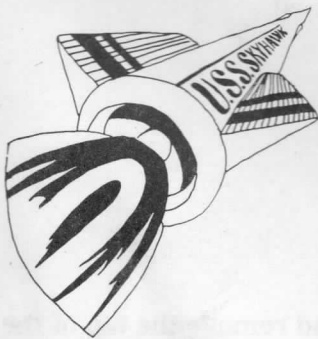


SKYHAWK II

fischer ASSEMBLY MANUAL



fischer

A DIVISION OF QUESTOR CORP.
P.O. BOX 50 CALIFORNIA, MO. 65018

A DIVISION OF
QUESTOR

INSTRUCTIONS

Your pinball game has been designed, tested and manufactured by the industry's finest craftsmen, using the highest quality material available to give you trouble free performance.

Transit damage is not the responsibility of the manufacturer and must be called to the attention of the trucking company upon receipt. See section entitled "In Case of Damage".

Upon receipt of your game, please be sure to read the Owner's Manual carefully for "Assembly Instructions" and provided "Maintenance Tips".

IN CASE OF DAMAGE

If there is no visible damage to the carton, but concealed damage is discovered upon opening the product, proceed with the following steps:

1. Stop unpacking.
2. Save all packing material for inspection by the carrier.
3. Notify the carrier immediately (within 15 days of receipt) and request an inspection.
4. Confirm the damage to the carrier and state your intent to file a claim of damage.
5. Retain a copy of the inspection report.

The Skyhawk pinball game model no.3019 provides the finest quality construction and a unique design in pinball machines.

Step-by-step instructions for the set up of this game will follow later on in the text. These instructions must be followed to assure proper assembly of this game. There is also a parts list provided for ordering replacement parts.

PACKING INFORMATION

Position the carton in the general vicinity where the game will be set up and remove the top of the telescoping portion of the carton.

NOTE: Place some material onto the floor such as carpeting, etc., and remove the main cabinet placing it onto the material with the bottom upward and begin set-up.

All Fischer products have been carefully inspected to insure completeness and proper fit and are warranted against defective workmanship. Carefully unpack and examine each carton as well as packing material before discarding to make sure you have all the parts for proper installation of your game.

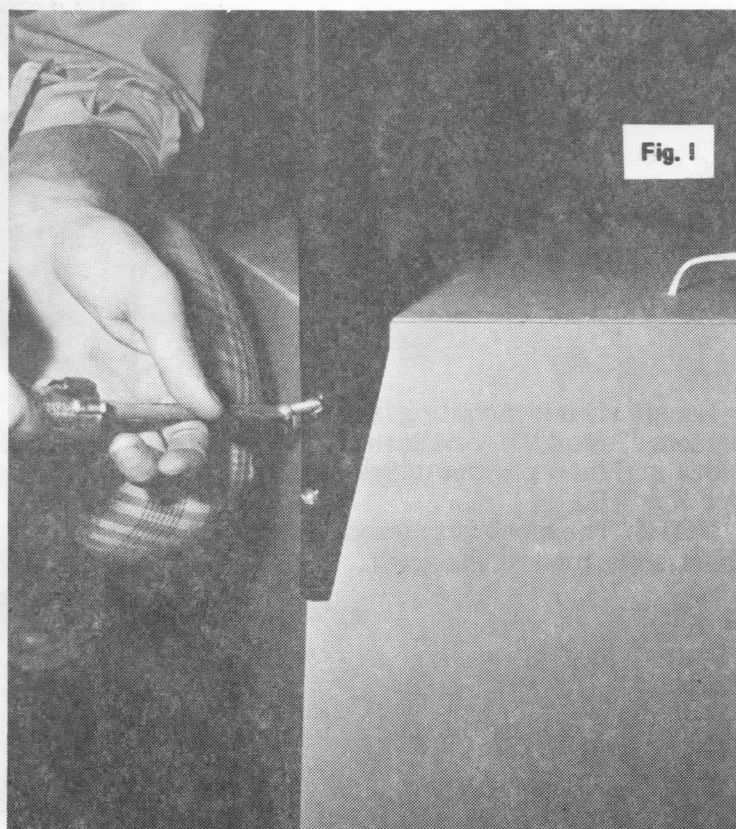
Your game is shipped in one (1) main carton.

LIMITED 90-DAY WARRANTY

The Fischer Sky Hawk Pinball is warranted to the original retail purchaser for a period of 90 days from date of purchase against defects in material and workmanship which are not the result of abuse, misuse, alteration, accident, improper assembly or installation, damage in transit or failure to maintain properly the unit as stated below, provided the enclosed warranty registration card has been completed and returned within 15 days of purchase. As a condition to this warranty, the consumer must have performed all normal maintenance on the unit as outlined in the owner's service manual. Call 800-325-8012 to obtain the name and address of the Fischer service center nearest your home. Free in-home warranty service will be provided if the defect has occurred within 30 days of purchase. After 30 days, a mileage charge for service must be paid by you or you have the responsibility to transport the unit to and from the dealer's place of business at your expense and risk. For further information concerning this warranty, please write Fischer Manufacturing Company, P.O. Box 50, California, Missouri 65018. This warranty does not cover bulbs, rubber bands, or damage to the plastic playfield or score unit covers. Damage that occurs in transit must be claimed against the shipper. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Remove the package of installation hardware and the (4) four legs from the carton.

Locate the (8) $\frac{1}{4}$ " - 20 x $2\frac{1}{2}$ " round head Phillips machine screws and with the legs positioned on the cabinet corner to match the pre-drilled hole patterns, install the (2) two mounting screws into each leg per Fig. I. Turn unit upright on its legs.



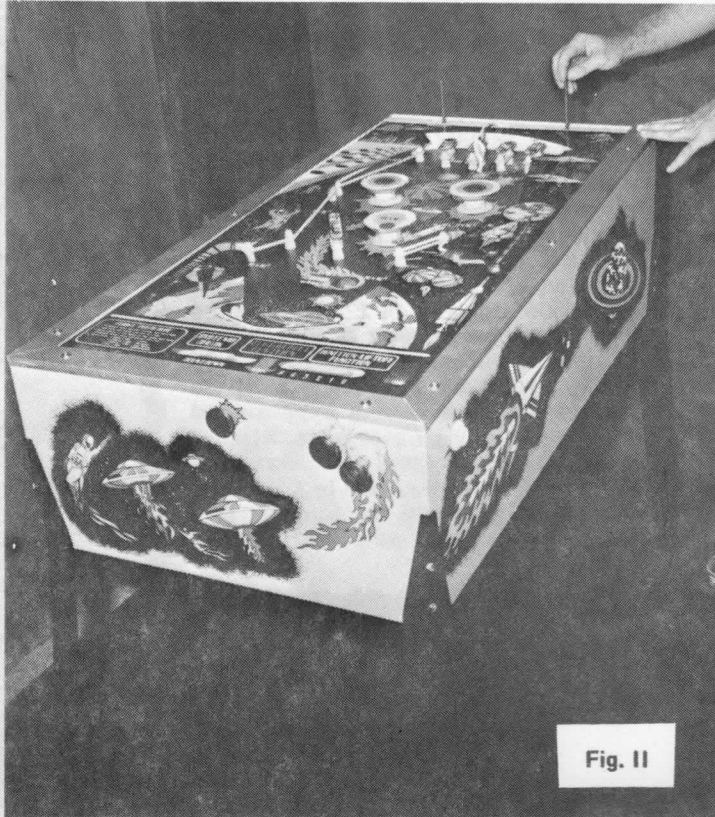


Fig. II

Locate the (2) two $\frac{1}{4}$ " - 20 x 6" long threaded rods from hardware package and install them into the (2) two outside holes until $2\frac{1}{2}$ to 3" is left protruding from the top of the main cabinet per Fig. II.

NOTE: Raise the glass adjacent to rods and place 5 balls into the table.

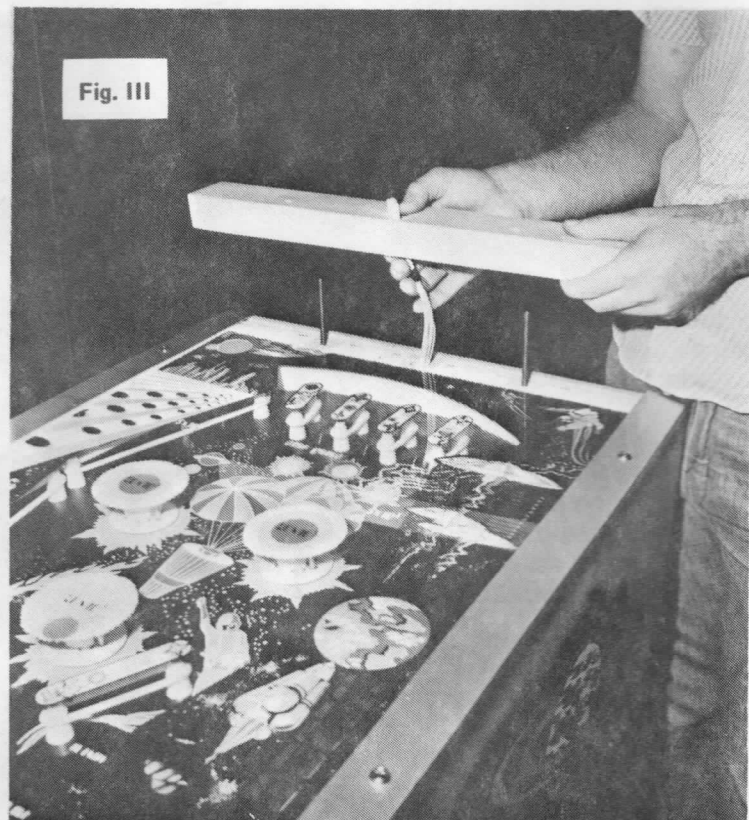
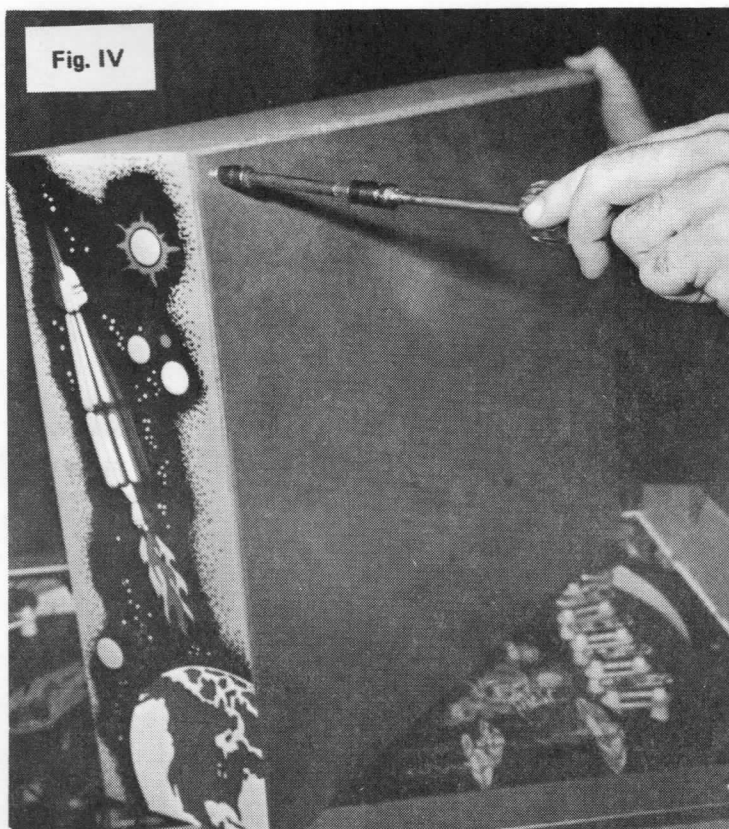


Fig. III

Locate (1) one mounting block in the main carton. Thread the wire harness through the block and then position block onto the rods per Fig. III.

NOTE: The block is tapered. Position the thick edge toward the front.

Fig. IV



Remove the upper cabinet from the carton and disassemble the back of the cabinet by removing (4) four No. 8 x $\frac{3}{4}$ " hex head screws per Fig. IV.

Fig. V



Thread the wire harness through bottom of cabinet and then place cabinet over rods per Fig. V.

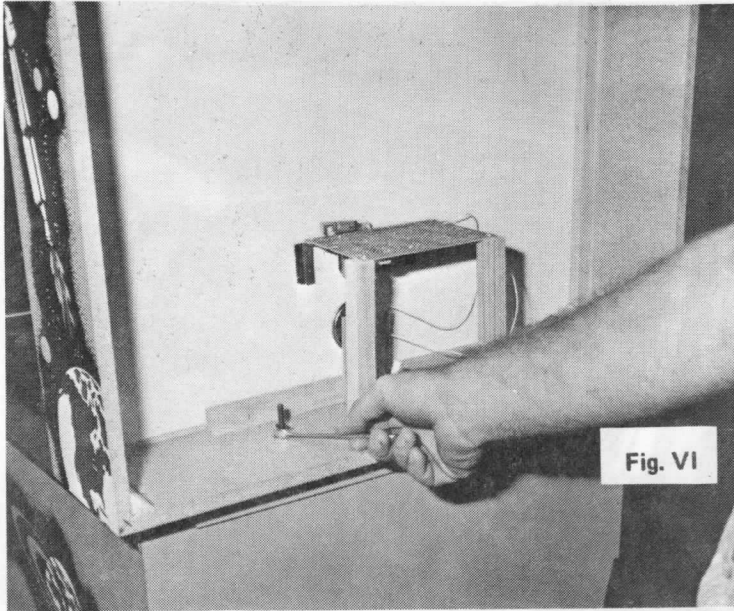


Fig. VI

Locate the (2) two $\frac{1}{4}$ " diameter flat washers and (2) two $\frac{1}{4}$ " diameter 20 UNC hex nuts and attach the cabinet top securely per Fig. VI.

The connector on the end of the wire harness should be plugged into the terminal strip on the printed circuit board which is attached to the back of the upper cabinet faceplate. Care should be taken that the connector is fully engaged and that the P.C. board is not disturbed per Fig. VII.

It should be noted that the connector can be installed improperly. To assure proper assembly refer to Fig. VII. (The step in the connector faces downward.)

Reinstall back in the same manner it was removed from upper cabinet using the (4) four screws when it was disassembled.

NOTE: Make sure there are no particles or chips to interfere with the roll of the ball in the ramp.

This completes the installation of the Sky Hawk pinball.

Please note - the general playability of this unit is somewhat affected by the levelness of the game. To assure optimum ball roll during normal play, it is desirable to have the game as level as possible. Also, the game has a "pendulum" type tilt mechanism, so it is important the pinball game is level to assure uniform sensitivity.

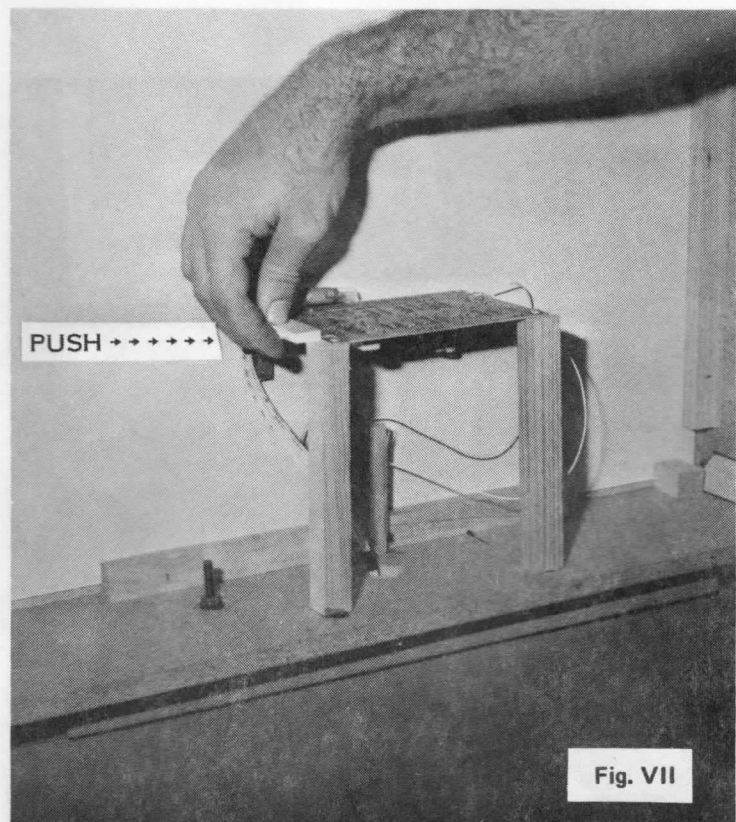


Fig. VII

BASIC GAME OPERATION

REFER TO FIG. 1, PAGE 3.

First, your Home Pinball Game should be plugged into an electrical outlet (110 volt household current) and the cord switch turned "on".

Second, pull in the reset knob to release the five steel game balls. This will also reset the scoring digits to zero.

Third, push the ball lift knob to raise the first game ball into position in front of the ball shooter.

Fourth, pull back the ball shooter and release it to shoot the ball into the playfield.

Once the ball enters the playfield, scoring will begin. The player's goal is to get as high a score as possible with five balls (balls which go into the free ball lane are played again for additional scoring).

Scoring occurs when the ball hits various bumpers, switches or goes over the roll-over. The flippers are used to keep the ball in play to increase the score, and as skill and timing improve. . so will scoring.

The player continues to shoot until all five balls (any free balls) have been played. . which completes the scoring for that game. When all 3 roll-over switches have been activated the bonus light is lighted and the bonus score changes from 5 to approximately 150 points.

Compete with other players to see who can get the highest score, or play again to improve your own scoring ability. It is recommended that one ball be played at a time. If more than one ball is in play a circuit breaker may open. If this occurs reset breaker on the under side of main cabinet.

HOW IT WORKS

This Section will help explain how the game actually operates so that the maintenance and service sections of this manual are more understandable.

Basically, this Home Pinball Game is a combination of levers, switches, lights, and solenoids that operate on low voltage (7 volts or 28 volts). The game has three main operating sections: (1) the Score Unit Assembly, (2) the Playfield, and (3) Player Controls. These sections are explained below and refer to Fig. 1.

SCORE UNIT ASSEMBLY

The Score Unit Assembly receives power from the transformer, which reduces the high voltage from your house. The transformer is protected by resettable circuit breakers which prevent transformer overload. The transformer also sends out low voltage power to the playfield that operates all the switches and solenoids (28 volts) and all lights and scoring (7 volts). The ball rolling on the playfield will close various switches that send signals to the score unit through wires. These wires are combined into what is called an electrical harness. The playfield wires and the score unit assembly wires are connected by an electrical connector.



PLAYFIELD

The playfield has all the parts that cause scoring and ball action. When the ball hits one of the bumpers or kickers, a switch is closed, sending a signal to the corresponding solenoid. This solenoid takes electrical energy and turns it into mechanical energy that causes ball action. . . in the case of your Sky Hawk Pinball Game, the bumpers and kickers move the ball away faster than it hit. At the same time all this is going on, a signal is sent through the wire harness to the score unit, which records the points from the scoring area. In the case of the Roll-Over and Upper Rubber Band Switches, no solenoids are activated, but a signal is sent directly to the score unit to register the points.

PLAYER CONTROLS

The Player Controls are located on the outside of the lower cabinet and are: the score reset knob, the ball lift knob, the two flipper buttons, and the ball shooter. They are mechanical inputs from the player that either move the ball or close switches. The ball lift and ball shooter apply force directly to the ball. Pulling in the reset knob mechanically releases five balls and also closes a switch that resets the four (4) digits to zero. Pushing in either flipper button closes a switch that causes the flipper solenoid to move both its respective flipper.

Before disassembling or performing any maintenance or service procedures on your Sky Hawk Pinball Game, its electrical cord must be disconnected from the Sky Hawk electrical outlet and remain disconnected until it has been completely reassembled.

PRECAUTIONARY STATEMENT

Before attempting to disassemble, perform maintenance on, or service this game, read this Owner's Manual completely.

This game is intended for recreational use in the home and not for commercial or institutional purposes. Commercial or institutional use voids the warranty.

MAINTENANCE

Your Sky Hawk Pinball Game has been designed to be trouble-free but easy to service. Simple adjustments and repairs can be made in the home. Under normal playing conditions, no regular lubrication or cleaning of the mechanical or electrical parts is needed. If the game has received very heavy play, has been in a dusty environment, or has been played over an extended length of time. . . the following parts may be lubricated, after the part has been wiped clean:

Ball Shooter Rod - Light Oil.
 Bumper Cup Blade - SAE Grease.
 Kicker Arm Pivots - Light Oil.
 Reset Rod - Light Oil.
 Ball Lift Rod - Light Oil.

— This is normal consumer maintenance and is not covered by warranty.

The playfield and scorer plastic face sheets, and the main cabinet, can be cleaned with a soft cloth and a mild, non-abrasive, detergent or glass cleaner. Cleaners using ammonia or solvents could cause damage and should not be used.

Servicing steps are detailed in the following PROBLEM SOLVING section, and they will help solve most of the problems that could happen.

It should be noted that the customer is responsible for normal maintenance of the Skyhawk Pinball. This includes keeping the switches in proper adjustment, replacing bulbs or rubber bands, and lubricating.

PROBLEM SOLVING

Most of the problems that could happen are minor in nature and are relatively easy to solve. As with any machine that delivers as much action as your **Sky Hawk Pinball Game**, some adjustments over time will be required to maintain maximum performance and enjoyment. Reading the previous sections of this manual is strongly recommended to help you understand the terms used in this section, and **BEFORE PERFORMING ANY OF THE STEPS IN THIS SECTION, MAKE SURE YOU HAVE THOROUGHLY READ THE PRECAUTIONARY STATEMENT ON PAGE 9.**

For a detailed view of how each item is assembled (disassembled) refer to the **SERVICE PARTS** section of this manual. Component identification can be simplified by reviewing each assembly breakdown.

Before attempting any of the recommended solutions, read the following information.

To remove the playfield cover disassemble chrome trim by removing (8) No. 8 x $\frac{3}{4}$ oval head screws, lifting the cover up and disengaging the match mate. Following this you should remove the six Phillips screws that attach the playfield to the cabinet.

To lift the playfield up, push the two flippers all the way up; lift the bottom out; and pull the top from under the upper cabinet.

NOTE: Do not lift the playfield more than 8" up from the cabinet until you have disconnected the wire harness from the P.C. board inside the main cabinet per Fig. IX.

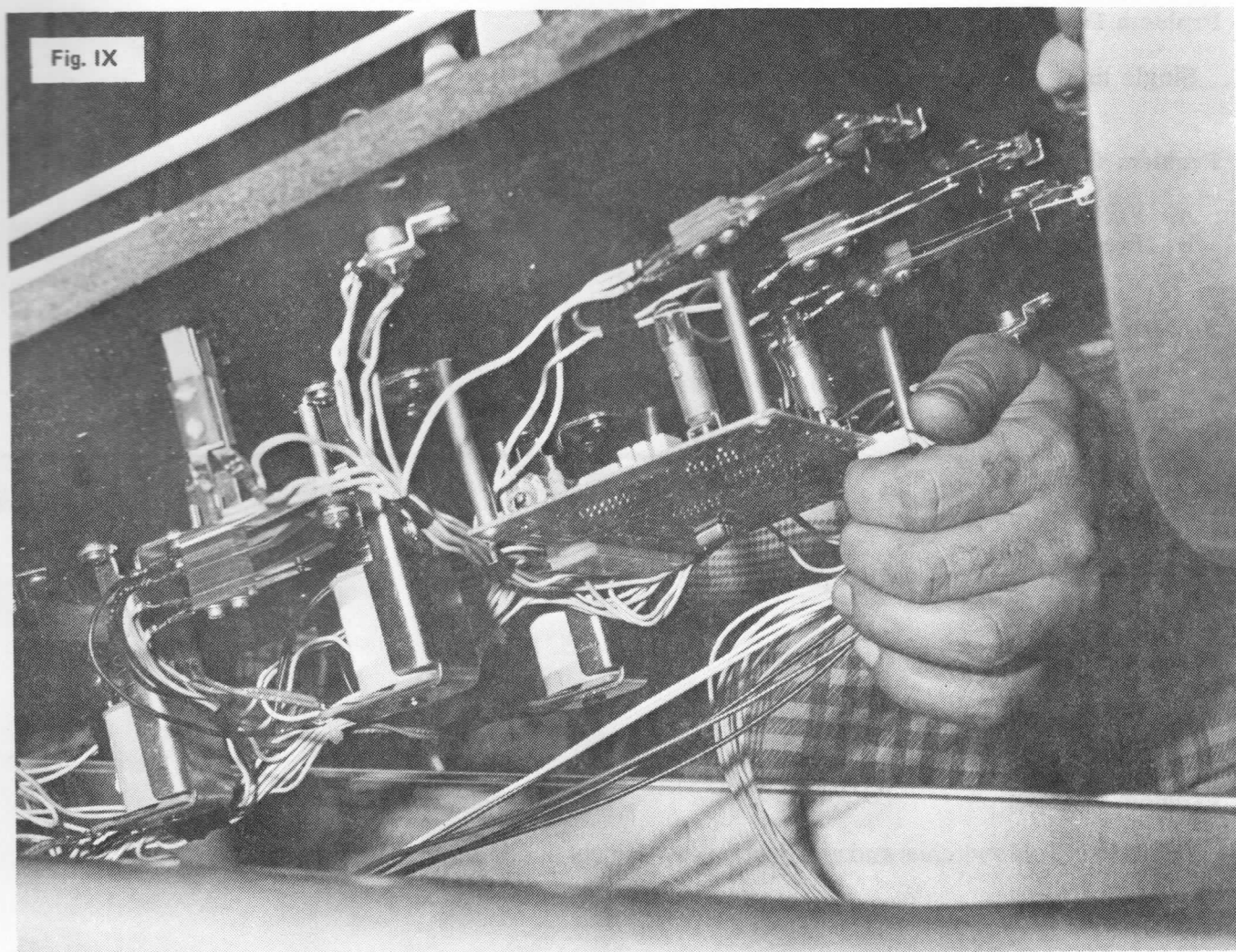


Fig. IX

Problem Description

All lights "off" - nothing works on the playfield.

Problem Cause

- A. No power from AC outlet.
- B. Circuit breaker "open".
- C. Electrical connection.

Problem Solution

- A. Turn live switch on; firmly insert plug into outlet. Check outlet for power by using some other appliance that you know works.
 - B. Reset breakers by pressing button on the underside of bottom of main cabinet.
 - C. Check for loose or broken wires.
-

Problem Description

Single light does not go on.

Problem Cause

- A. Failed electrical part.
- B. Electrical connection.

Problem Solution

- A. Replace defective light bulb with one known to work.
 - B. Check lead for loose or broken wires.
-

Problem Description

Unit holds steady tone when plugged in.

Problem Cause

Scoring switch is closed.

Problem Solution

Check playfield switches and readjust any switch out of adjustment.

Problem Description

Unit scores continually.

Problem Cause

P.C. board on underside of playfield is unplugged or connector is on upside down.

Problem Solution

Lift playfield and check plug in on P.C. board to make sure it is plugged in properly.

Problem Description

Reset knob releases balls but does not reset score.

Problem Cause

Switch contact adjustment.

Problem Solution

Adjust switch attached to front, inside of cabinet to a maximum gap of about $\frac{1}{4}$ ". Note that the switch should close when release rod is fully extended out.

Problem Description

Circuit breaker trips "repeatedly".

Problem Cause

Circuit breaker will trip when there is a switch closed either in the thumper or kicker circuit or when the flipper switch is not opening.

Problem Solution

Recheck all of the switch contacts to make sure that all are adjusted properly.

Problem Description

Roll over fails to score every time or roll over stops the ball.

Problem Cause

- A. Switch contact adjustment.
- B. Dirty contact.

Problem Solution

- A. Adjust roll over switches so they operate when switch wire is approximately $\frac{1}{4}$ " above playfield surface.
 - B. Clean contact with fine abrasive paper.
-

Problem Description

Bumper does not work.

Problem Cause

- A. Circuit breaker trip.
- B. Switch adjustment.
- C. Failed electrical part.

Problem Solution

- A. Reset circuit breaker by pushing button on underside of cabinet bottom.
 - B. Adjust bumper switch to a $\frac{1}{32}$ " gap.
 - C. Inspect coils for loose connection. If problem is not solved, replace coil.
-

Problem Description

Bumper action slow, inconsistent or not scoring every time.

Problem Cause

- A. Switch adjustment.
- B. Hardware loose or missing.

Problem Solution

- A. Gap contacts of cup blade switch on bottom of playfield to .030" as indicated. The plastic post must be in the center of cup for uniform action.
- B. Inspect coil plunger for missing or loose hardware and replace or tighten.

Problem Description

Kicker does not work; does not score everything hit.

Problem Cause

- A. Circuit breaker tripped.
- B. Switch adjustment.
- C. Electrical connection.
- D. Failed electrical part.

Problem Solution

- A. Reset circuit breaker by pushing button on underside of cabinet bottom.
 - B. Adjust switch at rubber band so that contacts are 1-16 apart.
 - C. Check for loose or broken wires.
 - D. Inspect coil for looseness. If problem is not solved, replace coil.
-

Problem Description

Flippers "chatter" when operated.

Problem Cause

- A. Switch adjustment.
- B. Failed electrical part.

Problem Solution

- A. Adjust leafs on switch so that they make contact half way into stroke of button.
 - B. Inspect flipper coil assembly and make sure contacts are closed (touching). To adjust contact properly, push coil plunger all the way into coil and adjust contact point to 1/16" gap.
-

Problem Description

Neither push button makes the flippers work.

Problem Cause

- A. Circuit breakers.
- B. Switch adjustment.
- C. Electrical connection.

Problem Solution

- A. Reset circuit breaker located on underside of main cabinet bottom.
- B. Adjust the flipper switch so that it makes contact approximately half way into the stroke of button.
- C. Inspect assembly for a loose wire or bad connection either at the switch or coil on the playfield.

Problem Description

One push button fails to operate flippers.

Problem Cause

- A. Electrical connection..
- B. Switch adjustment.

Problem Solution

- A. Inspect assembly for a loose or bad wire connection either at the switch or coil on the playfield.
 - B. Adjust the flipper switch so that it makes contact approximately half way into stroke of button.
-

Problem Description

LED's don't light up.

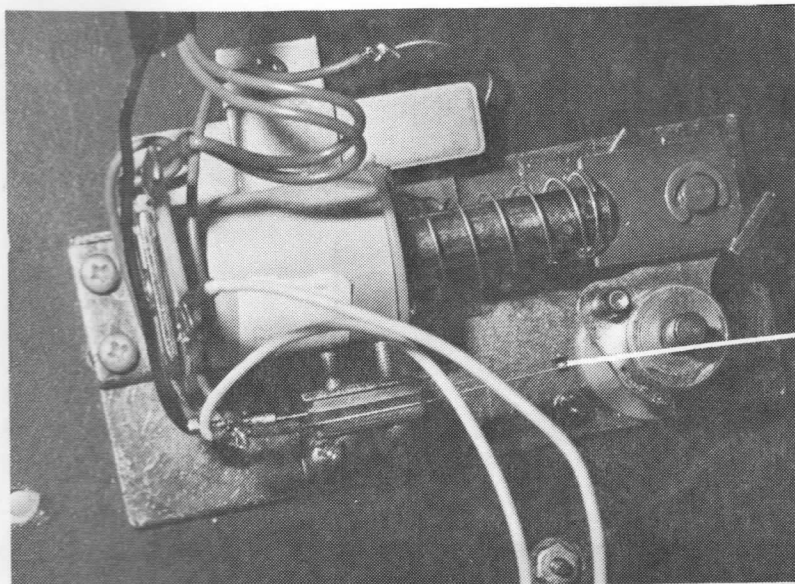
Problem Cause

- A. Connector is unplugged.
- B. Connector is on upsidedown.
- C. Electrical connection.

Problem Solution

- A. Remove back of upper cabinet and plug in connector properly.
- B. Remove back and plug in connector.
- C. Inspect plug-in for loose or broken wires.





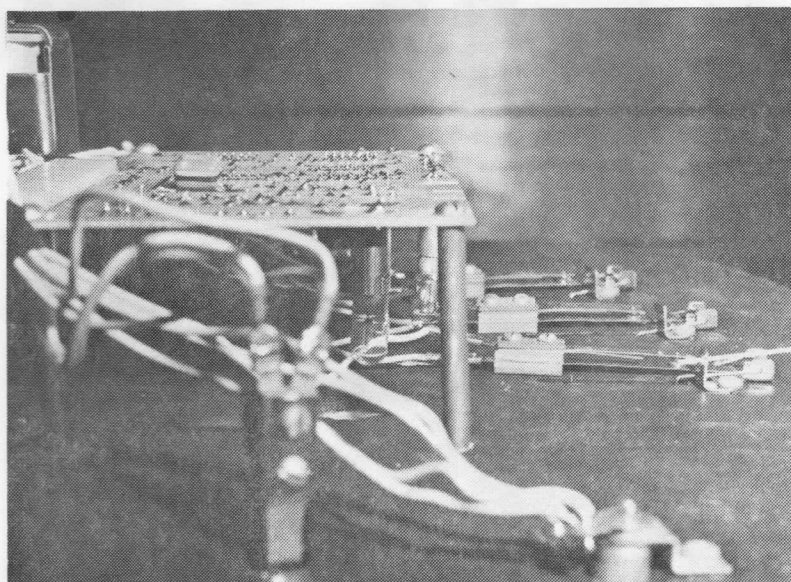
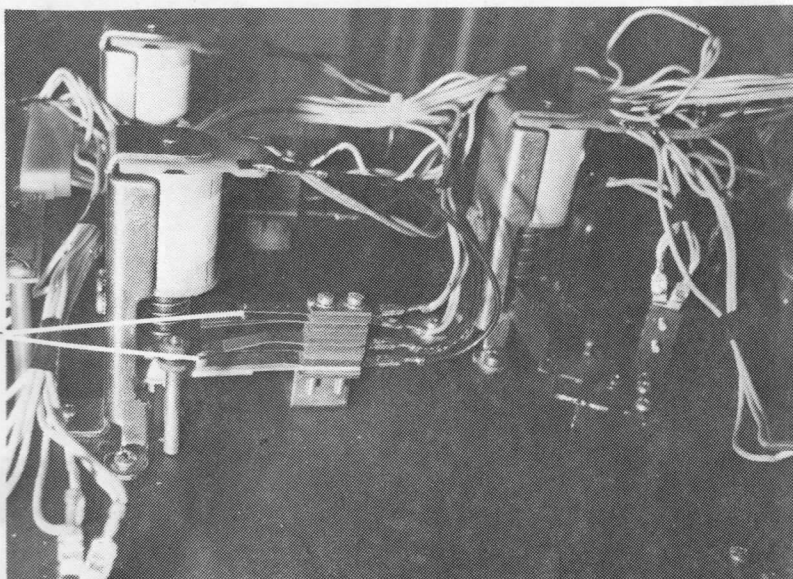
FLIPPER ASSEMBLY

Closed

NOTE: When coil is activated gap should be $1/16''$.

THUMPER ASSEMBLY

Gap of $1/32''$ open.



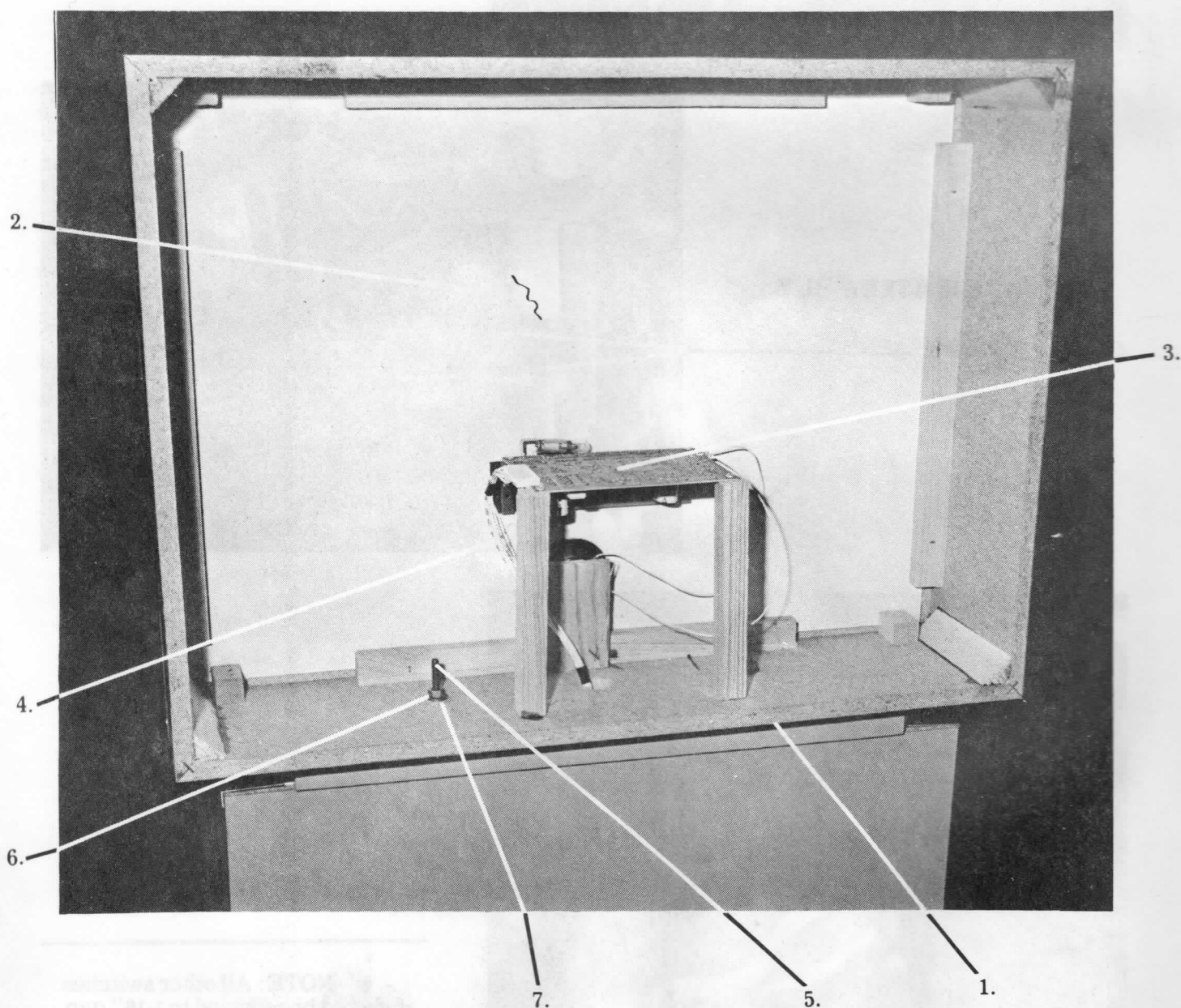
ROLL OVER ASSEMBLY

$1/32''$

NOTE: All other switches should be adjusted to $1-16''$ gap.

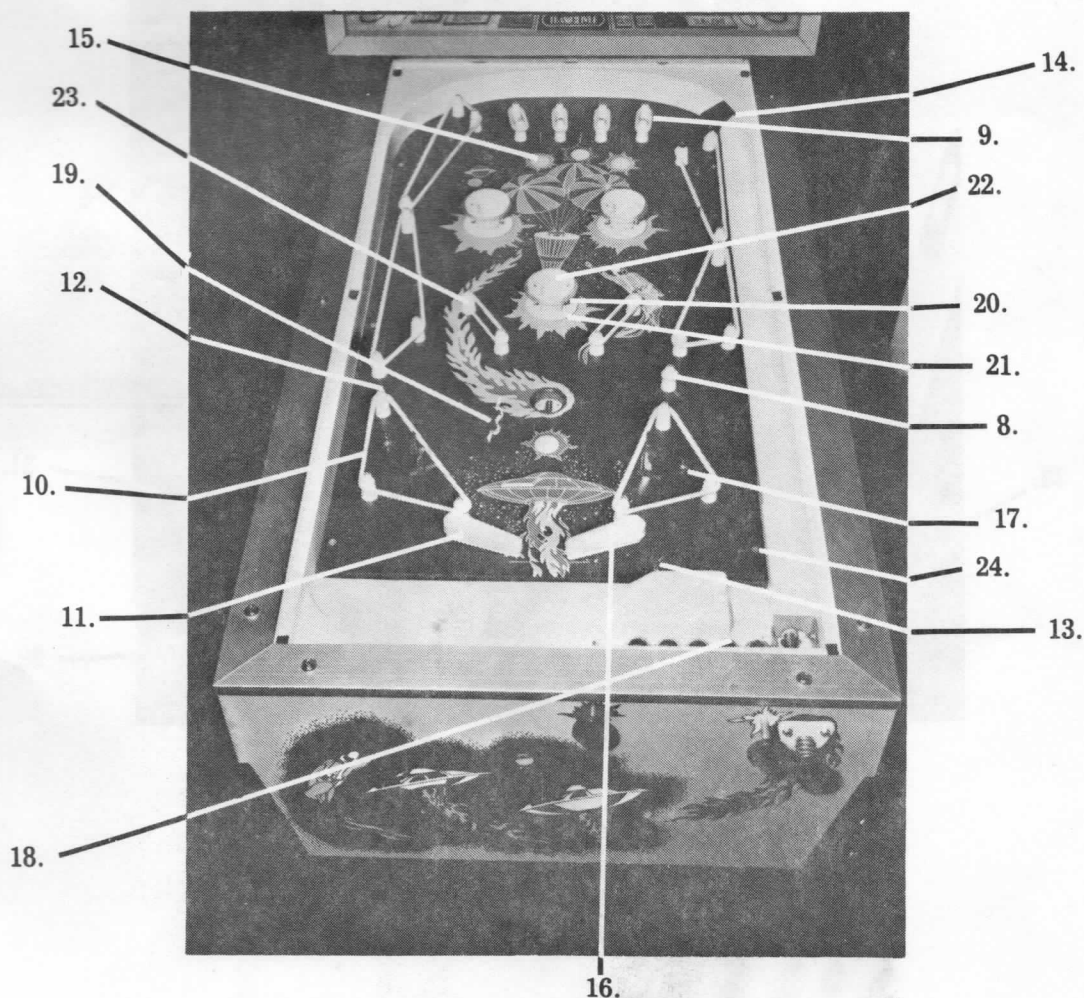
PARTS LIST UPPER CABINET

Item No.	Description	Qty.	Parts No.
1.	Upper Cabinet	1	03-54-038
2.	Upper Cabinet Face	1	02-62-031
3.	P.C. Board with LED's	1	02-64-003
4.	Cabinet Harness	1	02-64-006
5.	$\frac{1}{4}$ " - 20 x 6" Diameter Rod	3	02-56-024
6.	$\frac{1}{4}$ " Flat Washer	3	02-56-004
7.	$\frac{1}{4}$ " Hex Nut	3	02-56-006



TOP PLAYFIELD

Item No.	Description	Qty.	Parts No.
8.	5-16" ID Ring	1	02-62-037
9.	1 ID Ring	4	02-62-038
10.	4 ID Ring	7	02-62-039
11.	Flat Kicker Ring	2	02-62-040
12.	Bumper Post Screw	31	02-54-012
13.	Guide Wire with Nuts & Washers	1	08-22-059
14.	Ball Gate and Bracket	1	02-22-060
15.	1 Plastic Disk	4	02-62-041
16.	Flipper Arm Assembly	2	02-64-015
17.	No. 47 Lamps	9	02-64-004
18.	Steel Balls	5	02-64-036
19.	Playfield	1	02-66-009
20.	Thumper Ring and Rod Assembly	3	02-64-031
21.	Thumper Skirt	3	02-64-032
	Thumper Base (item not shown)	3	02-64-033
22.	Thumper Body	3	02-64-034
	Thumper Spring (item not shown)	3	02-64-035
23.	Bumper Post	31	02-62-036
24.	Playfield Screws	6	02-54-011
	Power Cord with Switch (item not shown)	1	02-64-009



PARTS LIST

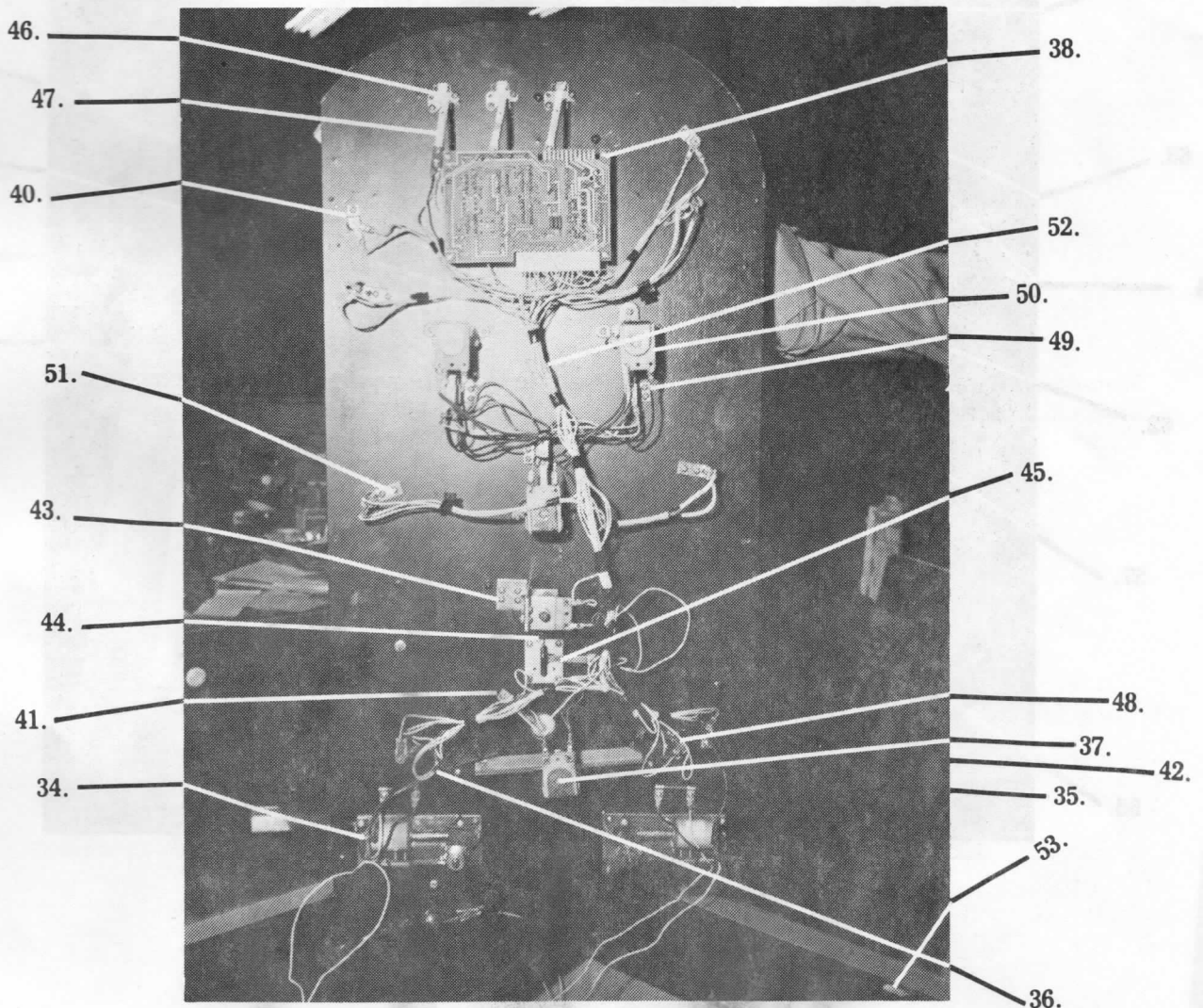
Item No.	Description	Qty.	Parts No.
25.	Cabinet	1	03-54-034
26.	Pull Rod Assembly	1	02-64-037
27.	Push Rod Assembly	1	02-64-038
28.	Ball Shooter Assembly	1	02-64-034
29.	Flipper Button Assembly	2	02-64-041
30.	Playfield Cover	1	02-62-042
31.	No. 10 x 1" - 24 Round Head Machine Screws	3	02-50-026
	Reset Switch (item not shown)	1	02-64-040
	Flipper Switch (item not shown)	2	02-64-042
32.	Legs	4	02-58-017
33.	1/4" - 20 UNC x 2 1/2" Oval Head Machine Screw	8	02-50-026



PARTS LIST

19.

Item No.	Description	Qty.	Parts No.
34.	Flipper Assembly (Right)	1	02-64-013
35.	Flipper Assembly (Left)	1	02-64-014
36.	Kicker Arm	2	02-64-016
37.	Long Kicker Coil Assembly	1	02-64-017
38.	No. 6 x 2 1/2" Round Head Phillips Screw (Type "A" Threads)	4	02-54-013
39.	Spring for Kickout Coil (Not Shown)	1	02-64-014
40.	No. 47 Lamp Socket	4	02-64-019
41.	No. 47 Lamp Socket (Bonus)	1	02-64-020
42.	Resistors	2	02-64-021
43.	Ball Kickout Assembly	1	02-64-022
44.	Ball Kickout Plunger Assembly	1	02-64-023
45.	Ball Kickout Switch	1	02-64-024
46.	Roll Over Switch	3	02-64-025
47.	Roll Over Leaf Switch	3	02-64-026
48.	Kicker Switch	8	02-64-027
49.	Thumper Switches	3	02-64-028
50.	Thumper Coil Assembly	3	02-64-030
51.	No. 6 x 1/2" Round Head Phillips Screws (Type "A" Threads)	72	02-54-014
52.	Playfield Harness	1	02-64-012
53.	Match Mate	6	02-64-034



PARTS LIST

Item No.	Description	Qty.	Parts No.
54.	Tilt Bracket	1	08-22-057
55.	Circuit Breaker Bracket	1	08-22-058
56.	Circuit Breaker Switch	2	02-64-010
57.	Transformerr	1	02-64-011
58.	No. 6 x ½" Oval Head Phillips Screws	8	02-54-014
59.	3-16" - 24 x 2½" Long Machine Screw	1	02-50-025
60.	3-16" - 24 Hex Nut	1	02-56-026
61.	Cabinet Harness	1	02-64-006
62.	Cabinet Trim	1	03-52-035
63.	Washer - No. 8 Grommet	8	02-54-016
64.	No. 8 x ¾" Oval Head Screw	8	02-56-029

