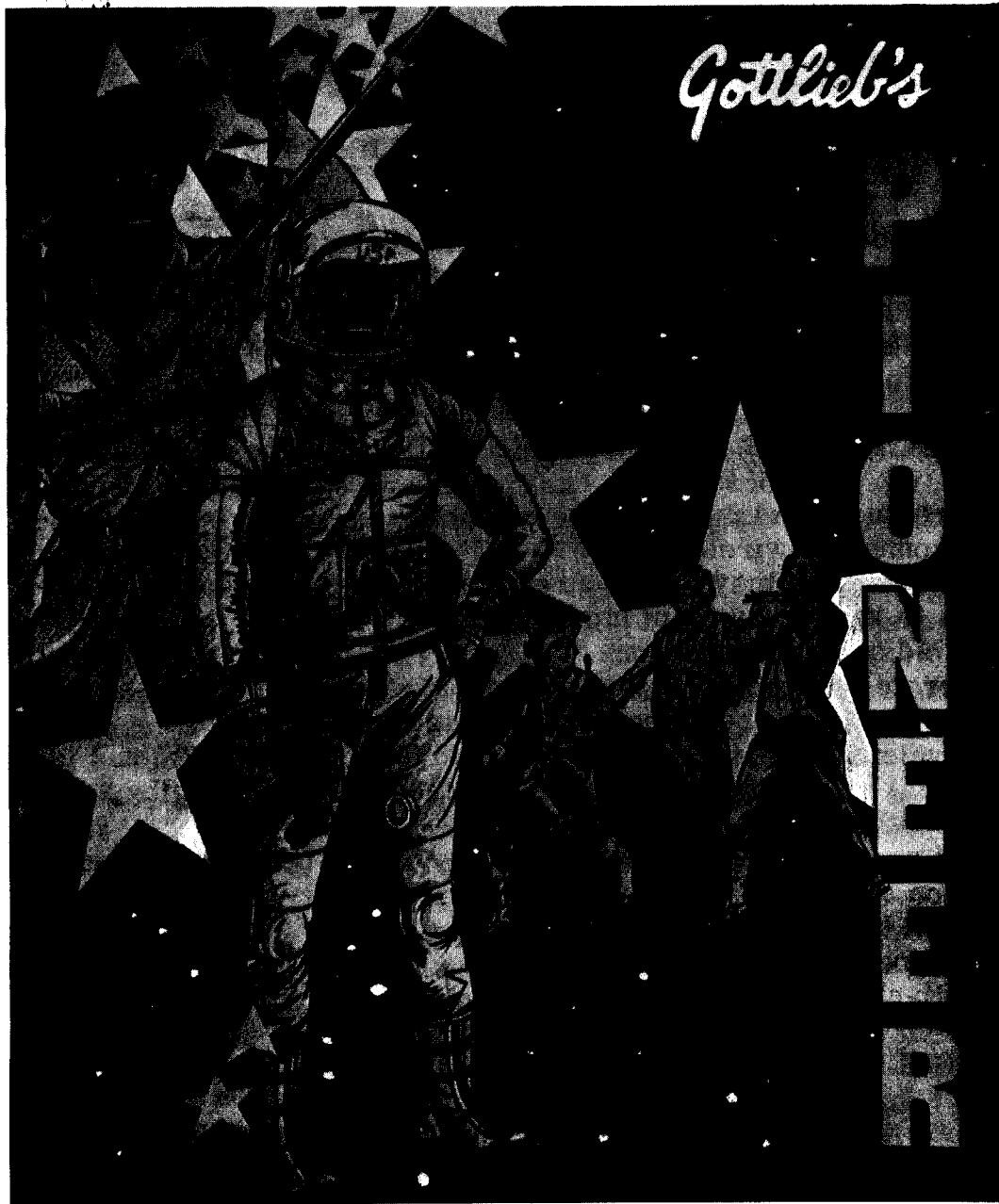




**INSTALLATION PROCEDURES
AND
GAME OPERATION INSTRUCTIONS**

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PRICE \$1.00

PIONEER

INSTALLATION PROCEDURES AND GAME OPERATIONS INSTRUCTIONS

All games have been carefully inspected before leaving the factory. However, minor troubles may result due to vibration during shipment. Plugs may come out of their sockets, tilt switches may be out of adjustment, etc.

The following steps should be taken to insure the proper operation of this machine:

VISUAL INSPECTIONS TO BE DONE BEFORE PLUGGING IN LINE CORD.

1. Check for foreign material across the contacts.
2. Look for disconnected wires.
3. Check plugs to be sure they are securely seated in the sockets.
4. Dress cables to keep away from moving parts.
5. Inspect for cold solder connections.
6. Manually operate all step-up units. Action should not be sluggish.
7. Check the fuses. They should be firmly seated in the clips.
8. Adjust leg levelers so that playboard has desired pitch ($3-1/2^{\circ}$) and is level to the horizontal axis. ($3-1/2^{\circ}$ pitch is obtained by having all leg adjusters set at same height)
9. Check the tilt switches: Vibration tilt on playboard, pendulum tilt and ball roll tilt on side panel.
10. Adjust ball roll tilt and pendulum tilt.
11. Check the bounce switches on the bottom panel and in the lightbox.
12. Check the anti-cheat switch on the front door.

PLUG IN THE LINE CORD

The coin chute lights and the scene lights in the lightbox should go on. If not, operate the on-off switch located at the bottom right front corner of the cabinet.

Drop coins through the coin entrances to check alignment of coin feed troughs to rejectors. Check coin lockout wireforms; they should be out of the path of the coins when the game is on.

If the 1st coin chute adjustment is in 1 play position, inserting a coin in the 2nd chute will actuate the 2nd chute relay "W". "W" relay will step the "replay" unit as indicated by the 2nd chute adjustment plug. (2, 3, 4, or 5 steps.)

If the 1st coin chute adjustment is in "2nd chute adjustment" position, inserting a coin in the 1st or 2nd chute will actuate the 2nd chute relay "W".

In the above examples. if the coin actuates "W" relay, it is necessary to push the red button on the front door to start the game.

OPERATING INSTRUCTIONS

1. Inserting a coin or pushing the replay button actuates "S" relay (start relay).
2. This relay will lock-in through its own switch and a motor 2B switch.
3. "S" relay starts the motor running.
4. "AX" relay actuates through switches on "U" and "S" relays and a switch on motor 2C. "Q" and "U" relays de-energize when "AX" relay operates.
5. When "AX" relay is actuated the score units and player unit reset sequence starts. The 1st player score units resets to zero through the P3 switch stack on the player unit and motor switch 1A. When these units reach zero the player unit steps once, the 2nd player score units reset to zero through the P4 switch stack on the player unit and motor switch 1A. When these units reach zero the player unit steps until P5B opens. The score units and player unit are now reset.
6. When "P5A" on the player unit closes, "AX" and "BX" relays reset through motor 1D and switches on "U", "O" and "R" relays. The reset cycle is now complete.
7. Inserting additional coins or pushing the replay button will actuate "CX" relay through switches on "U" and "S" relays and a switch on motor 2C. The replay button circuit opens when "CX" relay actuates.
8. Place the ball in the outhole. The ball return switch closes and completes the circuit to "O" relay through the normally closed switches on "J", "AX" and "Q" relays. "O" relay locks-in through its own switch and a switch on motor 2B. When "O" relay is energized, motor 4C actuates the ball return coil (which kicks the ball onto the runway) through a switch on "O" and a normally closed switch on "BX" relay. The ball is now on the runway and is ready to be put into play.
9. The remaining balls that enter the outhole are kicked across the trough switch which pulls in "P" relay. "P" relay runs the motor. Switches on "U", motor 2C "P", "BX", and motor 1A advances the "player" unit the required number of steps determined by the "player" unit switches and "CX" relay.

WHEN A TILT SWITCH IS MADE THE PLAYER LOSES THE BALL IN PLAY. IF THE PLAYER CAUSES ONE OF THE BOUNCING SWITCHES TO OPEN (IN THE LIGHTBOX OR ON THE BOTTOM PANEL) THE GAME WILL BE OVER. ADJUST THESE SWITCHES TO YOUR NEEDS.

PLAYFIELD OPERATION

Hitting A-B-C-D-E rollovers light corresponding rollover buttons. Lit rollover buttons score 500 points and add bonus. Completing A-B-C-D-E sequence lights center hole occasionally for "Extra Ball."

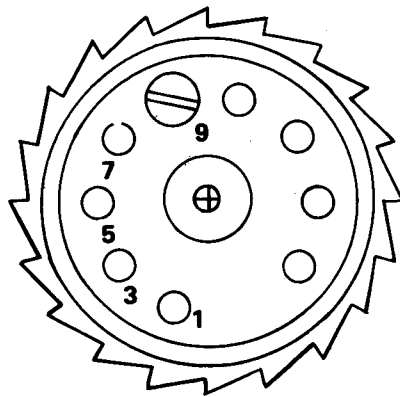
The drop targets score 500 points and add bonus. Completing both "1776" and "1976" drop targets lights center hole occasionally for "Double Bonus." Completing A-B-C-D-E rollovers and both drop targets lights center hole occasionally for "Special."

Bonus is scored when the ball leaves the playfield or when the ball goes into the center hole when lit for "Double Bonus." On last ball in play the bonus value is doubled. If both "Double Bonus" value lights are lit, center hole scores 4 times indicated value.

The features reset after each ball in play.

WHEN A TILT SWITCH IS MADE, "T" RELAY WILL ENERGIZE. A NORMALLY CLOSED SWITCH ON "T" WILL OPEN AND BREAK THE CIRCUIT TO "R" RELAY. THE CIRCUIT TO "R" RELAY WILL ALSO OPEN IF ANY OF THE BOUNCE SWITCHES OPEN. (IN THE LIGHTBOX, ON THE FRONT DOOR OR ON THE BOTTOM PANEL).

REPLAY UNIT STOP ADJUSTMENT



TO CHANGE STOP POSITION MOVE SCREW
TO DESIRED HOLE.

ADJUSTMENT ON PIONEER

LIGHTBOX

POINT SCORE ADJUSTMENT

This adjustment allows replays for various high scores. See point score adjustment card for instructions. Refer to recommended score card before making the changes. When changing the scores, change the card on the playfield card holder to agree.

BOTTOM PANEL

1ST COIN CHUTE ADJUSTMENT AND 2ND CHUTE ADJUSTMENT

This adjustment provides for the 1st chute to set up the game or to parallel the 2nd chute which steps the replay credit unit. If the adjustment is in 1 play position, inserting a coin in the 1st chute will set up the game. Inserting a coin in the 2nd chute will step the replay unit. (2, 3, 4, or 5 steps). If the adjustment is in 2nd chute adjustment position, inserting a coin in either chute steps the replay unit.

PLAYBOARD

3 - 5 BALL ADJUSTMENT

This adjustment changes the number of balls played per game. The third or fifth ball leaving the playfield will trip the "last ball" relay "BX" through switches on "O", rivets on the Player unit disc and "U" relay.

SEE PLAYBOARD INFORMATION PAGE FOR MECHANICAL ADJUSTMENTS.

TILT AND FUSE PANEL

There are two sets of holes for mounting the tilt bob strike plate. By moving the strike plate closer to tilt bob support bracket the game will be less sensitive to tilting.

FRONT DOOR

COIN CHUTE SWITCH

The coin chute switches are carefully adjusted to the recommended pressures and gaps with a feeler gauge and a gram gauge. Under normal operation these switches will function as designed. However, if a sharp blow on the front door or dropping of the cabinet sets up the game, carefully inspect and adjust the coin chute switches as indicated on Page 10 of this booklet.

"RELAYS"

<u>NO.</u>	<u>COIL NO.</u>	<u>TYPE</u>	<u>CONTACTS</u>	<u>USE</u>
A	A-9746	AG.	1A	SERIES RELAY
B	A-9735	AG.	4A	RIGHT & LEFT POP BUMPER RELAY
C	A-9735	AG.	3A	CENTER POP BUMPER RELAY
D	A-9735	AG.	4A	500 POINT & ADD BONUS UNIT RELAY
E	A-9735	AG.	4A, 2B	BONUS UNIT SCORE RELAY
F	A-489	AS.	2 DISCS	00-90 UNIT RELAY
G	A-9735	AG.	5A, 1B	HOLE RELAY
H	A-9738	AG.	1A, 1B, 1C	TILT HOLD RELAY
I	A-9738	AG.	2A, 2B	EXTRA BALL RELAY
J	A-9735	AG.	2A, 5B, 1C	BONUS UNIT SCORE CONTROL RELAY
L	A-9735	AG.	6A	1000 POINT RELAY
M	A-9735	AG.	5A	100 POINT RELAY
N	A-9735	AG.	5A	10 POINT RELAY
O	A-9735	AG.	6A, 1B	BALL RETURN RELAY
P	A-9735	AG.	4A	ADD PLAYER UNIT RELAY
Q	A-9740	AG.	2A, 2B, 1C	GAME OVER RELAY
R	A-9738	AG.	1A, 2B, 1C	HOLD RELAY
S	A-9740	AG.	6A	START RELAY
T	A-9742	AG.	1B	TILT RELAY
U	A-9740	AG.	4A, 1B, 1C	1ST BALL RELAY
V	A-9740	AG.	2A	REPLAY BUTTON RELAY
W	A-9740	AG.	2A, 1B, 1C	2ND CHUTE RELAY
AX	A-9735	INTER-	2A, 4B, 2C	RESET CONTROL RELAY
AXR	A-5662	LOCK		
BX	A-9735	INTER-	3A, 2B	LAST BALL RELAY
BXR	A-5662	LOCK		
CX	A-9735	INTER-	2A, 2B	2ND PLAYER RELAY
CXR	A-5662	LOCK		

"SEQUENCE BANK"

<u>NO.</u>	<u>COIL</u>	<u>CONTACTS</u>	<u>USE</u>
1B	A-1119	1A, 1B, 1C	"A" ROLLOVER RELAY
2B	A-1119	1A, 1B, 1C	"B" ROLLOVER RELAY
3B	A-1119	1A, 1B, 1C	"C" ROLLOVER RELAY
6B	NO COIL	4A	SEQUENCE COMPLETED RELAY
4B	A-1119	1A, 1B, 1C	"D" ROLLOVER RELAY
5B	A-1119	1A, 1B, 1C	"E" ROLLOVER RELAY
LB	A-15359	4B	DOUBLE BONUS RELAY

"OTHER COILS USED"

<u>COIL NO.</u>	<u>DESCRIPTION</u>
A-5141	FLIPPER COILS
A-4893	POP BUMPER COILS
A-5195	CHIME COILS
A-5194	ADD BONUS UNIT COIL
A-5194	SUBTRACT BONUS UNIT COIL
A-5194	KNOCKER COIL
A-1496	ADD REPLAY UNIT COIL
A-1496	SUBTRACT REPLAY UNIT COIL
A-5194	ADD PLAYER UNIT COIL
A-15259	SCORING UNIT COILS
A-1496	BALL RETURN COIL
A-1496	HOLE KICKER COIL
A-9736	COIN LOCKOUT COIL
A-15555	TARGET BANK RESET COILS - 60HZ. (USE A-9479 on 50HZ)
A-9479	SEQUENCE BANK RESET COIL
A-7760	MOTOR ASSEMBLY 60HZ.
A-11550	MOTOR ASSEMBLY 50 HZ.
A-7760	MOTOR CAM ASSEMBLY
B-3235	TRANSFORMER 115V.
B-8660	TRANSFORMER 230V.

DISC & WIPERS

	<u>GEAR & SHAFT</u>	<u>DISC</u>	<u>WIPER</u>
PLAYER UNIT	A-12399	B-12569	B-12568
00-90 UNIT (F RELAY)	D-8755	A-9016	B-9015
BONUS UNIT	A-13606	B-13020	B-13019

PIONEER MOTOR SWITCHES

MOTOR 1A (S-POS)	Inside Sw. Second Sw. Third Sw.	- Resets tens and hundreds score units. - Adds player unit. - Scoring.
MOTOR 1B	Inside Sw.	- 1st player match.
MOTOR 1C (S-POS)	Inside Sw. Second Sw. Third Sw. Fourth Sw. Fifth Sw.	- Motor runout. - Opens circuit to replay button and coin chute switches - Opens circuit to hole, trough and ball return switches. - Opens circuit to playboard contacts. - Opens circuit to playboard lights.
MOTOR 1D	Inside Sw. Second Sw.	- Subtract replay unit, resets or adds coin unit, actuates "AX" relay and adds total play meter. - 4th player match.
MOTOR 1E	Inside Sw. Second Sw.	- Opens circuit to double bonus light (hole). - Actuates "J" relay for double bonus.
MOTOR 2B	Inside Sw. Second Sw.	- "E", "G", "O", "P", "S", "V" and "W" relay lockin. - "D" relay lockin.
MOTOR 2C (L-POS)	Inside Sw. Second Sw. Third Sw. Fourth Sw. Fifth Sw. Sixth Sw.	- Coin chute credit totalizer. - 3rd player match. - Adds player unit control switch. - Subtract bonus unit control switch. - Resets "AX" and "BX" relays. - Resets drop target banks.
MOTOR 3B		- Resets sequence bank.
MOTOR 3C (S-POS)	Inside Sw. Second Sw. Third Sw. Fourth Sw.	- "U" relay lockin. - Bonus score control switch. - Adds bonus unit and hole scoring. - Subtract bonus unit control switch.
MOTOR 3E	Inside Sw. Second Sw.	- Opens circuit to extra ball light. - Actuates "I" relay for extra ball.
MOTOR 4A (S-POS)	Inside Sw.	- Resets thousands and ten thousands score units.
MOTOR 4B	Inside Sw. Second Sw.	- Coin chute credit totalizer. - 2nd player match.
MOTOR 4C (S-POS)	Inside Sw. Second Sw. Third Sw.	- Coin chute credit totalizer. - Actuates "Q" relay. - Actuates ball return and hole kicker coils
MOTOR 4E	Inside Sw. Second Sw.	- Opens circuit to special light. - Scores hole special.

PLAYBOARD INFORMATION

RUBBER RINGS

A	- A-10217	(4)
B	- A-10218	(1)
C	- A-10219	(6)
D	- A-10220	(2)
E	- A-10223	(4)
F	- A-13151	(2)
G	- A-15705	(4)

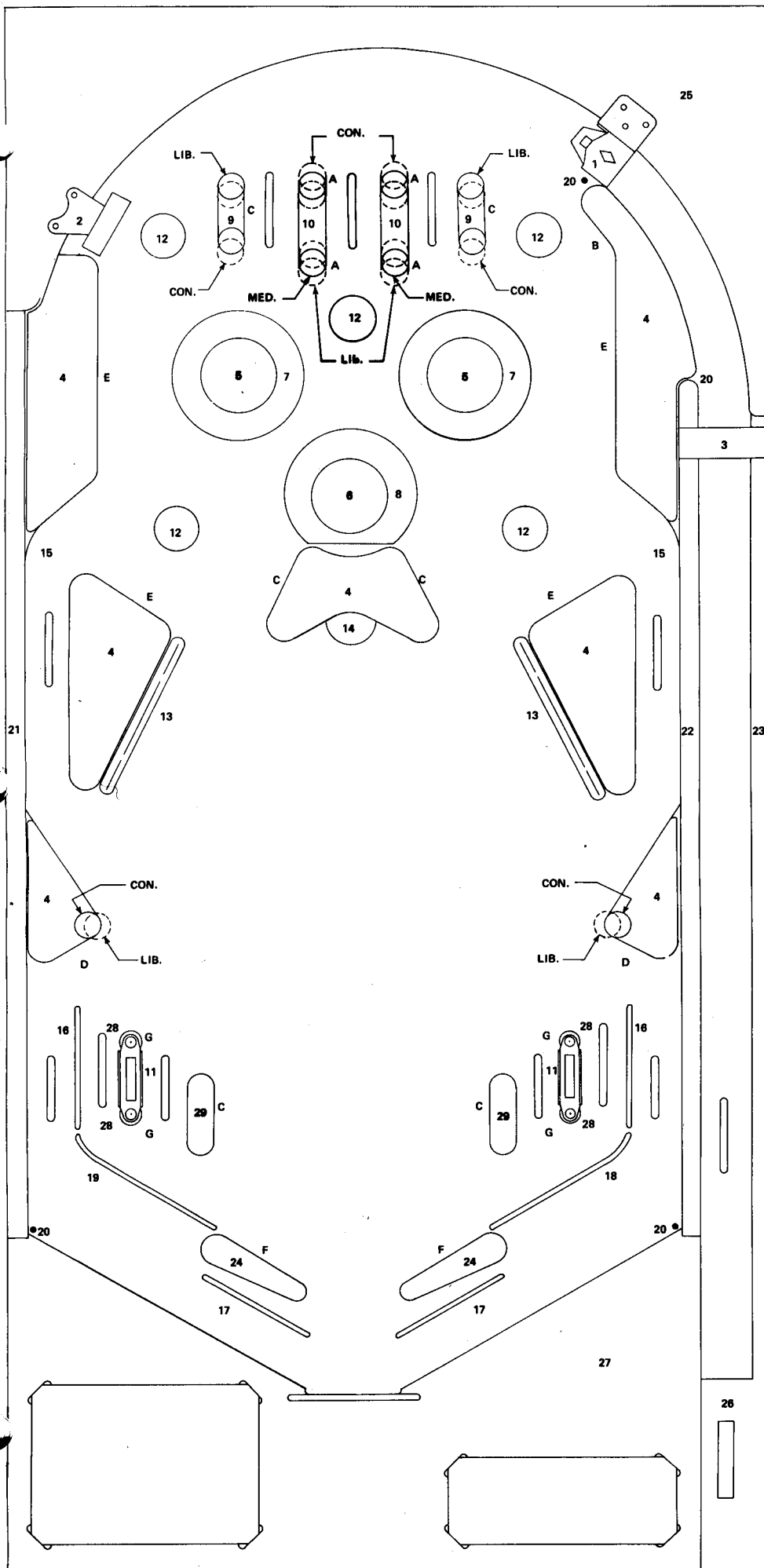
Mini Post Screw

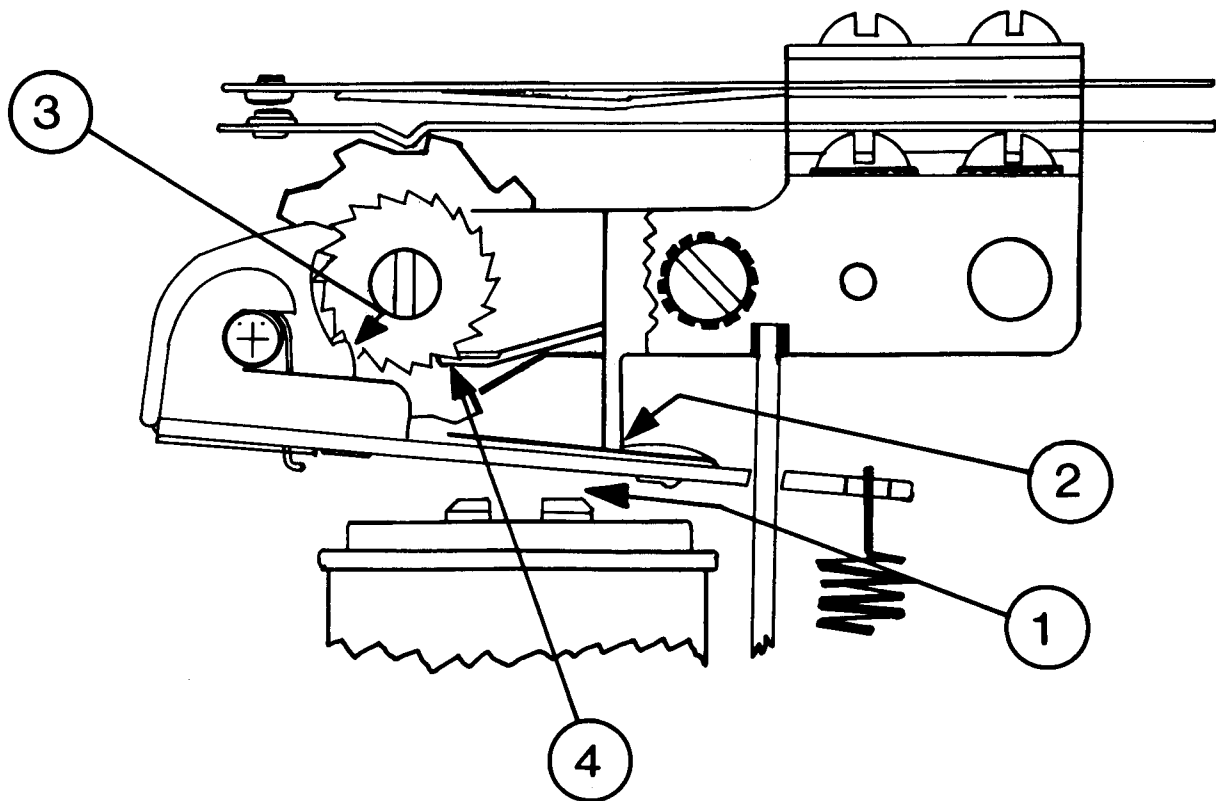
PARTS LIST

1. A-3290 Ball Gate.
2. A-9143 Ball Rebound Rubber.
3. A-8215 Ball Deflector.
4. C-15873 Plastic Shield Set.
5. Blue Pop Bumper A-13904 and White Cap A-15200 in Red & Blue.
6. Red Pop Bumper A-13904 and White Cap A-15200 in Red. & Blue.
7. A-8246 Pop Bumper Platter.
8. A-10234 Pop Bumper Trimmed Platter.
9. A-9393 Red Plastic Ball Guide.
10. A-9396 White Plastic Ball Guide.
11. C-15647 White Plastic Mini Post Rollover Guide.
12. D-11968 White Plastic Rollover Button.
13. 4 Pos. Drop Target Bank (L) 1, 7, 7, 6 (R) 1, 9, 7, 6 Both with black design.
14. C-15707 Red Plastic Hole Base Plate.
15. B-13891 Metal Flat Rail.
16. A-4832 Ball Guide Rail. (Wire Form)
17. A-13798 Ball Snubber Rail. (Wire Form)
18. A-14571 Ball Guide Rail. (Wire Form)
19. A-14572 Ball Guide Rail. (Wire Form)
20. A-10542 Steel Pin. (5)
21. C-7393 Wood Rail. (Left Side)
22. C-9771 Wood Rail. (Center)
23. C-13977 Wood Rail. (Right Side)
24. C-13150 Flipper.
25. D-4806 Top Arch, with "G" & "3, 4" Pos.
26. C-9767 Ball Shooter Gage.
27. D-13647-1A Card Holder.
28. 14792 Mini Post Screw. (4)
29. A-9393 White Plastic Ball Guide.

C-11561 White Plastic Post
1" High (38)

LIB. = LIBERAL
CON. = CONSERVATIVE
MED. = MEDIUM





"AS" RELAY ADJUSTMENT

If an adjustment is needed, follow steps as outlined below:

The gap between the armature and the pole piece of the coil as measured at (1) should be approximately .050 inches. The drive pawl should travel 1-1/4 to 1-1/2 teeth on ratchet spindle. Both of these conditions depend on the outboard bearings being perpendicular to the relay frame.

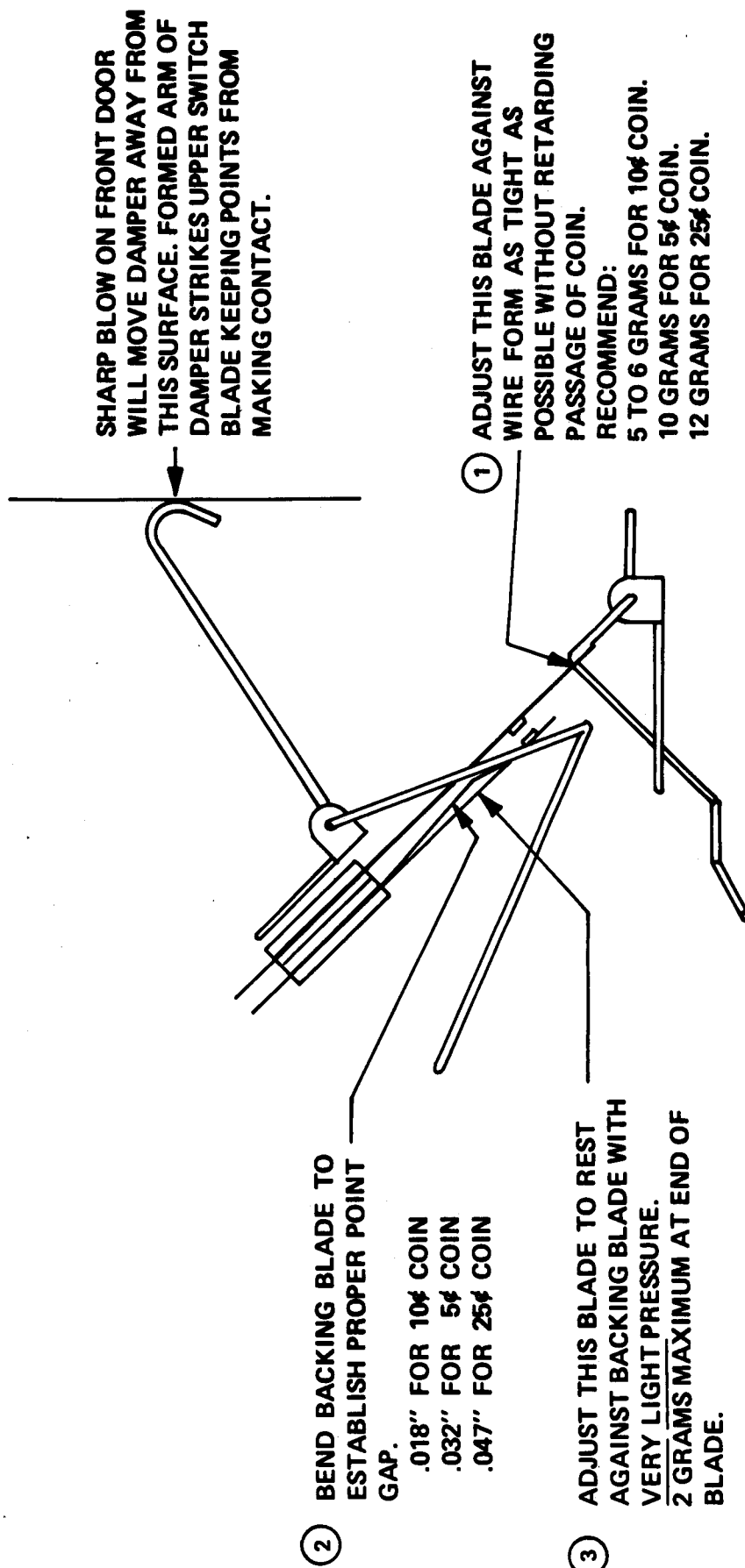
Tighten override stop (2) so that it just touches, but does not exert any pressure, on the armature. Check to see that the drive pawl is in firm contact with the ratchet spindle at (3).

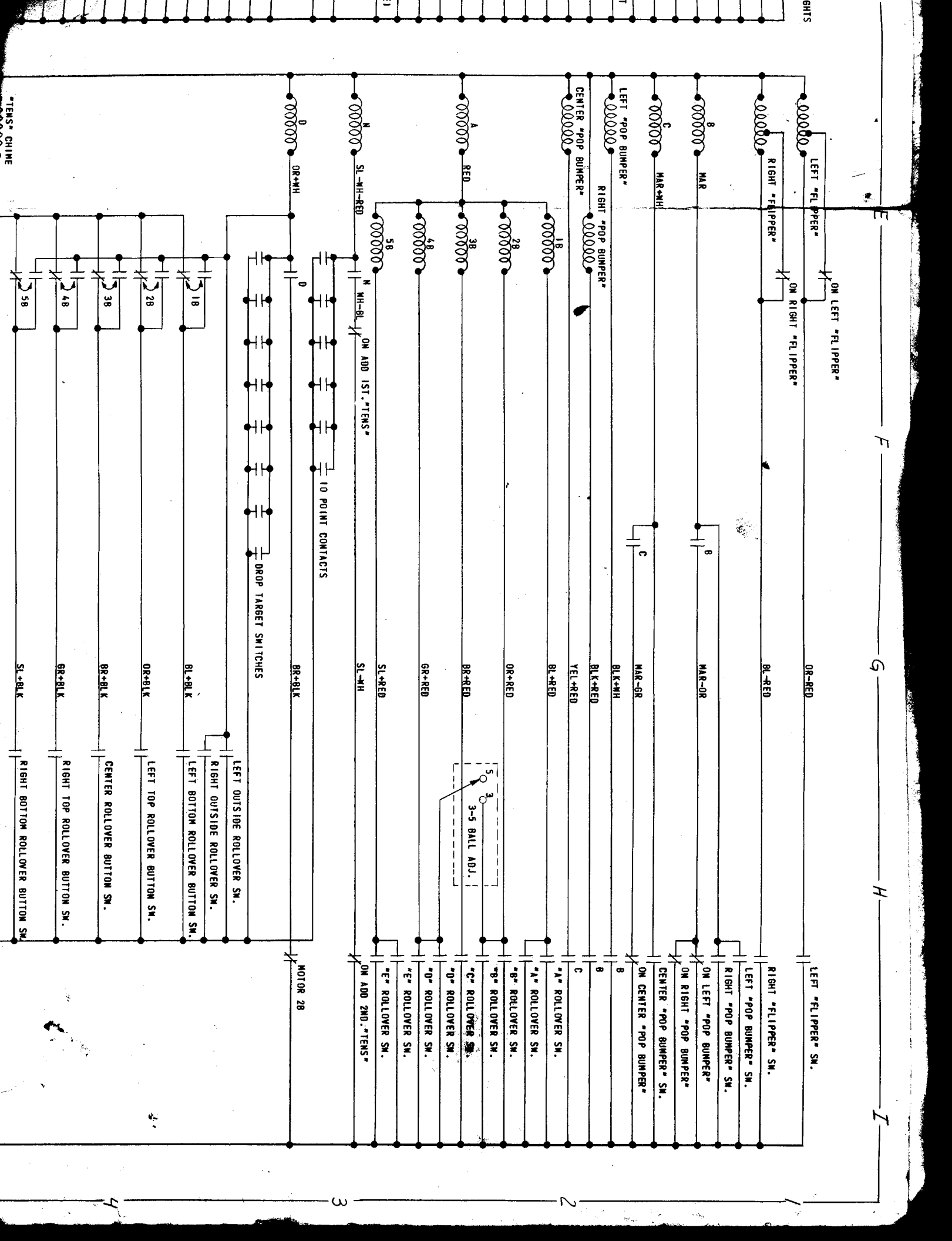
Adjust the index spring to rest in the 1st tooth back of center (4) and to exert a minimum of pressure to the ratchet. This pressure can be adjusted by bending the index spring mounting arm. Check thru one revolution to be sure the index spring clears each tooth with a minimum of backlash.

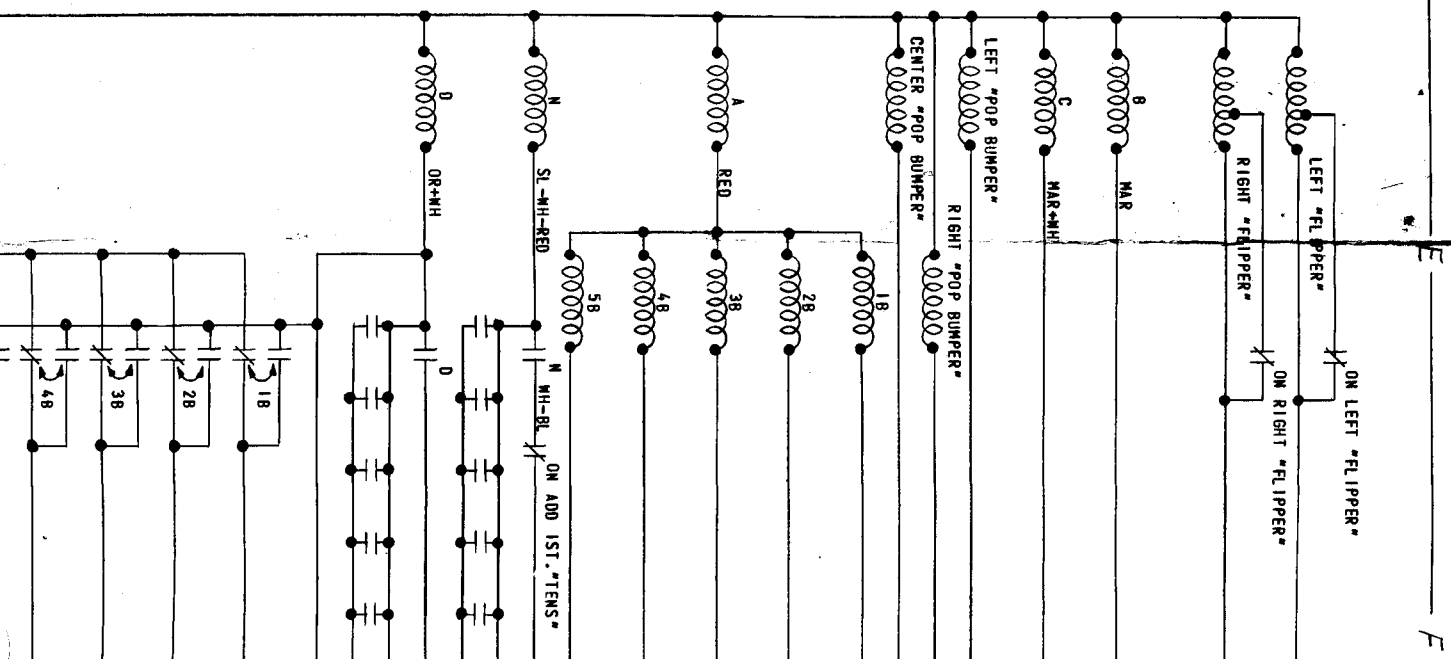
Adjust bottom switch blade to rest lightly in depression of cam; adjust top blade so that the gap between points is 1/32 inches and resting very lightly against backing blade.

If relay is equipped with a disc, the wiper will stop in the center of a segment when the above adjustments are correct.

COIN SWITCH ADJUSTMENT







10.

10.

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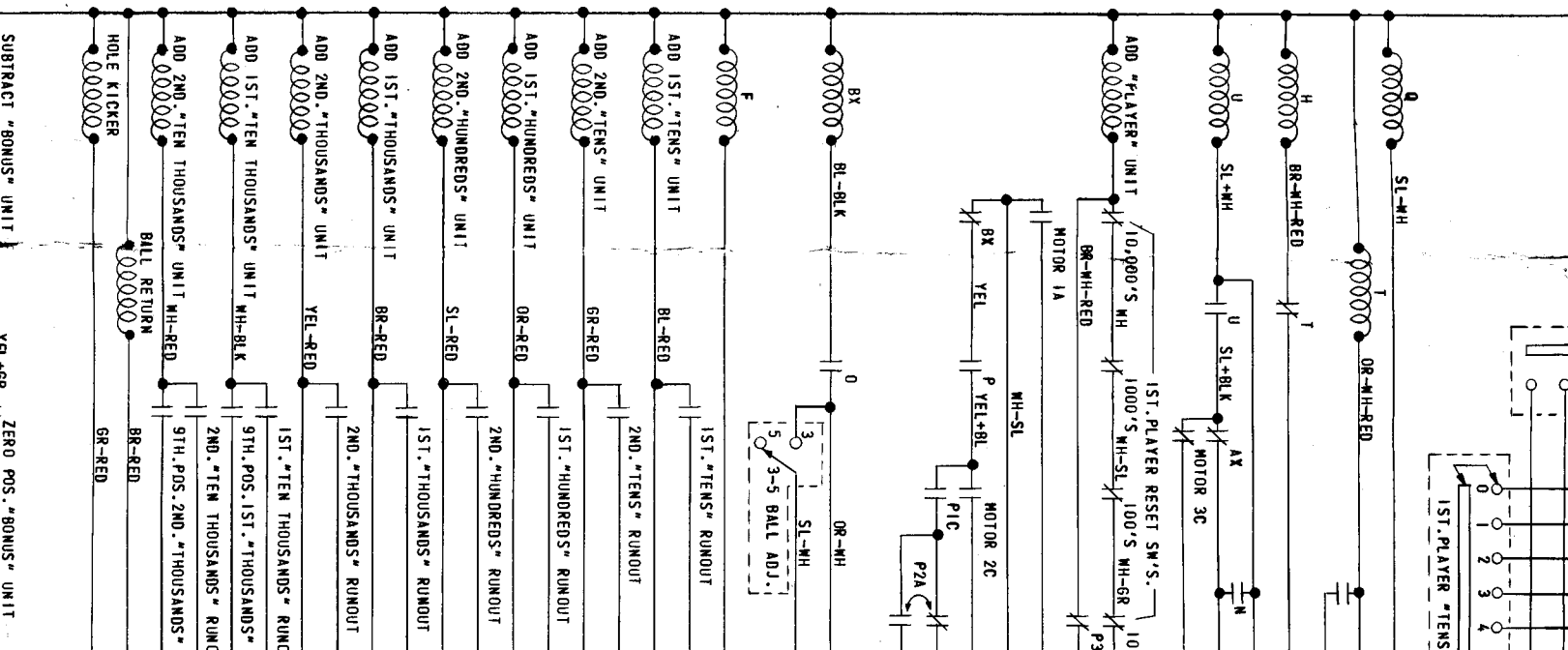
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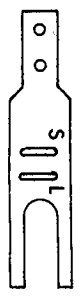
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12



BL & WH = BLUE AND WHITE MOT

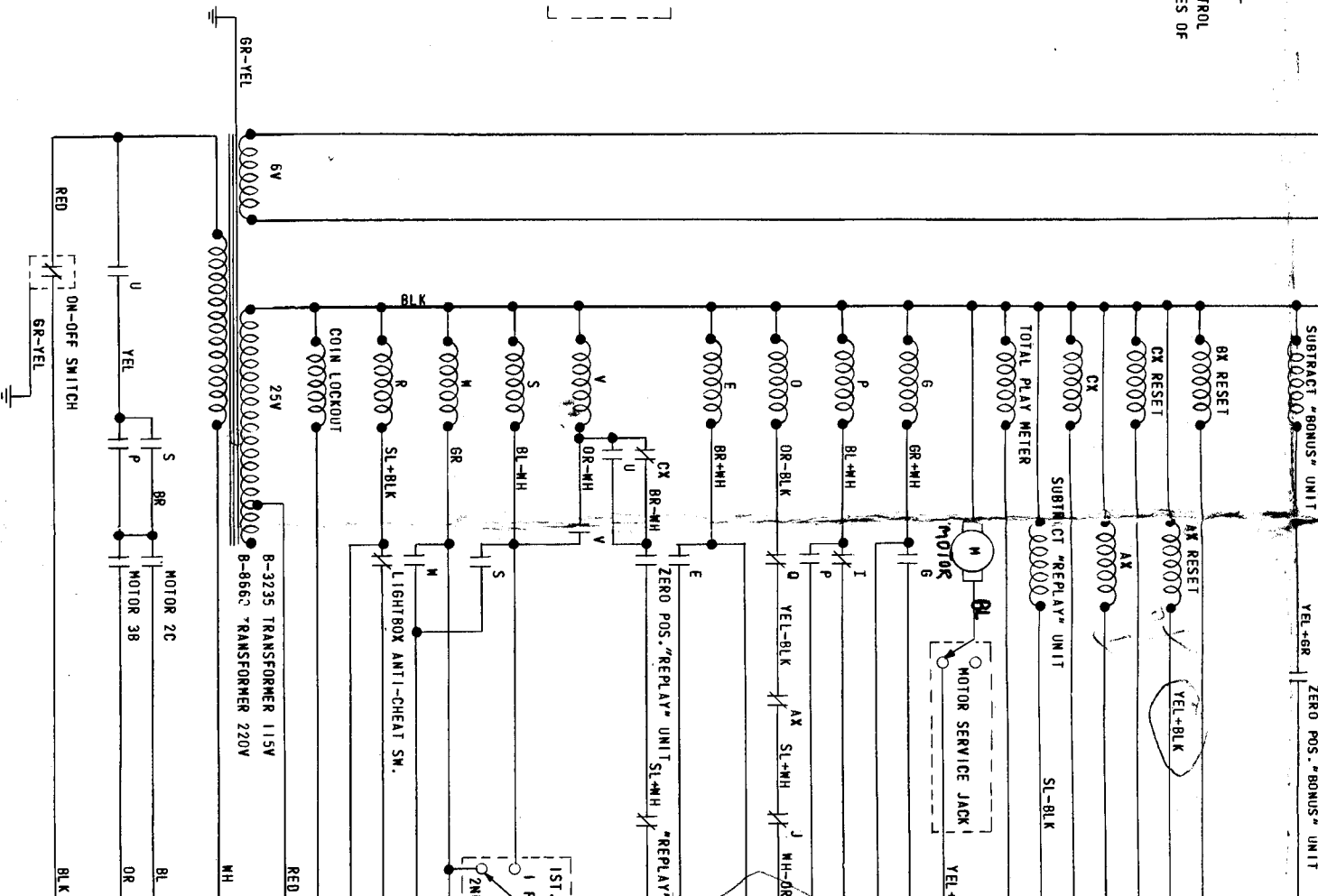
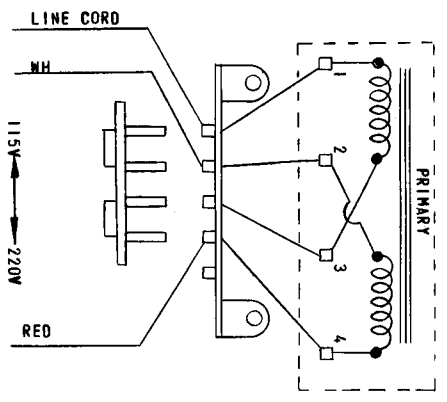
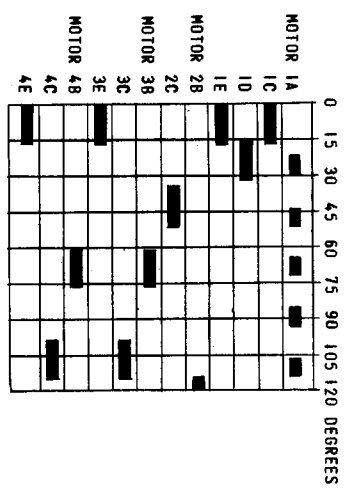




BL & WH = BLUE AND WHITE MOTTLED.
 NOTE:
 CIRCUIT IS SHOWN WITH MACHINE RESET,
 READY FOR 1ST. PLAYER TO SHOOT 1ST. BALL
 AND LINE CORD UNPLUGGED.
 DUE TO CIRCUMSTANCES BEYOND OUR CONTROL
 IT MAY BE NECESSARY TO SUBSTITUTE WIRES OF
 DIFFERENT COLORS.

POSITION	A	B	C	D	E
#1	3A "S" POS.		1A, 4B "S" POS.	1A	2A
#2		2B	5A, 1B "L" POS.		
#3		1A	2A, 2B "S" POS.		2A
#3 1/2					
#4		1A, 1B	2A, 1B "S" POS.		2A

MOTOR SEQUENCE CHART



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PIONEER

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