSTMENT OF
SWITCHES.



WHEN THE HEART SUIT AT TOP OF
LITEBOX IS COMPLETED (LAST
CARD IS ACE OF HEARTS) ADJUST-
MENT CAN BE MADE FOR 1, 2 OR 3
REPLAYS. WHEN GAME IS IN NOV-
ELTY ADJUSTMENT, ACE OF HEARTS
WILL RECORD 1,000 , 2,000 OR
3,000.

SUGGESTED SCORE CARDS,

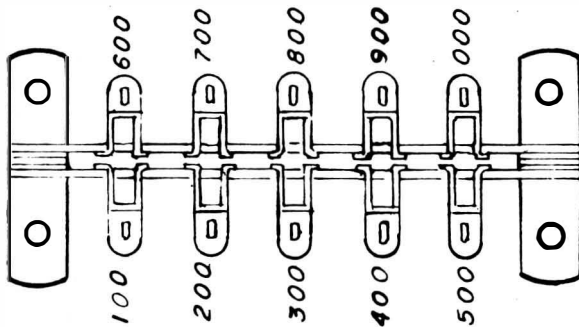
For 5 Ball Play - Card No. 354-13 (4,000-5,800)
For 3 Ball Play - Card No. 354-22 (2,700-3,900)

For Replay Games - Use instruction card 354-1. Use 354-3 with
one replay on ace of hearts; 354-5 for two replays; 354-7 for
three replays on ace of hearts.

For Novelty Play - Use instruction cards 354-2 and 354-8.

For 3 Ball Play - Use insert card 16D-8615-1A.

ADJUSTMENTS IN BACKBOX



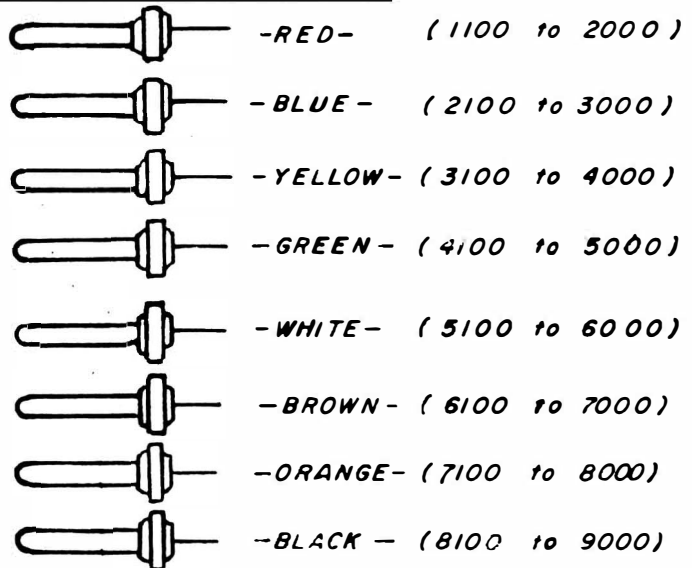
HI-Score Adjustment

Insert plugs into 10 Point Female at desired positions.

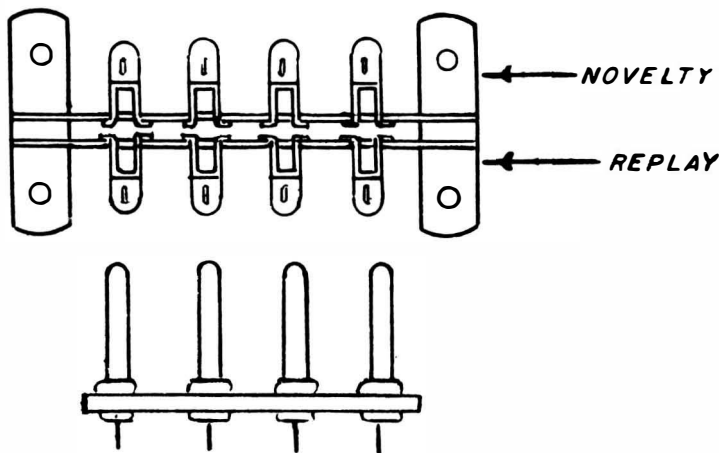
Examples:

Yellow wire into 300 position scores at 3300.

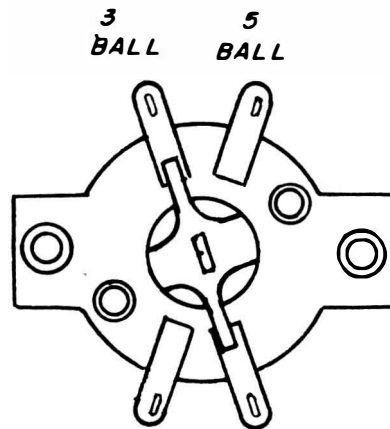
Yellow wire into 000 position scores at 4000.



Novelty-Replay Adj.



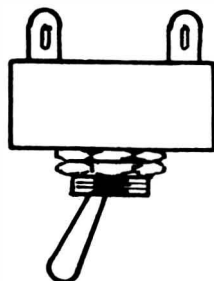
"Replay" Adjustment scores replays for Special and High Score. "Novelty" Adjustment scores 1,000 points for Special. In Novelty Adjustment, place all High Score Adjustment plugs in storage position in back box.



No. of Balls Adjustment

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

(Located under front of Cabinet)

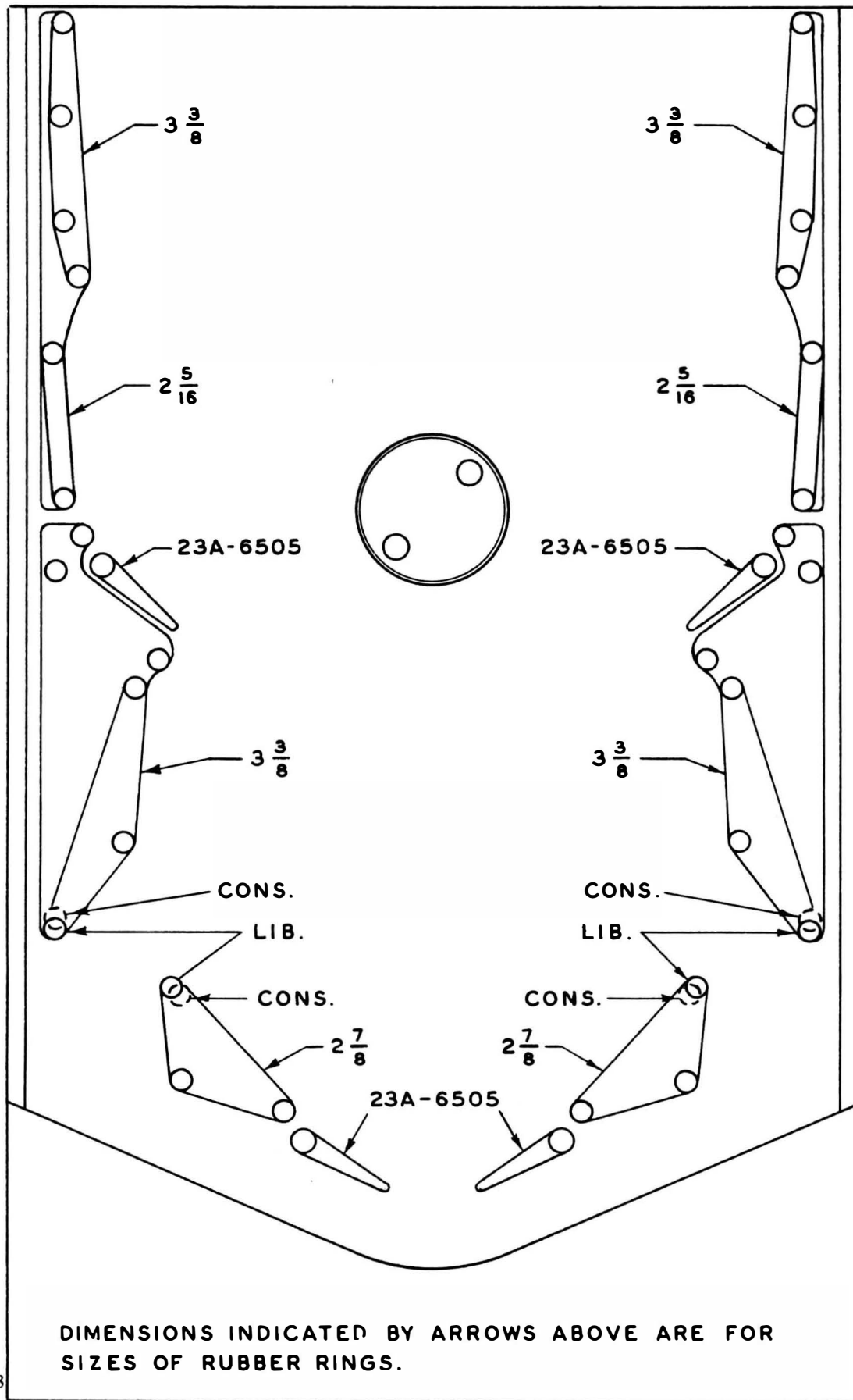


Master On-Off Switch

CONTROLS POWER TO TRANSFORMER

"4 ACES" — POST ADJUSTMENT SHEET

TO MAKE GAME MORE "CONSERVATIVE" OR "LIBERAL" — MOVE POSTS $\frac{3}{16}$ " 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 :

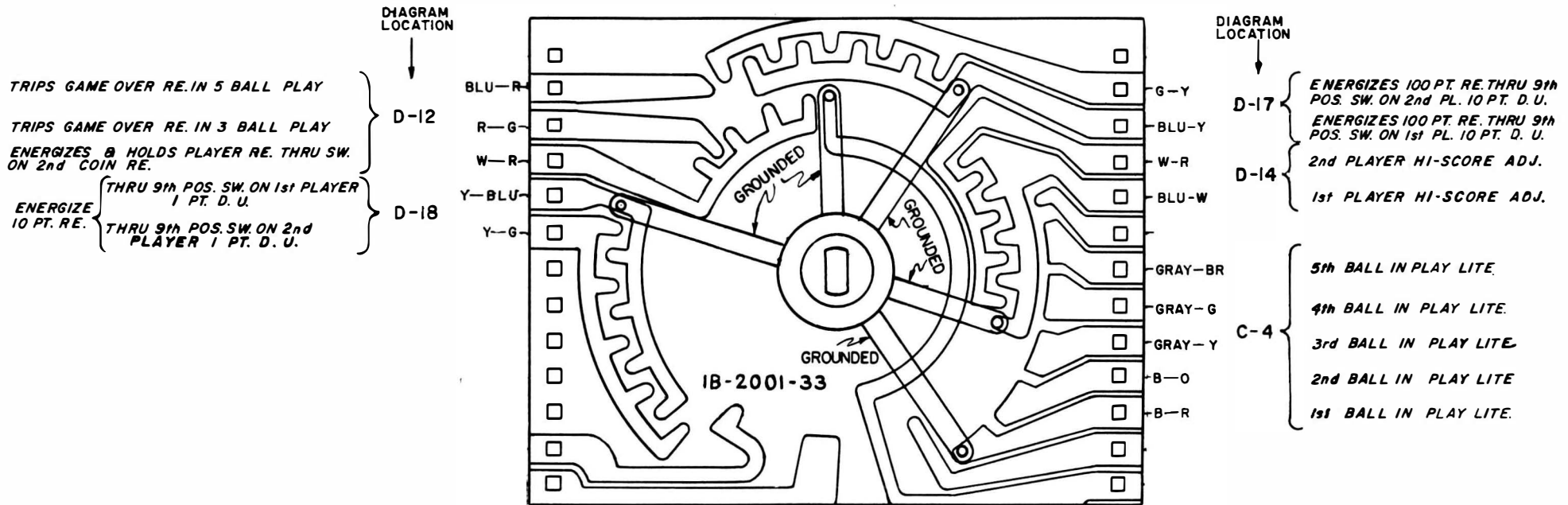
23A-6300 — $\frac{5}{16}$ " I.D.
23A-6306 — $2\frac{5}{16}$ " I.D.
23A-6307 — $2\frac{7}{8}$ " I.D.
23A-6308 — $3\frac{3}{8}$ " I.D.
23A-6505 — $1\frac{1}{2}$ " I.D.

30D-4621
PLAYFIELD ARCH

DIMENSIONS INDICATED BY ARROWS ABOVE ARE FOR
SIZES OF RUBBER RINGS.

BALL COUNT UNIT

THIS UNIT RESETS AT THE START OF A NEW GAME.
IT ADVANCES ONE STEP AT A TIME WHEN TWO PERSONS
ARE PLAYING & TWO STEPS IF ONLY ONE IS PLAYING.



View looking at WIPER FINGERS with
WIPER in RESET Position

LEFT BONUS DISC & RIGHT BONUS DISC.

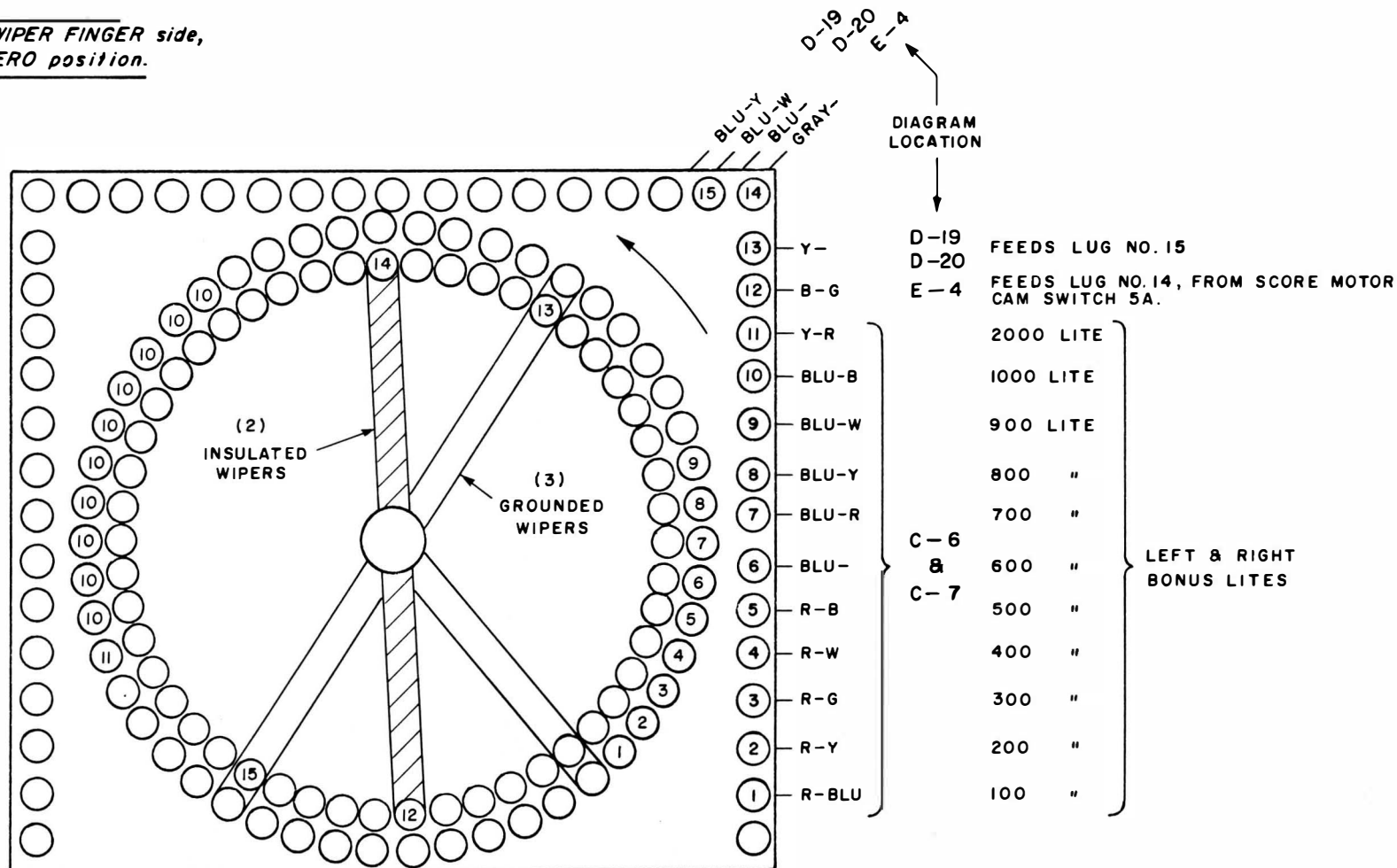
BOTH DISCS AND WIPER FINGERS ARE IDENTICAL.
EXCEPT FOR LUGS #14 & 15, WIRE COLORS ARE THE SAME.

THE LEFT BONUS UNIT ADVANCES ONE STEP EACH TIME
THE "LEFT ADVANCE RELAY" IS PULSED. IT RESETS, ONE
STEP AT A TIME, WHEN "LEFT COLLECT RELAY" IS ENER-
GIZED.

THE RIGHT BONUS UNIT ADVANCES ONE STEP EACH
TIME THE "RIGHT ADVANCE RELAY" IS PULSED. IT RE-
SETS, ONE STEP AT A TIME, WHEN "RIGHT COLLECT RELAY"
IS ENERGIZED.

BOTH UNITS HAVE A TOTAL RESET WHEN BALL LEAVES
PLAYFIELD.

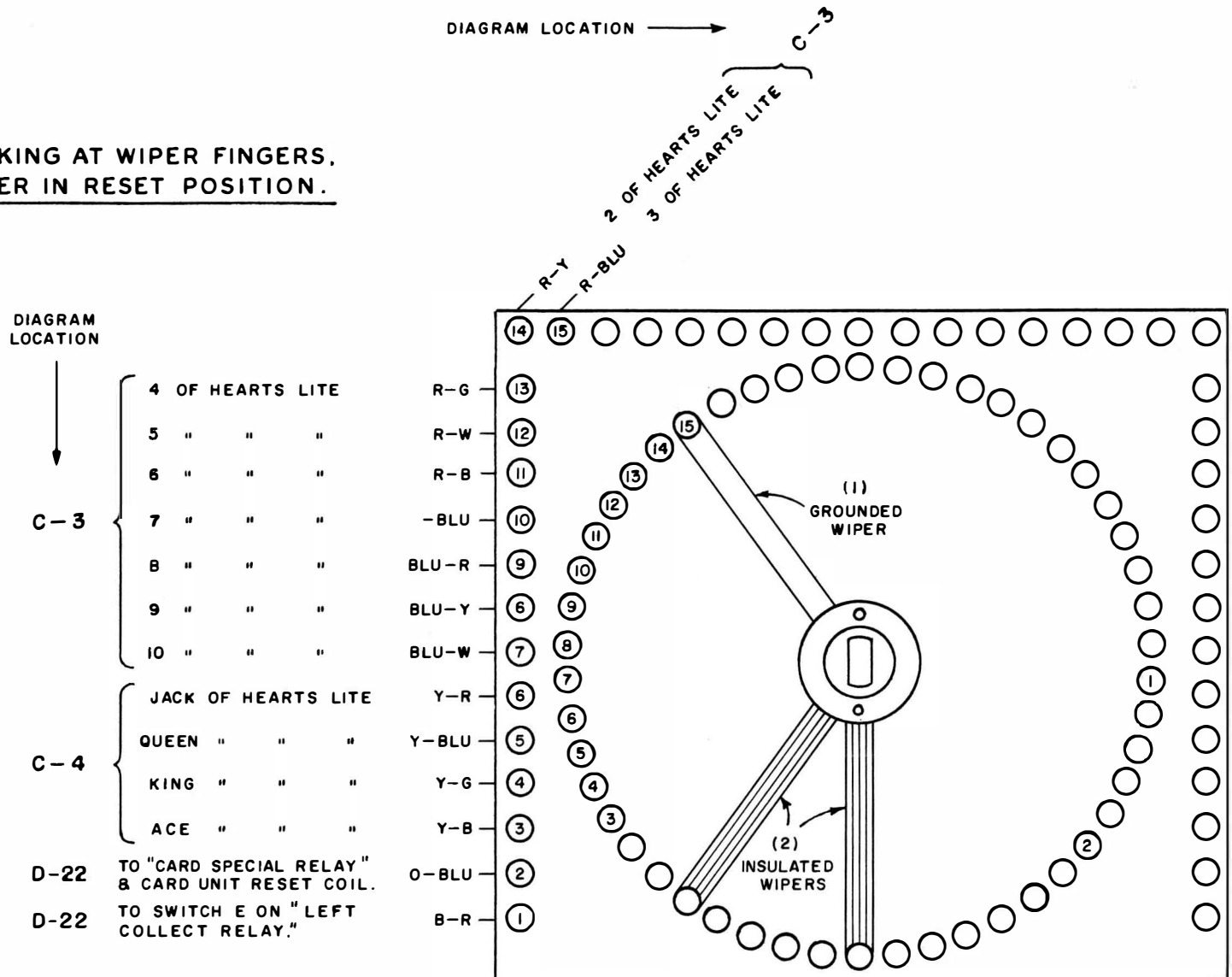
View looking at WIPER FINGER side,
with wiper in ZERO position.



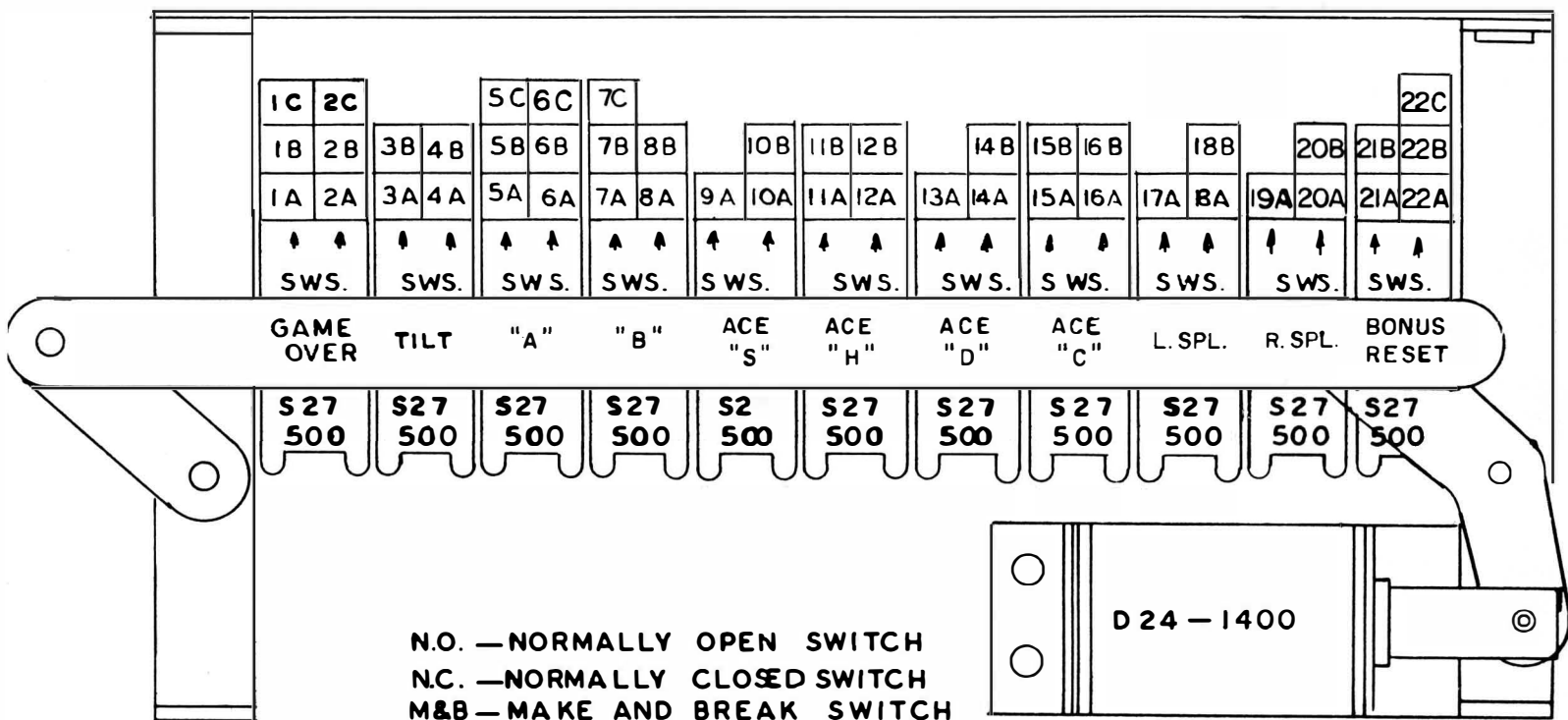
CARD UNIT DISC.

THIS UNIT ADVANCES ONE STEP IF BALL MAKES LEFT OR RIGHT INSIDE BOTTOM ROLLOVER, "WHEN LIT."
THE RESET COIL WILL ENERGIZE AT CAM SWITCH 4B, WHEN THIS UNIT HAS ADVANCED TO 12TH POSITION.

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



RELAY BANK SWS.



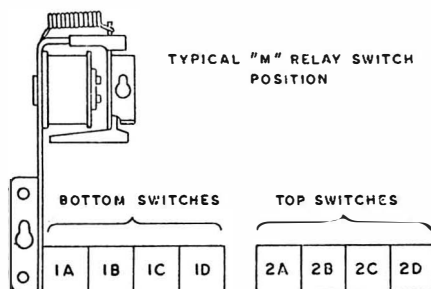
N.O. — NORMALLY OPEN SWITCH
 N.C. — NORMALLY CLOSED SWITCH
 M&B — MAKE AND BREAK SWITCH

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
GAME-OVER RELAY	1C	BR-Y-W -BR- B-Y	A-4	M&B	OPENS IN CIRCUIT TO "BALL IN PLAY" LITES AND CLOSES TO "GAME-OVER" LITE.
	1B	BLU-B -J-	E-13	N.C.	IN HI-SCORE AND "SPECIAL" CIRCUITS TO CREDIT UNIT S.U. COIL.
	1A	W-BR G-O	D-7	N.O.	IN CIRCUIT TO COIN RELAY, THRU CREDIT BUTTON SWITCH.
	2C	B-W -J-	A-8	N.C.	IN CIRCUIT TO ACE LITES AND OTHER PLAYFIELD LITES.
	2B	R-Y-W BLU-Y-W	F-12	N.C.	OPENS CIRCUITS TO PLAYFIELD SWITCHES.
	2A	BLU-W -Y-	D-9	N.O.	IN CIRCUIT TO START RELAY, THRU SWITCH ON COIN RELAY.

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
TILT RELAY	3B	R-Y-W -R-	F-14	N.C.	IN SERIES WITH SWITCH 2B ON GAME-OVER RELAY.
	3A	Y-BLU BLU-BR	E-13	N.O.	IN CIRCUIT TO OUTHOLE RELAY.
	4B	-J- -BLU- Y-B	A-8	M&B	MAKES TO TILT LITE.
	4A	B-W -J-	F-13	N.C.	IN SERIES WITH SWITCH 1B ON GAME-OVER RELAY.
"A" RELAY	5C	BR-Y G-R -J-	D-17	M&B	OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSES IN SERIES WITH SWITCH 7C ON "B" RELAY.
	5B	G-B G-W W-R	E-16	M&B	OPENS IN CIRCUIT TO 1 POINT RELAY AND CLOSES TO 10 POINT RELAY.
	5A	-O- -Y-	C-9	N.O.	TO LEFT SIDE "50 POINTS WHEN LIT" LITE.
	6C	-J- R-W BR-Y	E-17	M&B	OPENS IN CIRCUIT TO "A" RELAY AND CLOSES TO 100 POINT RELAY.
	6B	BLU-Y -J-	D-19	N.O.	IN CIRCUIT TO "LEFT SPECIAL" RELAY.
	6A	O-R O-BLU	B-10	N.O.	IN CIRCUIT TO LEFT AND RIGHT INSIDE ROLLOVER LITES.
"B" RELAY	7C	BR-Y -J- G-Y	E-17	M&B	OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSES TO CARD UNIT S.U. COIL.
	7B	G-B -G- W-R	E-16	M&B	OPENS IN CIRCUIT TO 1 POINT RELAY AND CLOSES TO 10 POINT RELAY.
	7A	O-R -Y-	C-9	N.O.	TO RIGHT SIDE "50 POINTS WHEN LIT" LITE.
	8B	-J- R-G BR-Y	E-18	M&B	OPENS IN CIRCUIT TO "B" RELAY AND CLOSES TO 100 POINT RELAY.
	8A	BLU-W -J-	D-20	N.O.	IN CIRCUIT TO RIGHT SPECIAL RELAY.

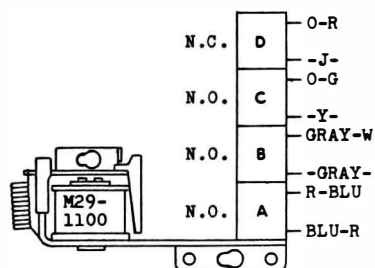
RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
ACE OF SPADES RELAY	9A	BR-W -J- BR-G	E-20	M&B	OPENS IN CIRCUIT TO "LEFT ADVANCE" RELAY AND CLOSES TO "LEFT COLLECT" RELAY.
	10B	-J- R-BLU W-R	E-18	M&B	OPENS IN CIRCUIT TO ACE SPADES RELAY AND CLOSES TO 10 POINT RELAY.
	10A	W-BR -Y-	C-8	N.O.	TO ACE SPADES LITES.
ACE OF HEARTS RELAY	11B	BR-O Y-G -J-	E-21	M&B	IN CIRCUIT TO "RIGHT COLLECT" RELAY AND "RIGHT ADVANCE" RELAY.
	11A	BR-R -Y-	C-9	N.O.	TO "ACE OF HEARTS" LITES.
	12B	-J- R-Y W-R	E-19	M&B	OPENS IN CIRCUIT TO ACE HEARTS RELAY AND CLOSES TO 10 POINT RELAY.
	12A	O-B O-G	B-9	N.O.	TO "COLLECT RIGHT BONUS" LITE.
ACE OF DIA- MONDS RELAY	13A	BR-O -J- BR-BLU	E-21	M&B	IN CIRCUIT TO "RIGHT COLLECT" RELAY AND "RIGHT ADVANCE" RELAY.
	14B	-J- R-B W-R	E-19	M&B	OPENS IN CIRCUIT TO ACE DIAMONDS RELAY AND CLOSES TO 10 POINT RELAY.
	14A	O-B -Y-	C-9	N.O.	TO ACE OF DIAMONDS LITES.
ACE OF CLUBS RELAY	15B	BR-W -BR- -J-	E-20	M&B	IN CIRCUIT TO LEFT ADVANCE RELAY AND LEFT COLLECT RELAY.
	15A	BR-B W-BR	B-8	N.O.	TO "COLLECT LEFT BONUS" LITE.
	16B	-J- BLU-R W-R	E-19	M&B	OPENS IN CIRCUIT TO ACE CLUBS RELAY AND CLOSES TO 10 POINT RELAY.
	16A	O-W -Y-	C-9	N.O.	TO ACE OF CLUBS LITES.

RELAY	SW.	WIRE COLORS	DIAG. LOC.	TYPE	SWITCH OPERATION
LEFT SPE- CIAL RELAY	17A	BR-Y W-G B-W	E-15	M&B	OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSSES TO CREDIT UNIT S.U. COIL.
	18B	-J- -J-	E-19	N.C.	TO COIL ON THIS RELAY.
	18A	G-W -Y-	B-7	N.O.	TO "LEFT SPECIAL" LITE.
RIGHT SPE- CIAL RELAY	19A	BR-Y W-O B-W	E-15	M&B	OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSSES TO CREDIT UNIT S.U. COIL.
	20B	-J- -J-	E-20	N.C.	TO COIL ON THIS RELAY.
	20A	GRAY-R -Y-	B-8	N.O.	TO "RIGHT SPECIAL" LITE.
BONUS RESET RELAY	21B	GRAY-B W-B	D-5	N.C.	TO RIGHT BONUS UNIT ESCAPEMENT COIL.
	21A	GRAY-G W-B	D-5	N.C.	TO RIGHT BONUS UNIT SINGLE RESET COIL.
	22C	W-R -J-	E-5	N.C.	TO COIL ON THIS RELAY.
	22B	GRAY-BLU W-B	D-5	N.C.	TO LEFT BONUS UNIT ESCAPEMENT COIL.
	22A	GRAY-O W-B	D-4	N.C.	TO LEFT BONUS UNIT SINGLE RESET COIL.



10¢ RE.

IS ENERGIZED BY 10¢ COIN SWITCH IF 10¢ ADJUSTMENT JACK IS IN "2 PLAYS FOR 1 COIN" POSITION.



E-20

IN CIRCUIT TO KNOCKER COIL.

D-8

RUNS SCORE MOTOR.

D-12

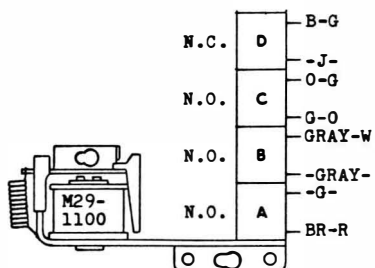
PULSES CREDIT UNIT S.U. COIL, THRU IMPULSE CAM SWITCH A.

E-5

IN HOLD CIRCUIT TO THIS RELAY.

25¢ RE.

IS ENERGIZED BY 25¢ COIN SWITCH.



E-20

IN SERIES WITH SWITCH D ON 10¢ RELAY.

D-7

RUNS SCORE MOTOR.

D-12

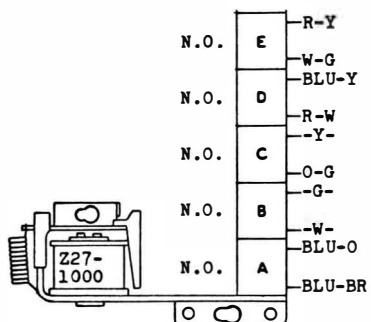
PULSES CREDIT UNIT S.U. COIL, THRU IMPULSE CAM SWITCH A.

E-6

IN HOLD CIRCUIT TO THIS RELAY.

OUTHOLE RE.

IS ENERGIZED BY OUTHOLE SWITCH, THRU A SWITCH ON SHOOTER RELAY.



D-9

ENERGIZES SHOOTER RELAY AT CAM SWITCH 3C.

E-9

ENERGIZES BALL COUNT UNIT S.U. COIL AT CAM SWITCH 1C.

D-7

RUNS SCORE MOTOR.

C-1

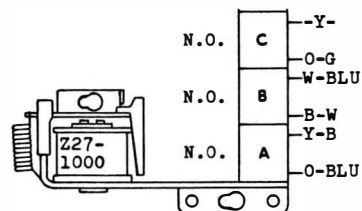
ENERGIZES 110 VOLT RELAY BANK RESET COIL AT CAM SWITCH 3D.

E-13

IN HOLD CIRCUIT TO THIS RELAY.

CARD SPECIAL RE.

IS ENERGIZED BY CARD UNIT DISC IN 12TH POSITION (ACE OF HEARTS).



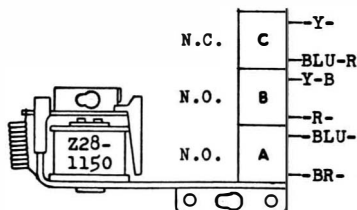
D-8 RUNS SCORE MOTOR.

E-13 IN CIRCUIT TO CREDIT UNIT S.U. COIL, OR 1000-9000 DRUM UNIT.

E-22 IN HOLD CIRCUIT TO THIS RELAY.

LOCK RE.

IS ENERGIZED BY COIN RELAY. CABINET BOTTOM SLAM SWITCH IS IN THIS CIRCUIT.



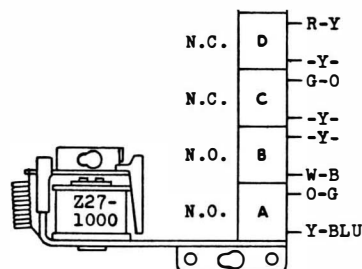
D-12 TRIPS GAME-OVER RELAY.

E-10 IN SERIES WITH SWITCH A ON SHOOTER RELAY.

D-8 IN HOLD CIRCUIT TO THIS RELAY.

SCORE MOTOR

IS ENERGIZED, AT SCORE MOTOR INDEX CAM SWITCH C, BY THE SAME CIRCUIT WHICH RUNS THE SCORE MOTOR.



D-13 IN CIRCUITS TO BALL RELEASE RELAY AND OUTHOLE RELAY.

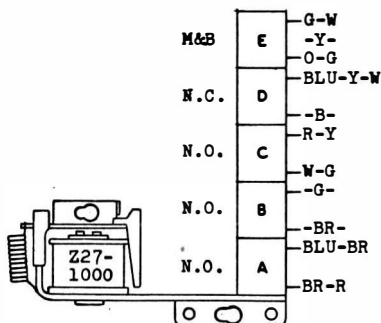
D-7 IN CIRCUIT TO COIN RELAY, THRU CREDIT BUTTON SWITCH.

D-4 IN CIRCUIT TO RESET COILS ON LEFT AND RIGHT BONUS UNITS.

E-7 IN HOLD CIRCUIT TO THIS RELAY.

START RE.

IS ENERGIZED BY COIN RELAY, THRU SWITCH ON GAME-OVER RELAY OR BALL COUNT UNIT ZERO SWITCH.



D-7 OPENS IN CIRCUIT TO 100 POINT RELAY AND CLOSSES TO RUN SCORE MOTOR.

D-15 OPENS CIRCUITS TO ALL PLAYFIELD SWITCHES.

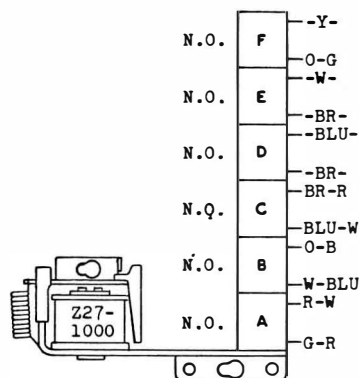
F-12 ENERGIZES SHOOTER RELAY AT CAM SWITCH 3C.

D-9 ENERGIZES 110 VOLT RELAY BANK RESET COIL, THRU SWITCH ON COIN RELAY AND CAM SWITCH 3D.

C-2 IN HOLD CIRCUIT TO THIS RELAY---ALSO TO PULSE SCORE RESET RELAY.

COIN RE.

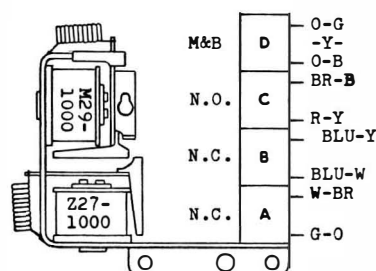
IS ENERGIZED BY COIN SWITCH.
ALSO BY CREDIT BUTTON, THRU CREDIT UNIT
ZERO SWITCH.



- D-7 RUNS SCORE MOTOR.
- C-2 IN SERIES WITH SWITCH B ON START RELAY.
- D-8 ENERGIZES LOCK RELAY.
- D-9 ENERGIZES START RELAY, THRU SWITCH ON GAME-OVER, OR BALL COUNT UNIT ZERO SWITCH.
- D-8 PULSES CREDIT UNIT RESET COIL AND 2ND COIN RELAY (TRIP COIL).
- D-6 IN HOLD CIRCUIT TO THIS RELAY.

2 ND COIN RE.

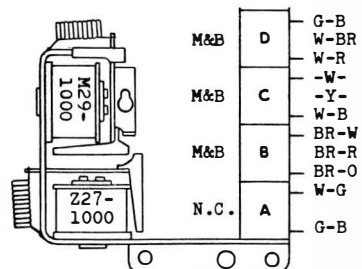
TRIP COIL IS ENERGIZED BY COIN RELAY AT
CAM SWITCH 1B.
RESET (OR LATCH) COIL IS PULSED AT CAM
SWITCH 3B BY SAME CIRCUIT THAT ENERGIZES
START RELAY COIL.



- C-5 TO "1 CAN PLAY" OR "2 CAN PLAY" LITES.
- E-12 ENERGIZES PLAYER RELAY, THRU BALL COUNT UNIT DISC.
- D-9 IN CIRCUIT TO BALL COUNT UNIT S.U. COIL.
- D-7 IN CIRCUIT TO COIN RELAY, THRU CREDIT BUTTON SWITCH.

CHANGE RE.

TRIP COIL IS ENERGIZED BY "ON LEFT" SWITCH,
THRU SWITCH ON CHANGE RELAY.
RESET (OR LATCH) COIL IS ENERGIZED BY
"ON RIGHT" SWITCH.

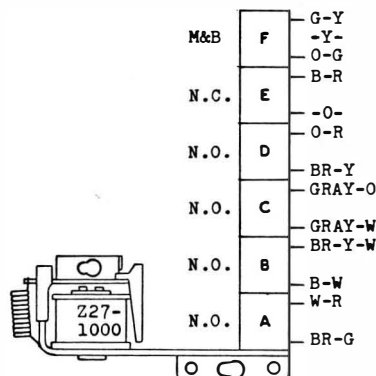


- E-16 OPENS IN CIRCUIT TO CHANGE RELAY (TRIP COIL) AND CLOSSES TO 1 POINT RELAY.
- C-10 TO "LEFT ADVANCE WHEN LIT" AND "RIGHT ADVANCE WHEN LIT" LITES.
- E-21 OPENS IN CIRCUIT TO LEFT ADVANCE RELAY AND CLOSSES TO ADVANCE RIGHT RELAY.
- E-16 IN CIRCUIT TO 1 POINT RELAY.

LOCATED ON PLAYFIELD

LEFT COLLECT RE.

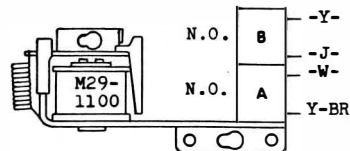
IS ENERGIZED BY LEFT BONUS TARGET SWITCH
IF ACE CLUBS AND ACE SPADES RELAYS ARE
TRIPPED.



- D-7 IN CIRCUIT TO RIGHT COLLECT RELAY, THRU SWITCH ON ACE HEARTS & ACE DIAMONDS RELAYS.
- D-21 OPENS CIRCUITS TO LEFT AND RIGHT REBOUND RELAYS, AND CARD SPECIAL RELAY.
- D-15 PULSES 100 POINT RELAY.
- E-4 PULSES LEFT BONUS UNIT SINGLE RESET COIL.
- D-3 TO LEFT MAGNET COIL.
- E-20 IN HOLD CIRCUIT TO THIS RELAY.

BALL RELEASE RE.

IS ENERGIZED BY PUSH BUTTON SWITCH, THRU SWITCH ON SHOOTER RELAY.



D-4

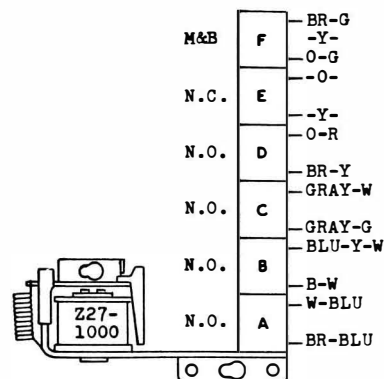
ENERGIZES BALL RELEASE COIL.

E-13

IN HOLD CIRCUIT TO THIS RELAY.

RIGHT COLLECT RE.

IS ENERGIZED BY RIGHT BONUS TARGET SWITCH, IF ACE HEARTS AND ACE DIAMONDS RELAYS ARE TRIPPED.



D-8
D-20

IN CIRCUIT TO LEFT COLLECT RELAY, THRU SWITCH ON ACE CLUBS AND ACE SPADES RELAYS.

D-21

IN SERIES WITH SWITCH E ON LEFT COLLECT RELAY.

D-15

PULSES 100 POINT RELAY.

E-5

PULSES RIGHT BONUS UNIT SINGLE RESET COIL.

D-3

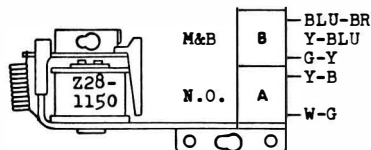
TO RIGHT MAGNET COIL.

D-21

IN HOLD CIRCUIT TO THIS RELAY.

SHOOTER RE.

IS ENERGIZED, AT CAM SWITCH 3C, BY START RELAY OR OUTHOLE RELAY.



E-13

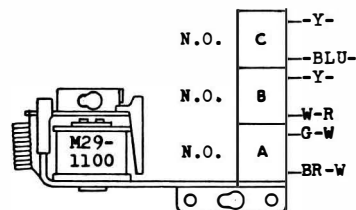
OPENS IN CIRCUIT TO OUTHOLE RELAY AND CLOSSES TO BALL RELEASE RELAY.

E-10

IN HOLD CIRCUIT TO THIS RELAY.

LEFT ADVANCE RE.

IS PULSED BY CENTER TARGET AND REVOLVING TARGET SWITCHES WHEN "LEFT ADVANCE" LITE IS LIT.
ALSO BY LEFT BONUS TARGET SWITCH.



D-4

ENERGIZES LEFT BONUS UNIT S.U. COIL.

D-18

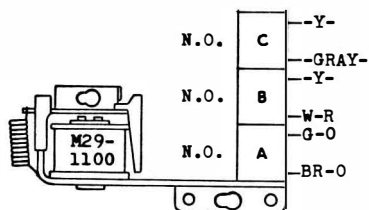
PULSES 10 POINT RELAY.

D-20

IN HOLD CIRCUIT TO THIS RELAY.

RIGHT ADVANCE RE.

IS PULSED BY CENTER TARGET AND REVOLVING TARGET SWITCHES WHEN "RIGHT ADVANCE" LITE IS LIT.
ALSO BY RIGHT BONUS TARGET SWITCH.



D-4

ENERGIZES RIGHT BONUS UNIT S.U. COIL.

D-18

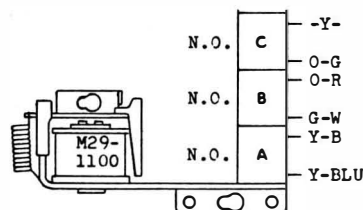
PULSES 10 POINT RELAY.

D-21

IN HOLD CIRCUIT TO THIS RELAY.

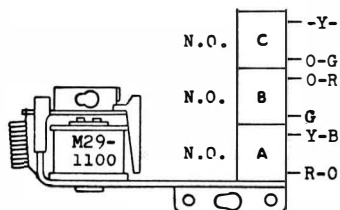
LEFT REBOUND RE.

IS ENERGIZED BY LEFT REBOUND SWITCH.
(SCORES 50 WHEN LIT).



RIGHT REBOUND RE.

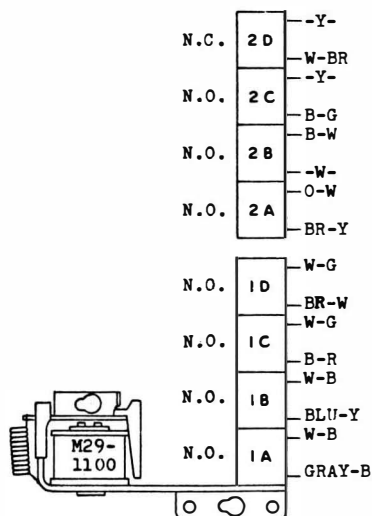
IS ENERGIZED BY RIGHT REBOUND SWITCH.
(SCORES 50 WHEN LIT).



LOCATED IN BACKBOX

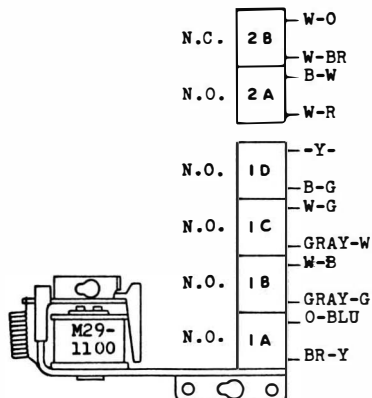
100 POINT RE.

IS PULSED BY LEFT COLLECT RELAY, RIGHT COLLECT RELAY, "A" AND "B" TARGETS, 4 BOTTOM ROLLOVERS AND CARD UNIT END-OF-STROKE SWITCH.



10 POINT RE.

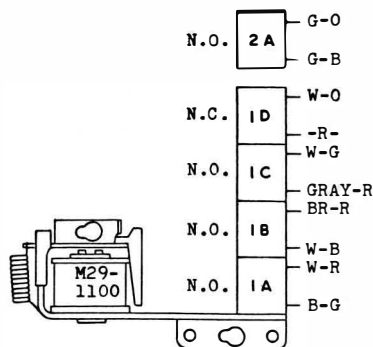
IS PULSED BY LEFT AND RIGHT REBOUND RELAYS, LEFT AND RIGHT ADVANCE RELAYS, AND (4) ACE TARGETS WHEN LIT.



- | | |
|------|--|
| D-8 | RUNS SCORE MOTOR. |
| D-16 | IN CIRCUIT TO 1 POINT RELAY OR 10 POINT RELAY. |
| E-21 | IN HOLD CIRCUIT TO THIS RELAY. |
| D-8 | RUNS SCORE MOTOR. |
| D-16 | IN CIRCUIT TO 1 POINT RELAY OR 10 POINT RELAY. |
| E-21 | IN HOLD CIRCUIT TO THIS RELAY. |
| D-10 | IN SERIES WITH SWITCH 2B ON 10 POINT RELAY. |
| D-22 | ENERGIZES BELL COIL. |
| F-14 | IN HI-SCORE CIRCUIT TO CREDIT UNIT S.U. COIL. |
| E-17 | IN HOLD CIRCUIT TO THIS RELAY. |
| D-11 | PULSES 2ND PLAYER 1000-9000 DRUM UNIT, THRU 9TH POSITION SWITCH ON 2ND PLAYER 100-900 D.U. |
| D-11 | PULSES 2ND PLAYER 100-900 DRUM UNIT. |
| D-11 | PULSES 1ST PLAYER 1000-9000 DRUM UNIT, THRU 9TH POSITION SWITCH ON 1ST PLAYER 100-900 D.U. |
| D-11 | PULSES 1ST PLAYER 100-900 DRUM UNIT. |
| D-10 | IN SERIES WITH SWITCH 1D ON 1 POINT RELAY. |
| E-18 | IN HOLD CIRCUIT TO THIS RELAY. |
| D-22 | ENERGIZES BELL COIL. |
| D-10 | PULSES 2ND PLAYER 10-90 DRUM UNIT. |
| D-10 | PULSES 1ST PLAYER 10-90 DRUM UNIT. |
| E-17 | PULSES 100 POINT RELAY, THRU 9TH POSITION SWITCH ON 1ST OR 2ND PL. 10-90 DRUM UNIT. |

I POINT RE.

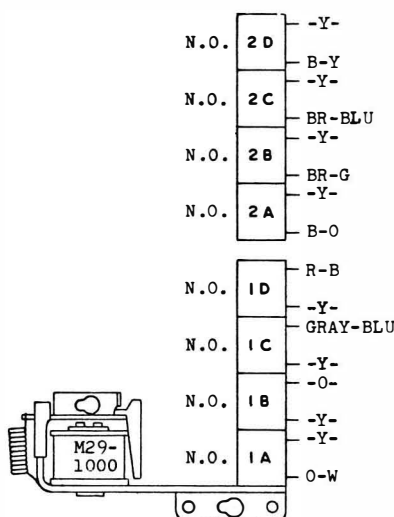
IS PULSED BY STANDUP SWITCHES, KICKER SWITCHES AND AS INDICATED ON PLAYFIELD.



- E-16 IN HOLD CIRCUIT TO THIS RELAY.
- D-10 IN SERIES WITH SWITCH B ON LOCK RELAY.
- D-10 PULSES 2ND PLAYER 1-9 DRUM UNIT.
- D-10 PULSES 1ST PLAYER 1-9 DRUM UNIT.
- E-18 PULSES 10 POINT RELAY, THRU 9TH POS. SWITCH ON 1ST OR 2ND PL. 1-9 DRUM UNIT.

SCORE RESET RE.

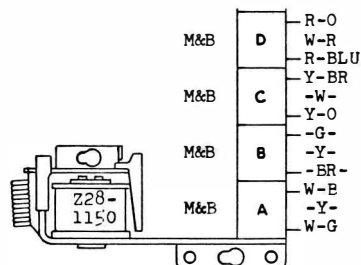
IS PULSED BY IMPULSE CAM SWITCH C, THRU SWITCH ON START RELAY.



- E-11 PULSES 1ST PLAYER 100-900 DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
- E-11 PULSES 1ST PLAYER 1000-9000 DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
- E-11 PULSES 2ND PLAYER 1000-9000 DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
- E-11 PULSES 2ND PLAYER 100-900 DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
- E-11 PULSES 2ND PLAYER 10-90 DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
- E-10 PULSES 2ND PLAYER 1-9 DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
- E-10 PULSES 1ST PLAYER 1-9 DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.
- E-10 PULSES 1ST PLAYER 10-90 DRUM UNIT, THRU ZERO SWITCH ON THAT UNIT.

PLAYER RE.

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



- E-11 TO 1ST OR 2ND PLAYER 1000-9000 DRUM UNITS, THRU NOVELTY POSITION OF ADJ. JACK.
- E-14 IN SERIES WITH SWITCH 2B ON 100 POINT RELAY.
- C-5 TO "1ST PLAYER UP" OR "2ND PLAYER UP" LITES.
- D-10 IN CIRCUIT TO ALL SCORING DRUMS, THRU SWITCHES ON 1 POINT, 10 POINT OR 100 POINT RELAYS.