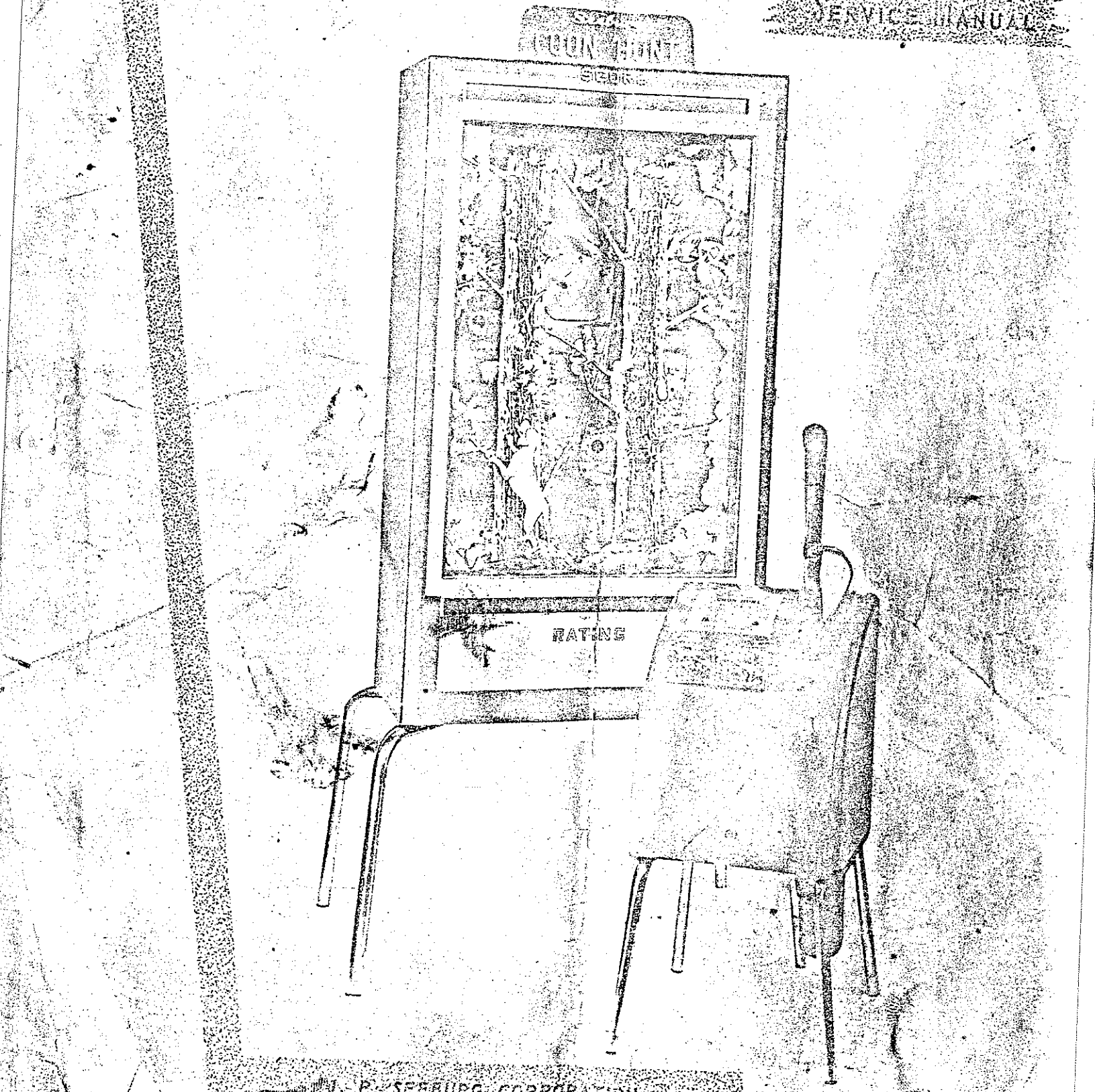
Seeburg Coin Phone

RAY-O-LITE RIFLE RANGE
Model G-6

Shooting Gallery

Jan. 1961

SERVICE MANUAL



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SEEBURG COON HUNT
Ray-O-Lite Rifle Range
Model G-5

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SEEBURG COON HUNT
Ray-O-Lite Rifle Range
Model G - 5

The Seeburg, Model G5, is a Ray-O-Lite rifle range with two moving targets and a rifle that is handled and aimed like a conventional rifle. It consists of a Target Cabinet, a gun stand and the rifle. Power connection to 117-volt, 60-cycle AC lighting circuit is made with a line cord and plug at the Target Cabinet. This cabinet can be supported from the floor with metal legs or it may be supported with a wall bracket. A 50-foot, 7-conductor cable connects the gun stand and the target cabinet. An 8-foot, 5-conductor cable connects the rifle and the gun stand. The long cable between the target and the gun stand permits operation of the range with shooting distance up to 45 feet. The entire operation of the range, except the main power switch, is from the gun stand. The power switch is in the target cabinet.

When the rifle is aimed and fired, it flashes a ray of light at the target. If it is aimed accurately, a photoelectric cell in the target is actuated by the light and a hit is scored. A "game" consists of 20 shots with score indicating lights in the target cabinet showing how many of the twenty shots resulted in hits. In addition to indicating the number of hits made, the score lights give a proficiency rating of Marksman, Sharpshooter or Expert. The rating of Marksman is given for a score of 12 to 15 hits; Sharpshooter, for a score of 16 to 18; Expert, is for a score of 19 or 20 hits.

The two targets operate independently although the score is added if either one is hit. When a game is started each target "climbs" its tree and, when it has reached the top, turns behind the tree and rapidly drops to the bottom. When it is all the way down, it again starts climbing, then turns so it is to the right or left of the tree where it completes its climb. The targets continue climbing and dropping until 20 shots have been fired.

If a hit is scored, the target hit will immediately drop a few inches, turning, as it does, so it is back of the tree. It remains motionless behind the tree until the next shot is fired. At the next shot, it moves from behind the tree, to right or left, and resumes climbing.

If, when the 20th shot is fired, the target at the left is back of the tree, the motion continues until it is again at the side. No additional shots can be fired while this extended target movement takes place.

Normal operation of the game involves target motion that follows a definite pattern for every condition except the target movement from behind the tree. Whether the target will appear at the left or right is determined only by the random position of a turning cam at the instant a target gets to the top or bottom of the tree. The mechanism that operates the targets, although assembled on a single frame and driven by one motor, is made up of two distinct units that have identical operation and have with few exceptions, duplicate and interchangeable parts. These mechanical movements, as well as other operational elements of the game and the operation sequence of the game are described in paragraphs that follow and are identified in reference illustration and diagrams.

The diagrams used for explanation have been simplified, where possible, by not showing plugs and sockets or terminal strips in a conventional manner. These are represented by circles, or squares, with arrowheads and are associated with two numbers and the letter J or E. The "J-number" refers to an equivalently marked socket as shown in the complete schematic of the game; the "E-number" refers to an equivalently marked terminal strip. The number within the circle or square identifies the socket terminal number or strip terminal. The arrowhead

indicates the direction of a plug to the socket or a wire to the terminal screw.

GUN STAND

The Gun Stand holds the gun when the game is not in use and is the control point for the game. It contains the credit system, a Game Start Button, a Muzzle Blast Sounder, a Shot Timing Relay and Condenser and three colored indicator lights. A red light turns on when the power switch at the target cabinet is turned on. A green and an amber light is associated with, respectively, the credits and the game operation.

The *CREDIT SYSTEM* consists of two coin slides and switches, two credit solenoids, a credit switch and a motor that drives the credit switch when a credit is used. The circuit is shown in Figure 2. Each coin switch (S19 and S20) is a double-pole double-throw switch operated by a coin slide. When a coin is inserted in the slide and the slide pushed in to the limit of its travel, switch 19b *(for example)* opens and switch 19a closes. 19a completes a 25-volt circuit to a credit solenoid. The plunger of the solenoid operates one of six snap-action switches that are assembled in a credit switch.

When the snap-action switch is closed, a circuit is completed through a 100-ohm resistor to the green pilot light (on the gun stand) to indicate that credit has been set up.

The credit switch rotates one-sixth turn each time a game is started. If the closed snap-action switch corresponds to a single credit, one operation of the motor will cause the switch to reset to the off position and cancel the single credit. If more than one credit is established, the game can be started once for each credit and each time the credit switch rotates one-sixth turn until the final credit is cancelled. When the circuit through the credit switch is open, the green indicator light turns off.

The *START BUTTON* is pressed to start a game when one or more credits have been established by operation of a coin slide. Figure 2. When a game has been started, the amber indicator light turns on. Figure 6.

The *MUZZLE BLAST SOUNDER* is located in the gun stand and simulates the sound of a gun shot to add realism to the game.

The Sounder operates from the shot timing relay (BB) each time the gun is fired.

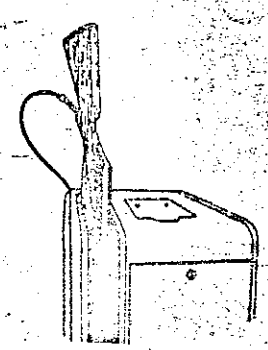
The *SHOT TIMING RELAY* controls the Shot Stepper, Muzzle Blast Sounder and the Gun Lamp. It is energized when the gun trigger is pulled by the discharge of a 200 mfd. condenser. The circuit is shown in Figure 4. The center blade of the trigger switch transfers the condenser from the 50-volt charging potential to the relay coil. The relay remains in the energized position for approximately 1/10 to 1/8 second. The equivalent of this is approximately 6 to 8 cycles of 60-cycle power.

The 500 ohm variable resistor connected across the shot timing relay coil is used to compensate for variations in the capacity of the condenser and resistance of the coil. An average setting for this resistor is about 125 ohms but it is adjusted at the factory for proper timing of the relay when the condenser supply voltage is 50. This voltage is measured at capacitor C1. (See Figure 4.)

CAUTION: The full output voltage of T2 is applied to the gun lamp for a very brief interval. If the time interval is appreciably lengthened, it will result in shortened life of the gun lamp. If the shot timing relay is operated manually (when T2 is supplying power to the lamp) and contacts AA are closed for an appreciable length of time, it can result in a burned out gun lamp for the voltage available to the lamp filament is considerable in excess of its normal rated voltage.

THE GUN

The gun when not in use, should be placed in the gun stand with the muzzle pointed down as shown.



Gun Stand

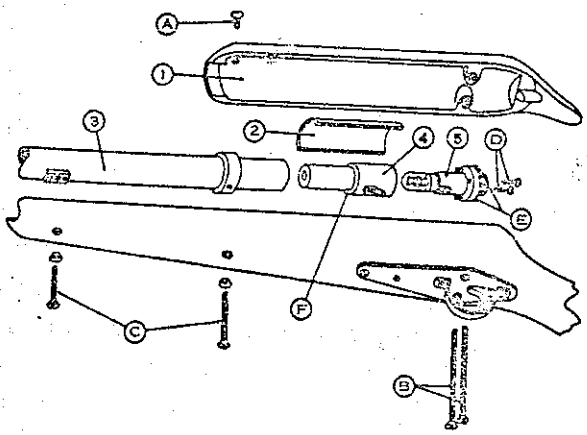
The *TRIGGER SWITCH* operates as a conventional gun trigger and controls the shooting.

The *GUN LAMP* is the light source for operation of the target scoring system. It is in the gun barrel with an optical system that will project its light in a narrow, pencil-like beam. The light is flashed momentarily when the gun trigger is pulled and the beam directed by aiming the gun.

The gun lamp is turned on at low intensity through an 11-ohm resistor when the game is started. The gun lamp terminal voltage in this started position is approximately 1-volt AC. It is "flashed" by the shot timing relay (AA) when the gun trigger is pulled. Figure 6.

THE GUN LAMP

The gun lamp is enclosed in a housing which clamps on the rear end of the gun barrel. It is important that the gun lamp be properly centered in the cartridge to give maximum light to operate the photo cell.



Gun Assembly

If it becomes necessary to adjust or replace a lamp, observe the following procedure:

1. Remove rear sight from (1) by taking out screws (a) and (b).
2. Remove rubber pad (2).
3. Remove screws (c) holding gun barrel in stock and lift barrel and cartridge (4) from the stock.
4. Move gun barrel away from the lamp cartridge so the cartridge slips out of the barrel.
5. Remove the gun lamp socket (5) by removing screws (d). Do not take out screws (e).
6. Replace the gun lamp. Reassemble the lamp cartridge and barrel. Fasten the barrel in the gun stock with the cartridge in the barrel so the shoulder (f) is against the end of the barrel.
7. It is important that the gun lamp is centered in the cartridge. If it is not, the light from the gun will be reduced and the pattern of the spot of light will be uneven. Test the centering by "shooting" at a white wall or piece of white cardboard about 20 feet from the end of the gun. The pattern should be round and of uniform brightness. If it is not, correct by adjusting the position of the screws (d) and (e) at the end of the cartridge. Tighten the screw on the side corresponding to the dark side of the light pattern (first loosening the screw on the opposite side).

   The lamp cartridge should be seated firmly against the end of the gun barrel when checking the lamp centering.
8. After the lamp has been correctly centered, place the rubber pad (2) over the cartridge and gun barrel and reassemble the rear sight frame (1).

The muzzle lens assembly is located in the front end of the gun barrel. To remove lens, loosen the front screw on the gun sight, which will allow the lens to be removed by inserting a finger and twisting while pulling out. After replacing the lens, be sure it is pushed against its stop and then tighten screw. It is very important that the muzzle lens and the small cartridge lens be kept clean and that the gun lamp is properly centered.

LUBRICATION

The target motor should be oiled at regular intervals with *Seeburg Select-O-Matic Special Purpose Oil*. On the target mechanism, all metal gears and sliding surfaces (except the target contact rails) should be lubricated with *Lubriplate*. All shaft bearings and rollers should be oiled with *Select-O-Matic Special Purpose Oil. (SEE LUBRICATION CHART)*. Use only DC-5 on the contact rails.

If the left target is behind the target column when the 20th shot is fired, the Column Turn Switch (AX) and the Column Detent Switch (AY) will hold the relay energized until the target is at the side of the column.

The *RESET RELAY*, when energized, lifts the dogs that hold the shot and score steppers in advanced position. When the dogs are lifted, the steppers turn to the "0 shot" position for start of a game.

The relay is energized (a) by the Carry-over Switch (CC) in the gun stand when the game is started or (b) by the Manual Reset Switch on the Amplifier-Controller in the target cabinet. Figure 2.

The principal functions of the *SHOT STEPPER* are to count the shots fired and limit the game by control of the 25-volt power to the target mechanism, the play control relay and the shot timing condenser charging voltage. A cam on the stepper is reset to the "zero shot" position by the Reset Relay at the start of a game and is advanced by the stepper armature each time a shot is fired. When the 20th shot is fired, the cam opens switch contacts (J and K) that end the game.

The stepper relay is energized by the Shot Timing Relay (BB) when the gun is fired. Figure 5.

The *SCORE STEPPER* counts the "hits", controls the score indicating lights, and operates the whiner switch contact (S). The stepper operates a switch that completes a circuit to the score lights corresponding to the number of hits made in a game. The switch is reset to the "zero score" position by the Reset Relay at the start of a game and is advanced each time a hit is made.

The stepper relay is energized by either of two Hit Control Relays (F and C). Figure 10.

There is a *HIT CONTROL RELAY* associated with each target. They close circuits (a) to the Score Stepper (C and F, Figure 10) and (b) drop solenoid in the target mechanism (B and E, Figure 9).

A hit control relay is energized by the plate current of a 2050 thyratron when a "hit" is made. See Figure and information given in description of Score Sensing System.

The *MANUAL RESET SWITCH*, on the Amplifier-Controller, is for operation of the Reset Relay to start a game when the target cabinet is open for service.

The Score Lights are controlled by the score stepper and operate at 6-volts from a secondary of transformer T1.

The *TARGET MECHANISM*, except for a single drive motor, is duplicated for each target. Each section consists of a mechanical action that changes the direction of vertical travel of the target and one that turns the target column. The direction of target travel is controlled by a Yoke Solenoid and a Drop Solenoid; the target column rotation is controlled by a Turn Solenoid. Control of both movements is accomplished by engaging pawls with sprockets.

The target will travel upward when neither the Drop Solenoid nor the Yoke Solenoid are energized. It will move downward if both are energized. It will be stationary if only the Yoke Solenoid is energized.

The target column will make a quarter-turn each time the Turn Solenoid is momentarily energized. The turn will be toward the back of the column if the target is at either side; it will turn to the right or left side if it is back of the column.

The *DROP SOLENOID*, diagram Figure 9, (a) closes the Drop Solenoid Switch and (b) releases the target drive so the target direction will be changed by the Yoke Solenoid. It also operates the TARGET DRIVE TENSION LEVER which closes the Turn Switch. (BF or AS) and on the right hand target mechanism, the whiner tone change switch (BR) See Figure 16.

It operates (a) from *HIT CONTROL RELAY* (E) when a hit is made and (b) from the Column Turn Switch (BO) when the target turns back of the column (after reaching the top of the column and the Top Reset Relay is energized).

The *YOKE SOLENOID*, diagram Figure 8, (a) controls Yoke Switch and (b) changes engagement of the target drive clutches.

It operates (a) from the Drop Solenoid Switch and (b) is held energized by the Yoke Switch (BE) through the Column Turn Switch (BQ) if the target is at the side of the column.

The *TURN SOLENOID*, diagram Figure 9, releases the target column turn drive.

It operates (a) from the Top Reset Relay (BH) if the target is at the side of column and (b) from the Yoke Solenoid Switch (BD) if the target is behind the column, and (c) from contacts (BF) of the *TURN SWITCH* when the Drop Solenoid is energized at time a "hit" is made.

The *TOP RESET RELAY*, diagram Figure 8, is energized by the Top Reset Switch (AK).

It controls the turn and drop of the target when the target reaches the top of the column before being "hit".

The *TARGET TAIL SOLENOID*, diagram Figure 8, flips the target tail when a "hit" is made.

It operates from the Drop Solenoid Switch (BC) when the target is at the side of the column.

The *TARGET EYE LIGHT*, diagram Figure 8, lights momentarily when a "hit" is made.

It operates from the Drop Solenoid Switch (BC) when the target is at the side of the column.

The *MOON*, diagram Figure 8, lights momentarily when a "hit" is made.

It operates from the Drop Solenoid Switch (BC) when the target is at the side of the column. Four lights are in series with an *OWL* Eye Light so the moon and owl eye operate together.

The *OWL EYES*, diagram Figure 8, light momentarily when a "hit" is made. The green eye lights when "hit" is made on right target; the red eye indicates the left target is hit. Each eye light is in series with four lights in the moon.

The *TARGET MOTOR* drives the target figures. It operates at 117-volts, through the Play Control Relay (R) Figure 1.

THE WHINER

The *WHINER* provides an audible signal when a hit is scored. It consists of a 6F6GT tube in a "relaxation oscillator" circuit driving a 4" speaker mounted in the top of the Target Cabinet. Connections for plate screen and heater supply for the tube are made through a 4-prong plug to the amplifier controller. The oscillator is turned on for momentary operation through contacts (S) on the Score Stepper relay. A second connection is made to a pair of contacts (BR) on the Turn Switch of the Right-Hand Target Mechanism. These contacts change the pitch of the sound from the whiner so it characterizes the target on which a hit is made.

OPERATION SEQUENCE

The sequence of operation of the Ray-O-Lite begins when a credit is established by operation of a coin slide. It can most easily be discussed if it is recognized as having six characteristic conditions or positions. They are as follows:

1. *STAND-BY POSITION* in which the main switch is turned on.

2. *CREDIT POSITION* in which credit has been established but the game has not been started.

3. *STARTING POSITION* in which the game Start Button is pressed to cancel a credit, reset the steppers to "zero shot" position and energize the play control relay.

4. *STARTED POSITION* in which the play control relay is energized, the target motor running, the steppers are reset and the gun is ready to "shoot".

5. *SHOT POSITION*. This position lasts for only a short interval when the gun trigger is pulled. In this Position, the gun lamp is momentarily turned on to full brilliance and the shot counting stepper is advanced one step.

6. *SCORING POSITION*. This position is associated with the Shot Position when a hit is made on a target. Like the Shot Position it lasts for only a brief interval.

STAND-BY POSITION

In the stand-by position the main switch is turned on, the cabinet lights are on and the red indicator light at the gun stand is lighted. Transformer T1 is supplying plate current for the amplifier tubes (through the 5Y3 rectifier); 6 volts for amplifier tube heaters and score indicating lights; 25 volts for control circuits and indicator lights; 165 volts for the plate circuits of the 2050 thyratrons.

In this position the shot stepper is at the 20th shot position with contact L closed and contacts J and K open. The score stepper is at some random position determined by the score made during the last game played and the score indicating light, or lights, will be lighted.

CREDIT POSITION

The game moves from the stand-by position to the credit position when a credit is established by operating the credit system. In this position, the green pilot light on the gun stand will be lighted from the 25-volt secondary of the power transformer through the credit switch and a 100-ohm resistor (R33) and the 25-volt circuit to the Start Button will be completed through the "b" sections of the coin switches. See Figure 2.

STARTING POSITION

This position exists during the interval between the pressing of the game Start Button and the Started Position. When the Start Button is pressed, a circuit is completed to the credit assembly motor so it will be turned on. The complete circuit for the motor is from the transformer (25 volts) through the credit switch, the "b" sections of the coin switches, the start button, and Contact L on the shot stepper.

When the credit assembly motor has started, the carry-over switch closes the three sets of contacts CC, DD and EE. Contacts EE shunt the credit switch and Start Button and are carry-over contacts for a complete cycle of operation for the credit assembly motor. Contacts DD shunt contact L on the shot stepper and complete the "hot" side of the motor circuit after Contact L is opened. Contacts CC close the 25 volt circuit to the reset relay.

When the reset relay is energized, it disengages the dogs holding the shot and score steppers in the advanced positions. When these steppers are released, they reset to the zero position. When the shot stepper has been reset to zero-position, Contact L will open but the circuit of the credit assembly motor will be maintained through contacts DD on the carry-over switch until the complete credit cycle of the motor has been made and the carry-over switch has again opened. When contacts CC on the carry-over switch are opened, the reset relay is de-energized and the dogs on the steppers are again engaged with the ratchets.

Contact J on the shot stepper closes when the stepper is released from the 20-shot position to complete a 25-volt circuit to the play control relay. See Figure 3.

During this starting interval, the play control relay and the reset relay are energized. The 50-volt supply for the shot timing circuit is closed at the play control relay (P) but open (and the timing condenser shorted through a 100-ohm resistor) at the reset relay (M and N). See Figure 4.

STARTED POSITION

This position exists when the starting operation has been completed and the play control relay is energized. Contact R of the relay completes the target drive motor circuit. Contact Q connects the gun lamp transformer primary to the line. See Figure 1.

The circuit for the gun lamp and transformer, T2, is shown in Figure . When this transformer is turned on by the play control relay, current is supplied to the gun lamp through an 11-ohm resistor (R32). This results in approximately one volt across the gun lamp filament. When this circuit is turned on, the amber pilot light on the gun stand is lighted through a 35-ohm resistor (R34) as shown in Figure 6.

The 200mfd. shot timing condenser is connected to the 50-volt DC supply through the play control relay (P), the reset relay (M), the shot stepper (K) and the trigger switch. See Figure 4.

Resetting the shot stepper also completes the 25-volt control circuit to the target mechanism through contact J.

In the started position, then, the shot and score steppers are at the zero position, the target drive motor is turned on, the 25-volt control circuit to the target mechanism is completed, the play control relay is energized, the gun lamp is dimly lighted with approximately 1 volt applied to the lamp filament, and the 200 mfd. condenser, connected to the gun trigger switch, is charged to 50 volts.

The target mechanism operation during the started position utilizes the 25-volt supply (through contact J of the shot stepper) and the target drive motor. Both targets operate independently. In the description that follows, the control switches and mechanical operations are referred to the target at the right side of the cabinet but apply equally well to either target and the portion of the mechanism associated with the individual target. Diagrams detailing the circuit components involved are figures 8 and 9.

TARGET OPERATION SEQUENCE:
Started Position

1. Target climbing on left or right side of tree.
   a. All switches at "normal".
   b. No solenoids or relays energized.
   c. Target drive detented.
   d. Column detented with swivel disk lobe not on switch actuator.
2. Target reaches upper limit of travel and closes top reset switch, Contact AK. See Figure 8.
3. Top reset switch closes 25 volts to Top Reset Relay. Contacts BH and BI close; BG opens. Figure 8.
4. a. Contact BI interlocks Top Reset Relay.
   b. Contact BH closes 25 volts to Turn Solenoid through BM (Column Turn Switch) and BK (Column Detent Switch). Figure 9.
5. Turn Solenoid releases column detent (so target will turn toward back of tree) and BK (Target Detent Switch) opens circuit to Turn Solenoid.
6. As target moves to back of tree, swivel disk operates Column Turn Switch and Contact BO closes 25 volts to Drop Solenoid through BH (Top Reset Relay). Figure 9.
7. Drop Solenoid releases target drive detent (so target drive is engaged) and closes BC (Drop Solenoid Switch).
8. BC closes 25 volts to Yoke Solenoid. Figure 8.
9. Yoke Solenoid shifts clutches (so target drives downward). As target moves down:
   a. Drop Solenoid is energized and target drive is not detented.
   b. Yoke Solenoid is energized.
   c. Top Reset Relay is energized.
   d. Target is back of tree and lobe on swivel disk is on switch.
   e. Turn Solenoid is not energized and target column is detented.
10. Target reaches lower limit of travel and opens BJ (Bottom Reset Switch) releasing Top Reset Relay, Drop Solenoid and Yoke Solenoid.
11. Drop Solenoid (released) opens Contact BC and permits target drive to detent, and internal gear is disengaged.
12. Top Reset Relay (released) closes contact BG.
13. Yoke Solenoid (released) shifts clutches so target drives upward.
14. Rising target permits BJ (Bottom Reset Switch), to close.
15. BJ closes 25 volts to Turn Solenoid through BG (Top Reset Relay), BD (Yoke Solenoid Switch), BN (Column Turn Switch), BK (Column Detent Switch). Figure 9.
16. Turn Solenoid releases column detent so target turns to right or left side of tree.

17a. BK (Column Detent Switch) opens circuit to Turn Solenoid.

17b. Lobe on column swivel disk releases Column Turn Switch).

The target is climbing at the right or left side of the tree as in 1 and the sequence will repeat until the game is completed or until a hit is scored.

SHOT POSITION

The shot position is of brief duration and occurs when the gun trigger is pulled. The center blade of the trigger switch transfers the 200 mfd. condenser (from the 50 volt charging potential) to the shot timing relay coil. This is shown in Figure 4 . The shot timing relay is energized by the discharge of the condenser and remains in the energized position for approximately 1/10 to 1/8 seconds.

When the shot timing relay is energized, Contact BB will complete a circuit from the 25 volt secondary of T1 to the Muzzle Blast Sounder in the gun cabinet and to the coil of the shot counting stepper. This circuit is shown in Figure 5 .

Contacts AA on the shot timing relay short out the 11-ohm resistor in the gun lamp circuit to bring the gun lamp to full brilliance during the interval the relay is energized. See Figure 6.

CAUTION: The full output voltage of T2 is appreciably lengthened, it will result in shortened life of the gun lamp. If the shot timing relay is operated manually (when T2 is supplying power to the lamp) and contacts AA are closed for an appreciable length of time, it can result in a burned out gun lamp because the voltage available to the lamp filament is in excess of its normal rated voliage.

Although the trigger may be held in the "pulled" position, the shot timing relay will be de-energized as soon as the 200mfd. condenser is discharged. Contacts AA and BB will then open so the gun lamp dims to the started position condition and the shot stepper armature returns to its normal rest position leaving the stepper cam advanced one position.

On successive shots the sequence is repeated and, with each shot, the shot stepper cam is advanced a step. When the ratchet leaves the zero position, the cam on the ratchet shaft will permit Contact L to close. When twenty shots have been fired, the cam will have advanced to the twentieth shot position and will open Contacts K and J.

Contact K opens the 50-volt DC supply for the 200 mfd. shot timing condenser. Contact J, one of four parallel contacts through which the play control relay and the target control may be energized, opens one path of the 25-volt supply as shown in Figure 3.

Contact I on the shot stepper acts as a carry-over for Contact J to insure a full stroke of the stepper by holding the play control relay in the energized position until the stepper coil is no longer energized by Contact BB of the shot timing relay. Contacts AX and AY (Figure 3) are on the left target mechanism and will be open if the left side target is exposed; closed if the target is concealed. The purpose of these contacts is to finish operation of the game with at least one (the left side) target exposed to view.

SCORE POSITION

The Score Position occurs if, when the gun trigger is pulled, the light from the gun lamp increases the level of light on a target photo cell sufficiently to "fire" a 2050 thyratron so a hit control relay is energized. The operation of the relay is discussed under Score Sensing System. When the relay associated with either target is energized, the 25-volt supply is completed to the score stepper as shown in the diagram Figure 10 and to a drop solenoid in the target mechanism. The score stepper will advance the score lamp switch one step – the "drop and turn" action takes place at the target. This action of the target occurs with the target scored on. The operational sequence follows. It is applicable to either target but the reference to switch contacts applies to the target at the right side of the cabinet and the portion of the mechanism associated with that target. Diagrams detailing the circuit components involved are Figures 8 and 9.

TARGET OPERATION SEQUENCE:

Score Position

1. Hit Control Relay closes Contact E.

2. Contact E closes 25-volt circuit to Drop Solenoid for approximately 1/10 second.

3. Drop Solenoid (a) closes contact BC and (b) releases target drive detent.

NOTE:

When step 3 occurs, steps 4 and 5 follow simultaneously with the (a) and (b) parts occurring in rapid succession. The result is that the target turns while dropping about 8" and, then, is stationary behind the column. The target is at a stand-still because the Yoke Solenoid is energized (target direction downward) but the Drop Solenoid, being energized for only a brief interval, has permitted only one revolution of the target drive.

4. (a) Contact BC closes circuit to Yoke Solenoid.

   (b) Yoke Solenoid changes target direction (down) and interlocks through BE and BQ (or BP on left target).

5. (a) Target Drive Detent Switch, BF, closes circuit to Turn Solenoid (through BK).

   (b) Turn Solenoid releases Column Detent (which opens BK and the Turn Solenoid Circuit) causing target to turn back of column.

NOTE:

Target now is stationary behind the column and the Yoke Solenoid is energized through BE (Step 4b).

6. The next shot (may be a hit on the left target or a "miss") operates the shot stepper and opens contact H to break the 25-volt circuit to the Yoke Solenoid.

7. Yoke Solenoid (a) engages clutch for upward movement of target and (b) closes contact BD.

8. Contact BD closes circuit to Turn Solenoid.

9. Turn Solenoid releases Column Detent (which opens BK and the Turn Solenoid circuit) causing target to turn to right or left from behind column.

When step 9 has been completed, the target will again be moving upward at the right or left of the column and a subsequent "hit" will repeat the sequence.

A target that has been hit and is behind its column will turn to the side and resume its upward travel when the other target reaches the top or bottom of its column. If, for example, the right side target is motionless behind the column, the yoke solenoid for that target will be energized through contact BE (yoke switch) and contact BP on the LEFT target Column Turn Switch. When the left target reaches the top of its column and turns to the back of it, contact BP opens and breaks the circuit to the right side yoke solenoid. With the yoke solenoid released, the target starts upward, contact BE opens and contact BD closes. BD closes the circuit to the turn solenoid (right side) so the target turns to the right or left as it starts upward. The turn solenoid circuit is through BG (Top Reset Relay); BD (Yoke Switch); BN (Column Turn Switch); BK (Column Detent Switch).

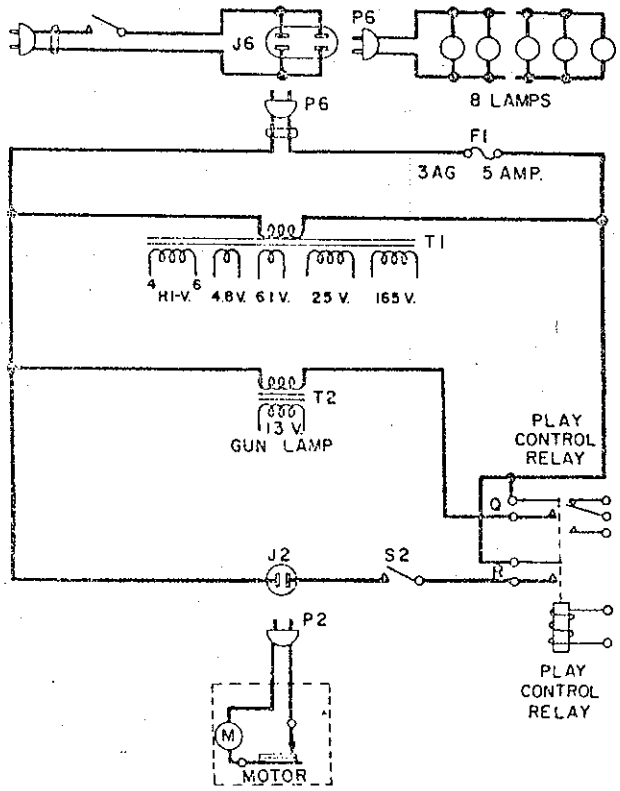


Figure 1.

117 V. AC POWER CIRCUITS

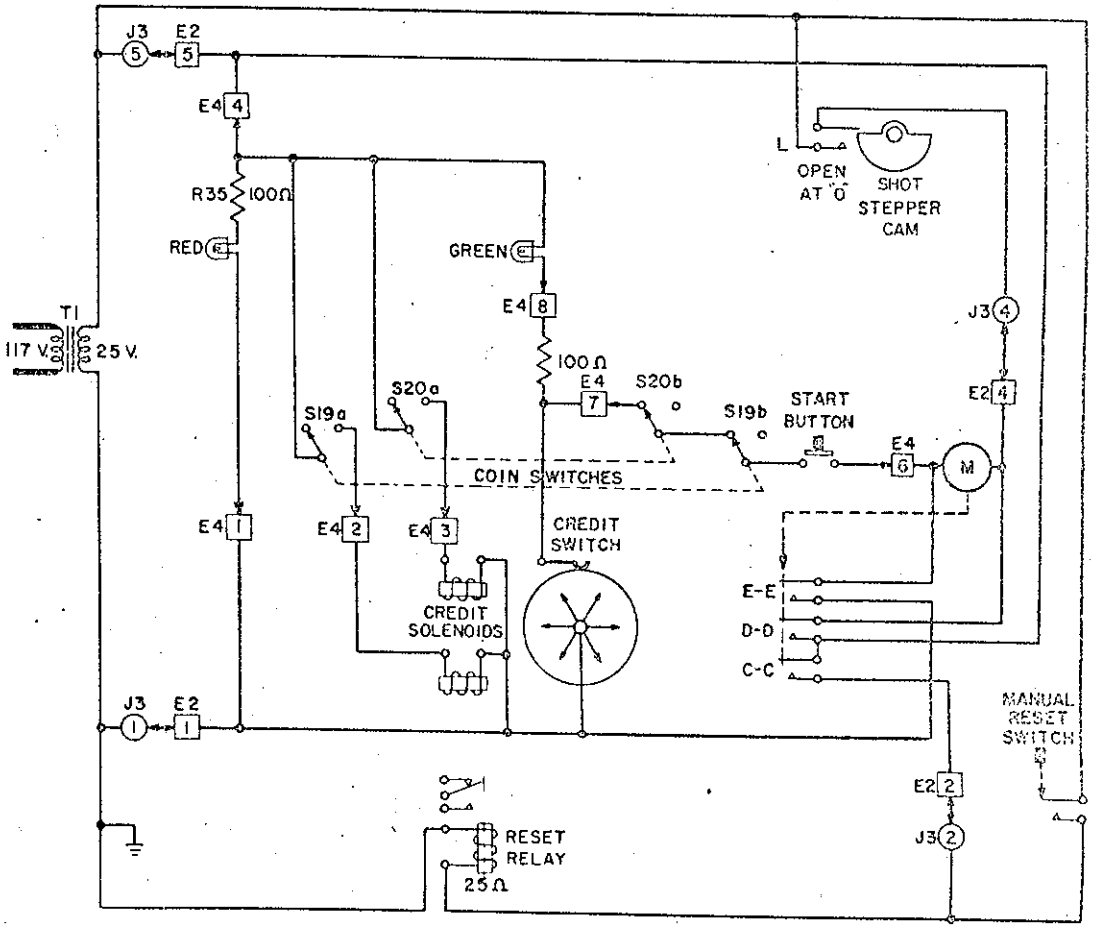


Figure 2.

CREDIT & RESET MAGNET CIRCUITS

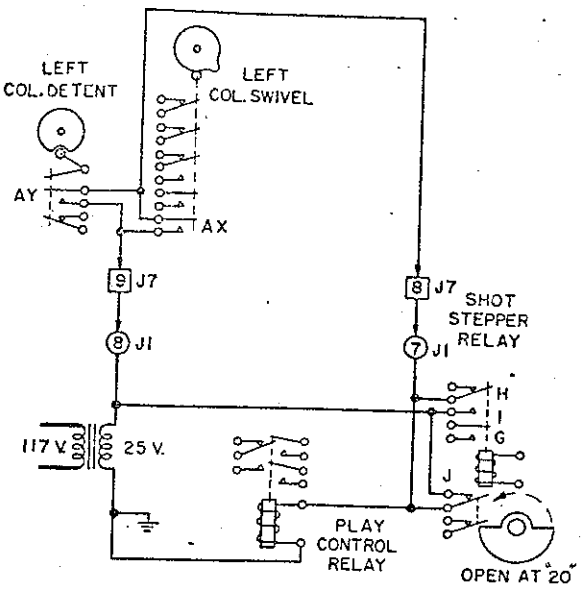


Figure 3.

PLAY CONTROL RELAY CIRCUIT

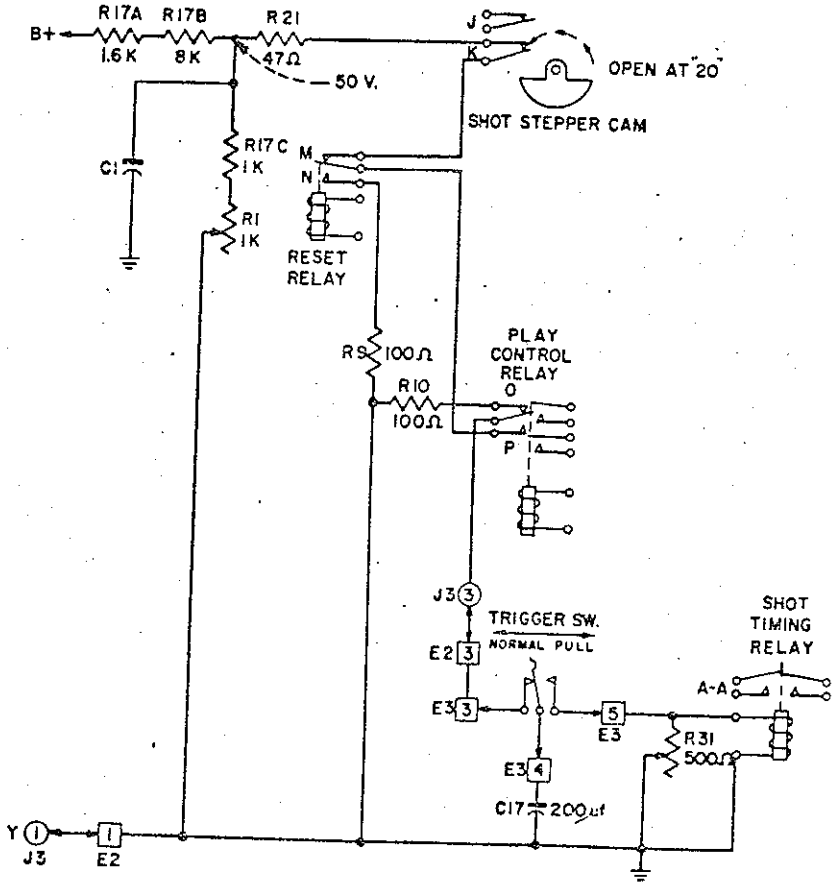


Figure 4.

TRIGGER SWITCH & SHOT TIMING RELAY CIRCUIT

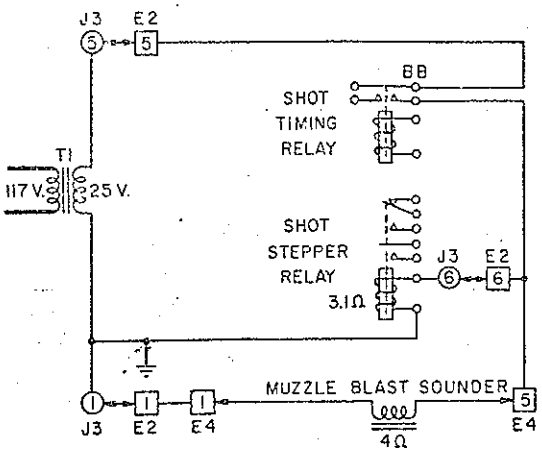


Figure 5.
SHOT STEPPER AND
MUZZLE BLAST CIRCUITS

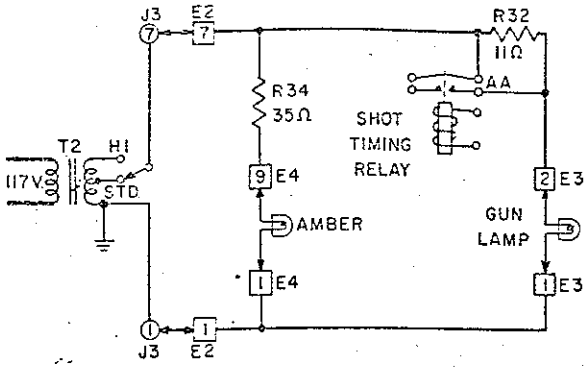


Figure 6.
GUN LAMP CIRCUIT

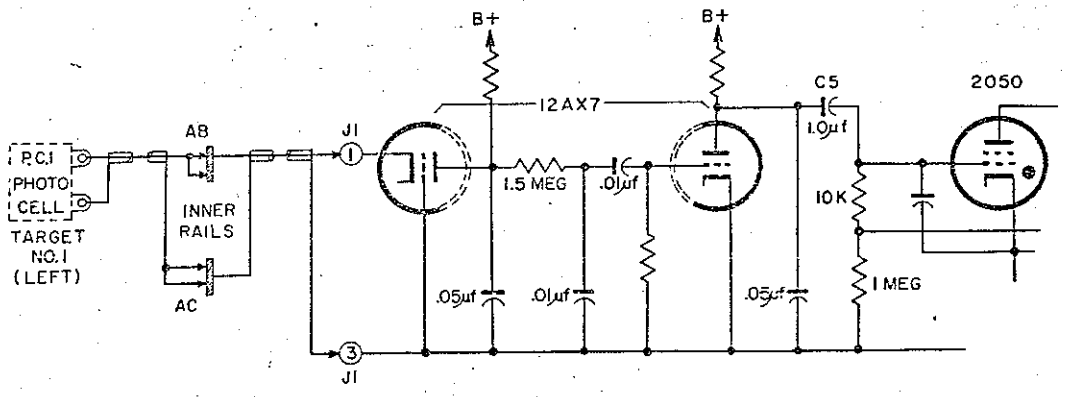


Figure 7A.
PHOTO CELL & AMPLIFIER CIRCUIT

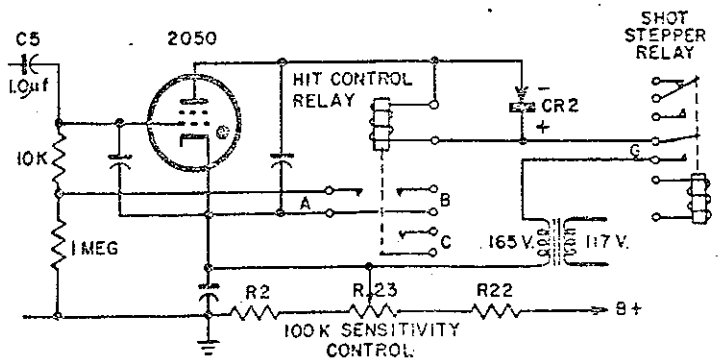


Figure 7B.
2050 BIAS CONTROL &
HIT CONTROL RELAY CIRCUIT

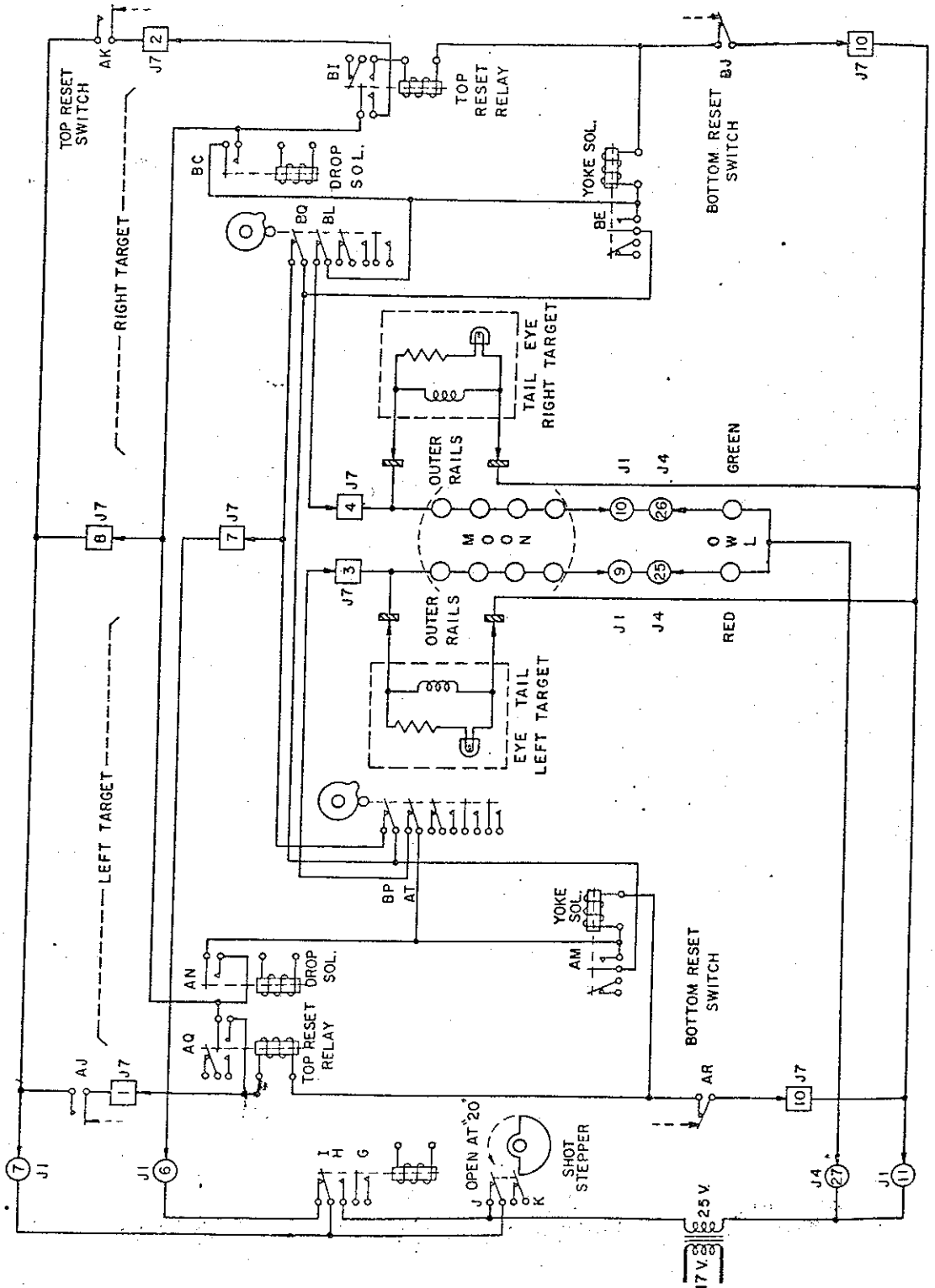


Figure 8.

TARGET, MOON, TOP RESET RELAY AND YOKE SOLENOID CIRCUITS

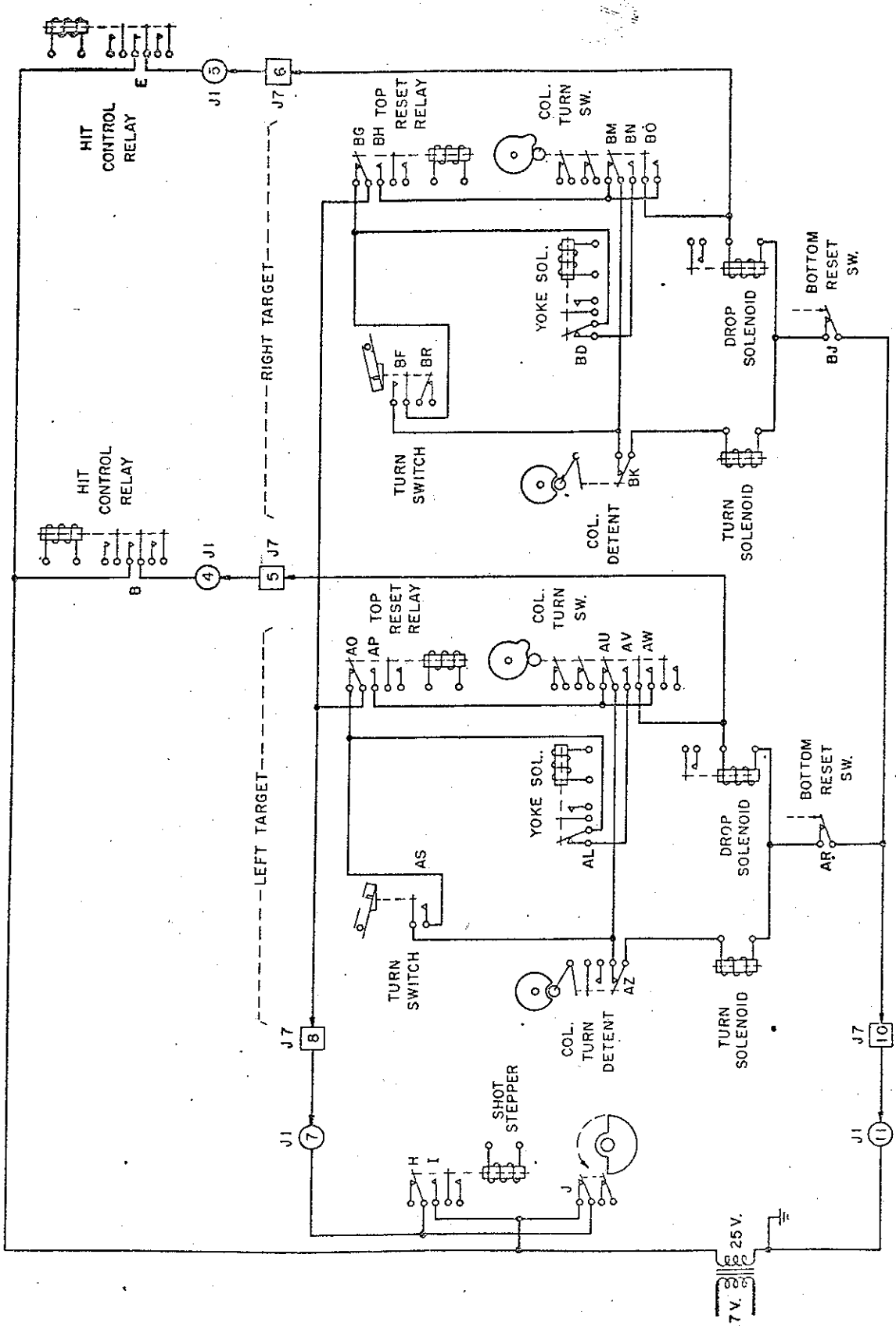


Figure 9.

DROP SOLENOID & SOLENOID CIRCUITS

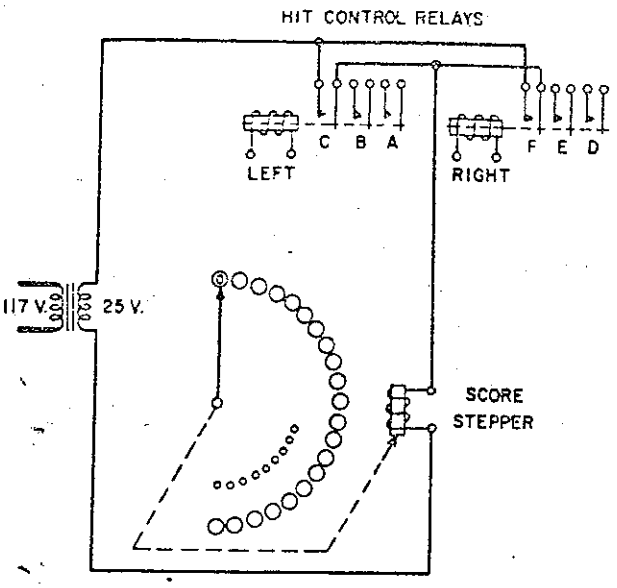


Figure 10.

SCORE STEPPER CIRCUIT

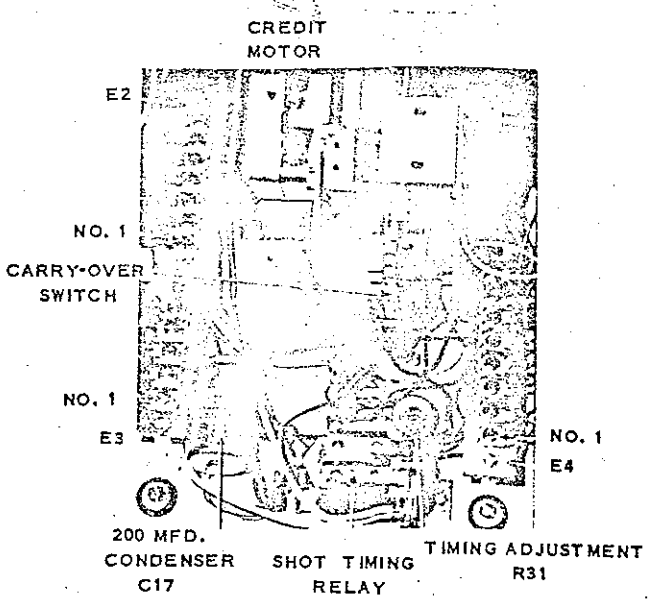


Figure 11.

GUN STAND COMPONENT IDENTIFICATION

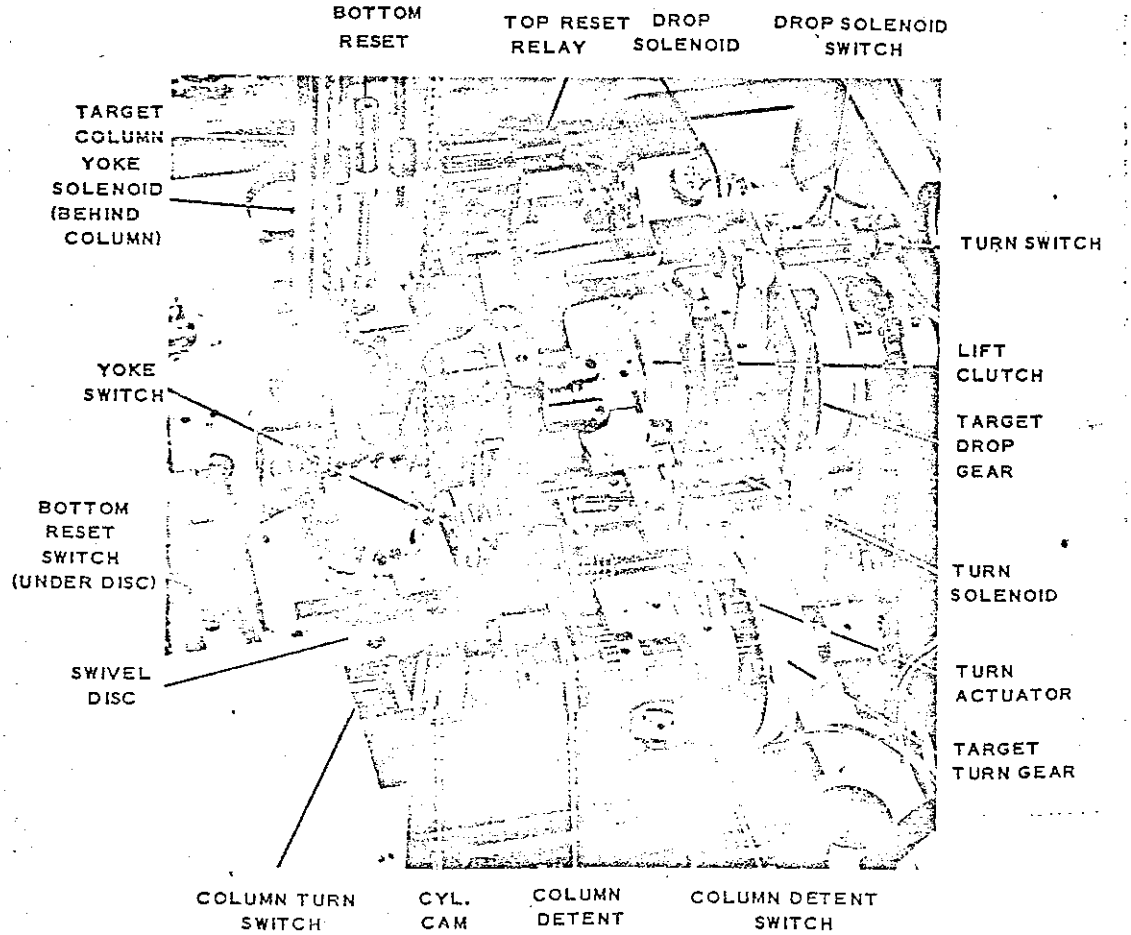


Figure 12.

MECHANISM IDENTIFICATION

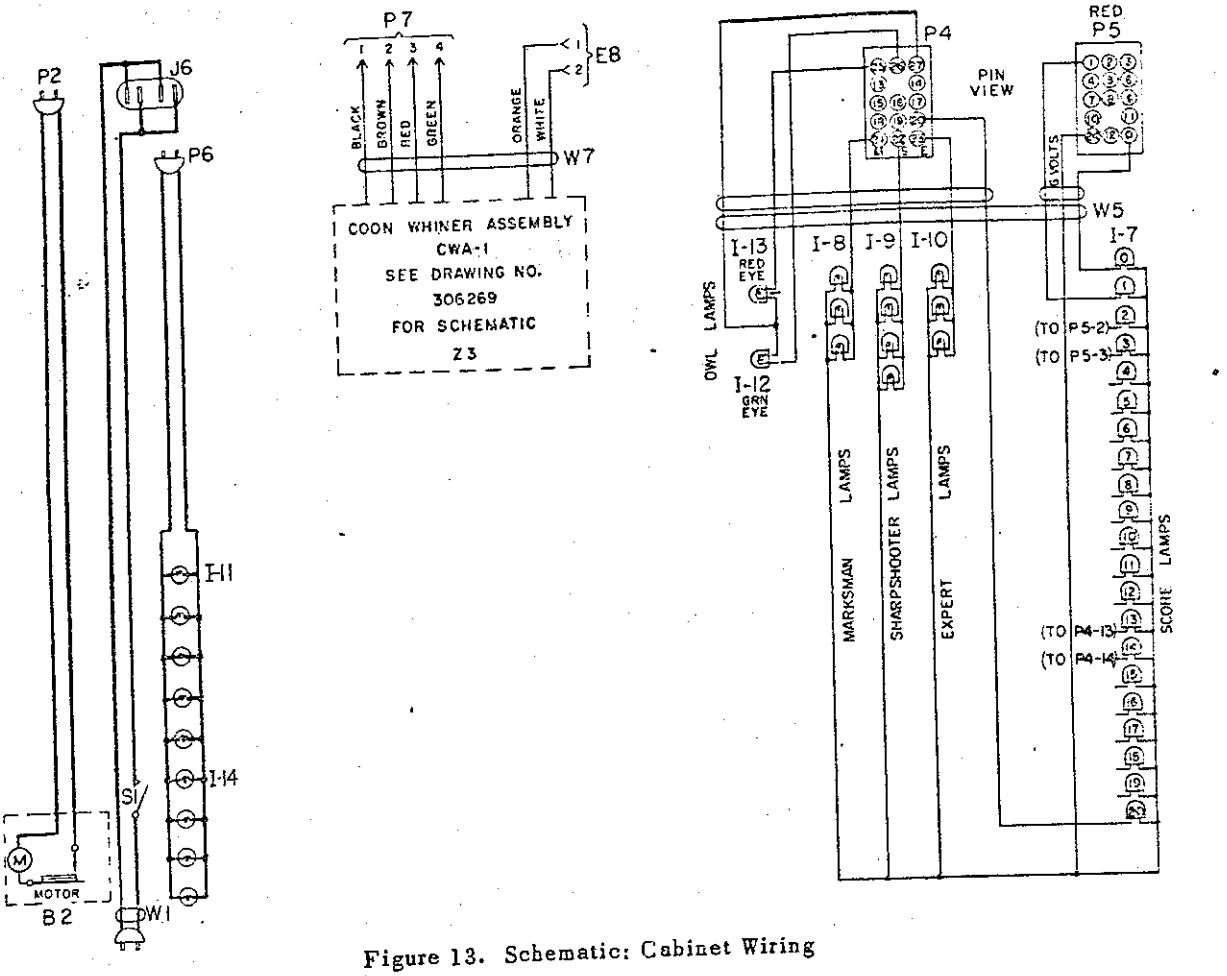


Figure 13. Schematic: Cabinet Wiring

PARTS LIST

Item	Part No.	Part Name
B2	126397	Motor Drive
I7	10242	No. 51 Lamp - Score
I8	10242	No. 51 Lamp - Marksman
I9	10242	No. 51 Lamp - Sharpshooter
I10	10242	No. 51 Lamp - Expert
I11	125672	15 W. Lamp - Cabinet
I12	10242	No. 51 Lamp - Owl
I13	10242	No. 51 Lamp - Owl
I14	125633	10 W. Lamp - Door
J6	F402253	A C Outlet
P2	10895	2 - Prong Plug
P4	125632	14 - Prong Plug
P5	125632	14 - Prong Plug
P6	10895	2 - Prong Plug
S1	S21168	Main Toggle Switch
W1	F402781	Plug & Line Cord Assembly
W6	127404	Score Cable
W7	306265	6 - Conductor Cable
Z3	306250	Coon Whiner Assembly

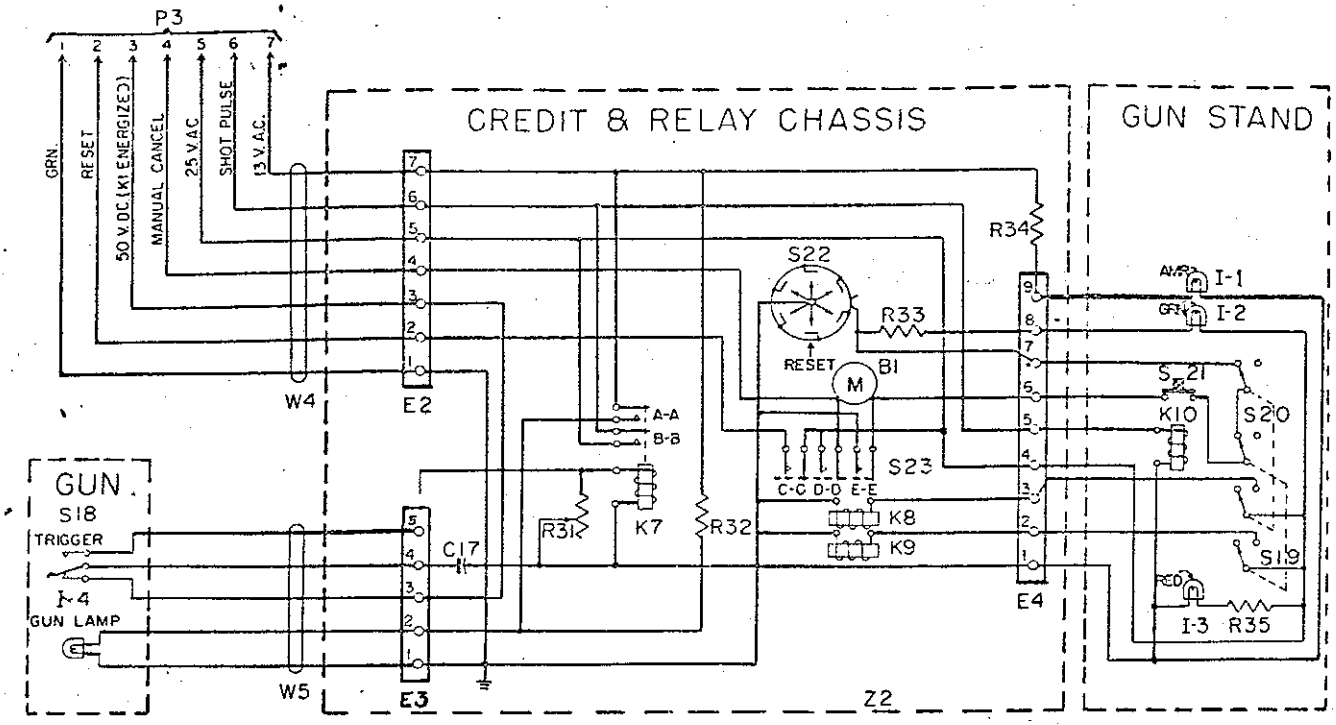


Figure 14. Schematic: Gun Stand

PARTS LIST

Item	Part No.	Part Name
B1	126141	Motor Assembly
C17	87608	200 Mfd. 50 V. Electrolytic
E2	125142	7 - Lug Terminal Strip
E3	125144	5 - Lug Terminal Strip
E4	125145	9 - Lug Terminal Strip
I1	10242	No. 51 Lamp - Ready
I2	10242	No. 51 Lamp - Credit
I3	10242	No. 51 Lamp - Pilot
I4	S85	Gun Lamp
K7	125141	Shot Timing Relay
K8	505082	Multiple Credit Coil
K9	505082	Single Credit Coil
K10	125150	Muzzle Blast Sounder
P3	F402041	7 - Prong Male Plug
R31	126125	500 Ohm Rheostat
R32	81021	11 Ohm W.W. 25 W. Resistor
R33	81126	100 Ohm W.W. 5 W. Resistor
R34	81131	35 Ohm W.W. 5 W. Resistor
R35	81126	100 Ohm W.W. 5 W. Resistor
S18	S21010	Trigger Switch
S19	125122	Single Credit Switch
S20	125122	Multiple Credit Switch
S21	12105	Start Button
S22	504140	Credit Switch
S23	126122	Carryover Switch
W4	S21116	Target Cable
W5	S21017	Gun Cable
Z2	126100	Credit & Relay Assembly

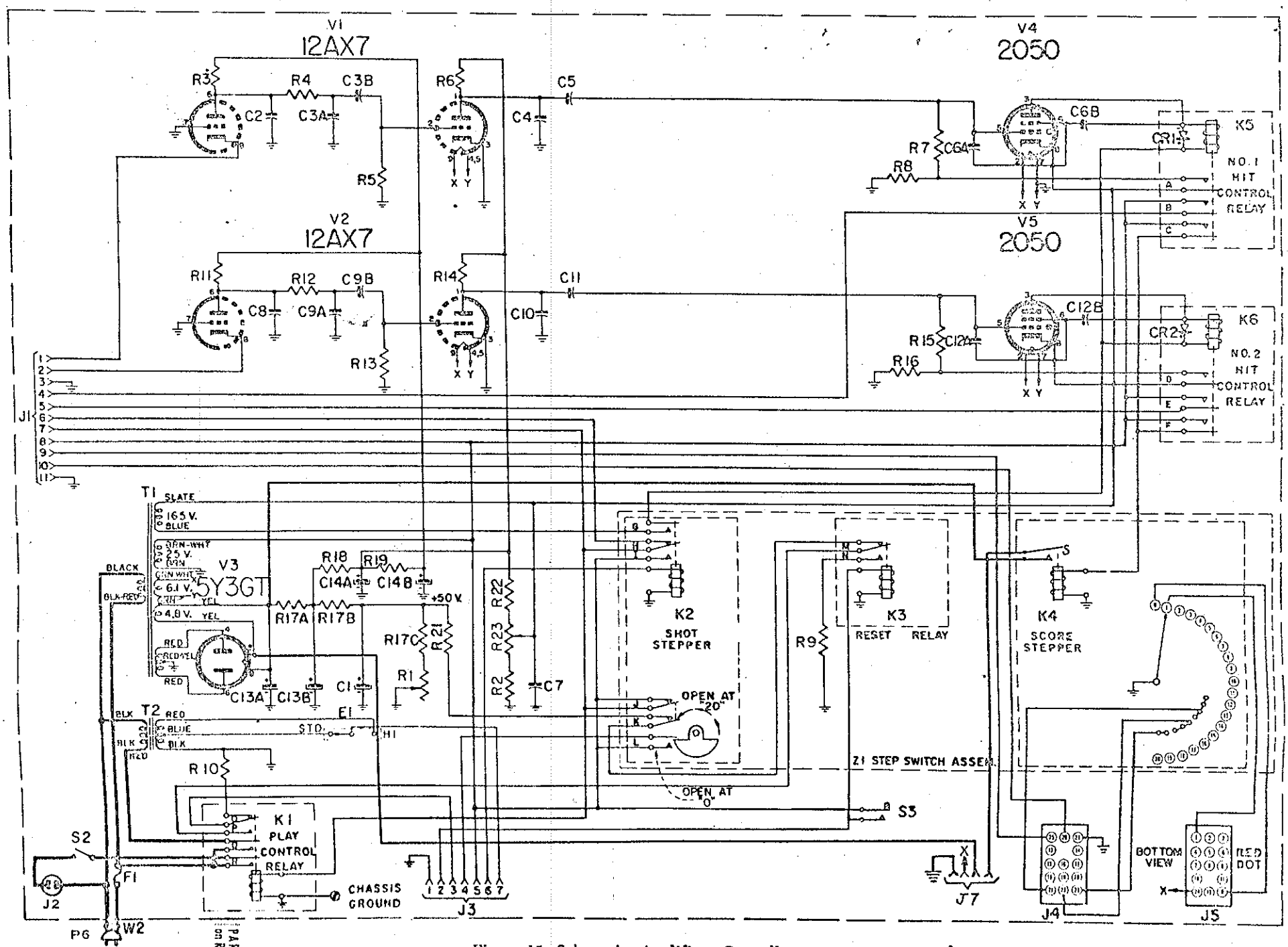


Figure 15. Schematic: Amplifier - Controller

AMPLIFIER CONTROLLER

PARTS LIST

Item	Part No.	Part Name
C1	87508	200 Mfd. 50 V. Electrolytic
C2	86140	0.05 Mfd. 400 V. Condenser
C3	86217	.01 - .01 Mfd. 600 V. Condenser
C4	86140	0.05 Mfd. 400 V. Condenser
C5	86155	1 Mfd. 400 V. Condenser
C6	86126	.005 - .005 Mfd. 600 V. Condenser
C7	86043	0.25 Mfd. 200 V. Condenser
C8	86140	0.05 Mfd. 400 V. Condenser
C9	86217	.01 - .01 Mfd. 600 V. Condenser
C10	86140	0.05 Mfd. 400 V. Condenser
C11	86155	1 Mfd. 400 V. Condenser
C12	86216	.005 - .005 Mfd. 600 V. Condenser
C13	87607	20 - 20 Mfd. 350 V. Electrolytic
C14	87607	20 - 20 Mfd. 350 V. Electrolytic
CR1	306220	Selenium Rectifier
CR2	306220	Selenium Rectifier
E1	306012	Terminal Strip
F1	602411	5 Amp. Fuse
J1	84230	11 - Prong Socket
J2	602386	AC Outlet
J3	84265	7 - Prong Socket
J4	306014	14 - Prong Socket
J5	306014	14 - Prong Socket
J7	400938	4 - Prong Socket
K1	306177	Play Control Relay
K2	306216	Shot Stepper Relay
K3	306043	Reset Relay
K4	306215	Score Stepper Relay
K5	306176	Hit Control Relay
K6	306176	Hit Control Relay
P6	303113	Plug & Line Cord Assembly
R1	306228	1 K 50 V. Adjust. Resistor
R2	82428	15 K ½ W. Resistor

Item	Part No.	Part Name
R3	82456	470 K ½ W. Resistor
R4	82462	1.5 Meg ½ W. Resistor
R5	82505	18 Meg ½ W. Resistor
R6	82456	470 K ½ W. Resistor
R7	82436	10 K ½ W. Resistor
R8	82460	1 Meg ½ W. Resistor
R9	82412	100 Ohms ½ W. Resistor
R10	82412	100 Ohms ½ W. Resistor
R11	82456	470 K ½ W. Resistor
R12	82462	1.5 Meg ½ W. Resistor
R13	82505	18 Meg ½ W. Resistor
R14	82456	470 K ½ W. Resistor
R15	82436	10 K ½ W. Resistor
R16	82460	1 Meg ½ W. Resistor
R17a	81157	1 K W.W. Resistor
R17b	81157	8 K W.W. Resistor
R17c	81157	1.6 K W.W. Resistor
R18	82437	12 K ½ W. Resistor
R19	82448	100 K ½ W. Resistor
R21	82408	47 Ohms ½ W. Resistor
R22	82452	220 K ½ W. Resistor
R23	306018	100 K Sen Control Resistor
S2	303112	Motor Toggle Switch
S3	306013	Manual Reset Switch
T1	306197	Power Transformer
T2	306196	Low Voltage Transformer
V1	12AX7	Tube
V2	12AX7	Tube
V3	5Y3GT	Tube
V4	2050	Tube
V5	2050	Tube
W2	303113	Plug & Line Cord Assembly
Z1	306175	Step Switch Assembly

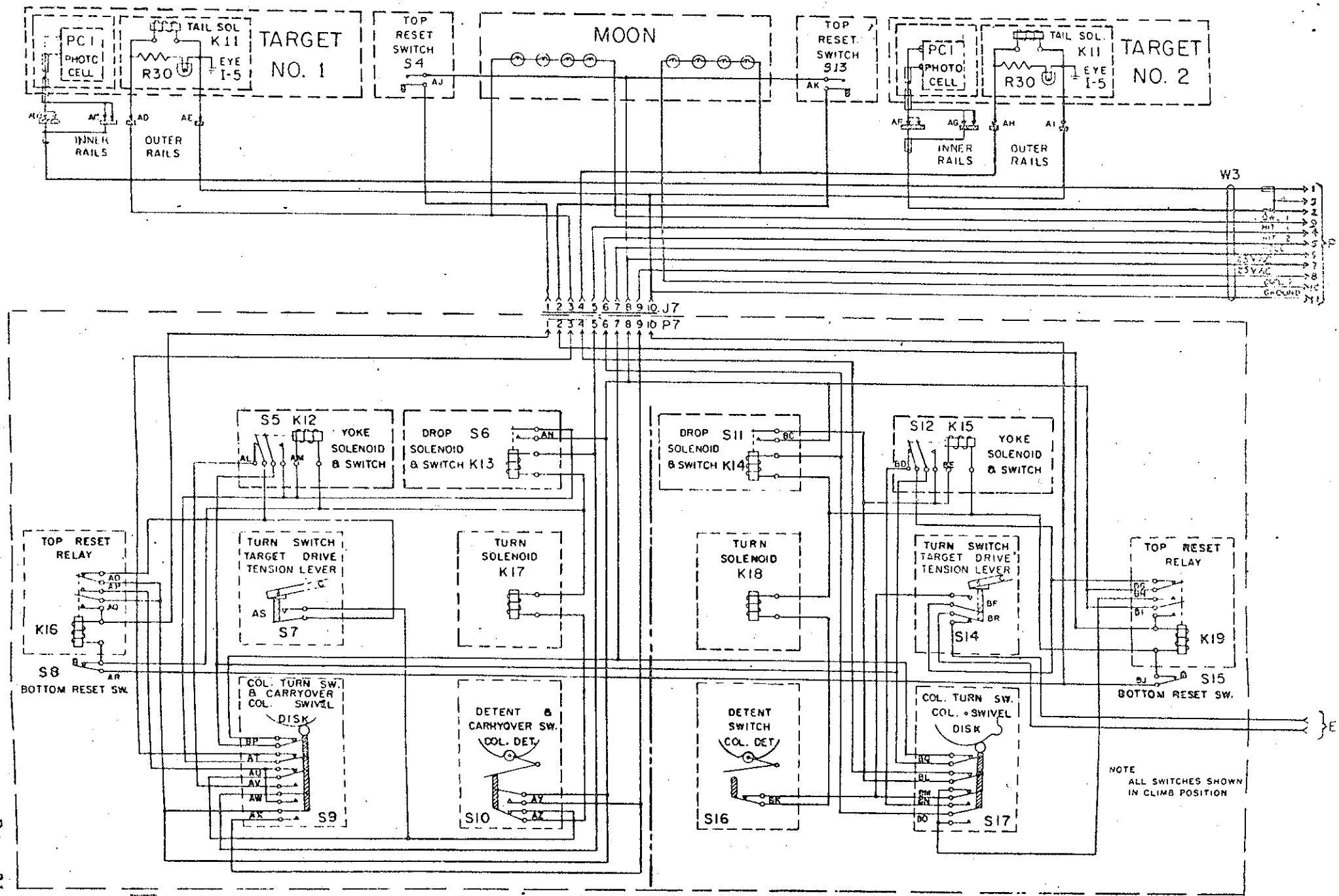


Figure 16. Schematic - Mechanism & Target

PARTS LIST on Reverse

MECHANISM & TARGET

PARTS LIST

Item	Part No.	Part Name
I5	10242	No. 51 Lamp
I6	10242	No. 51 Lamp
J7	127440	10 - Prong Socket
K11	127059	Tail Solenoid
K12	126531	Yoke Solenoid
K13	126591	Drop Solenoid
K14	126591	Drop Solenoid
K15	126531	Yoke Solenoid
K16	126421	Top Reset Relay
K17	126531	Turn Solenoid
K18	126531	Turn Solenoid
K19	126421	Top Reset Relay
P1	A250942	11 - Prong Plug
P7	126592	10 - Prong Plug
PC-1	127068	Photo Electric Cell
R30	81126	100 Ohm 5 W. Resistor
S4	127379	Top Reset Switch
S5	126432	Yoke Switch
S6	126428	Drop Solenoid Switch
S7	126617	Turn Switch
S8	126536	Bottom Reset Switch
S9	126404	Col. Turn & Carryover Switch
S10	126486	Detent & Carryover Switch
S11	126428	Drop Solenoid Switch
S12	126432	Yoke Switch
S13	127379	Top Reset Switch
S14	126627	Turn Switch
S15	126536	Bottom Reset Switch
S16	126552	Detent Switch
S17	126459	Column Turn Switch
W3	127441	Control Cable

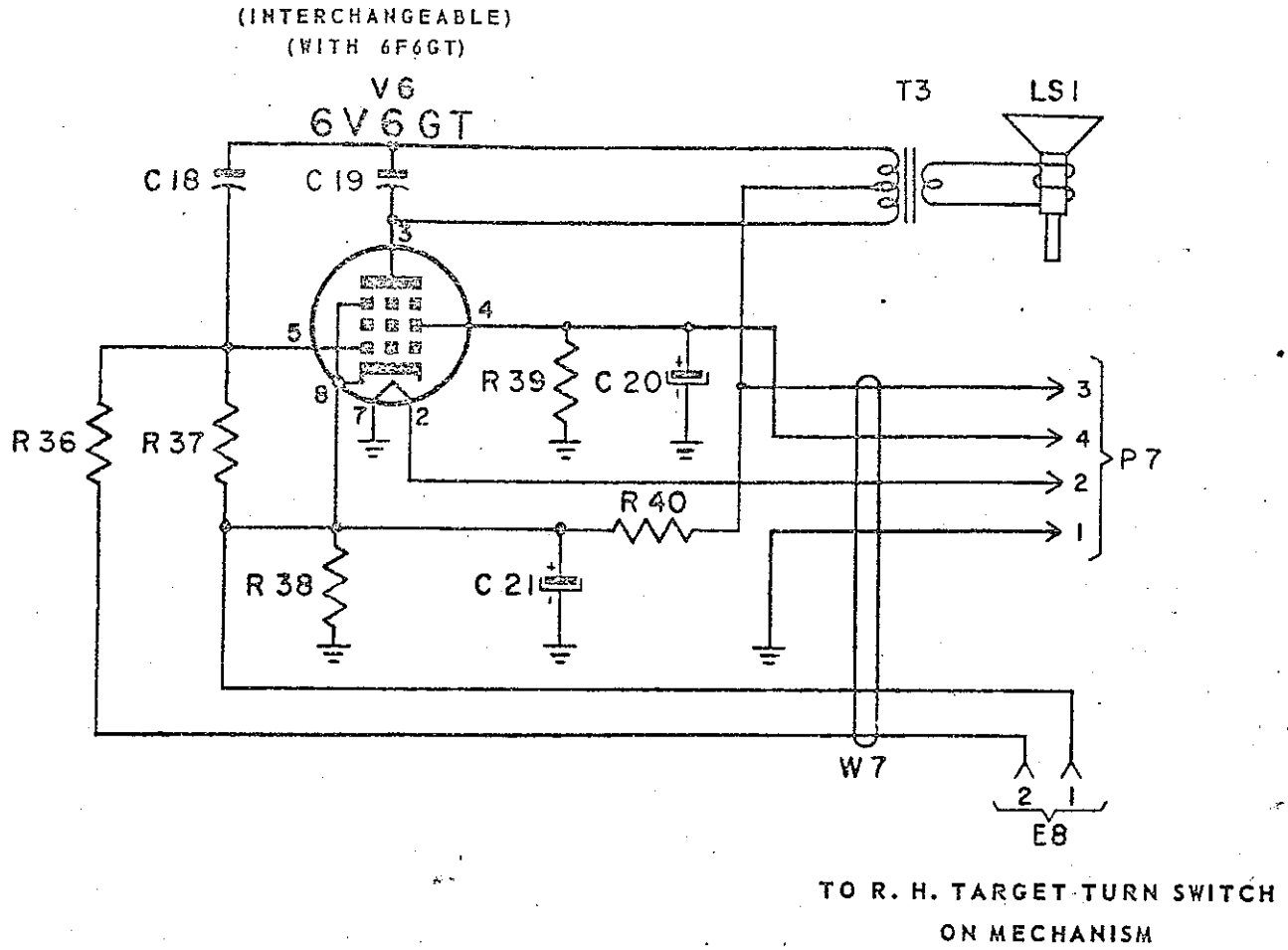


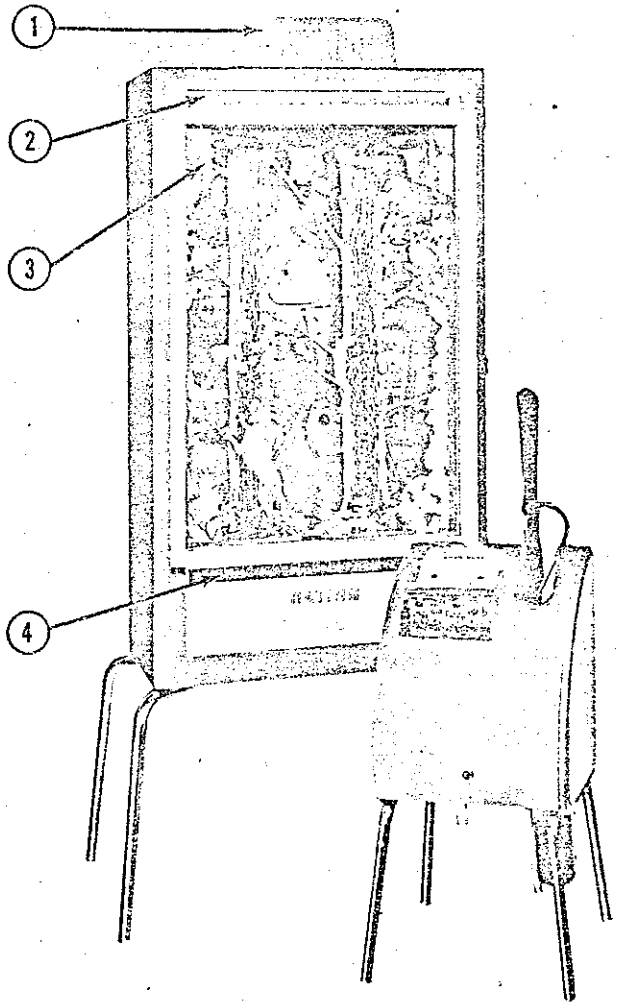
Figure 17. Schematic - Coon Whiner Assembly

PARTS LIST

Item	Item No.	Part Name
C18	86140	0.05 Mfd. 400 V.
C19	86213	.005 Mfd. 400 V.
C20	87610	5 Mfd. 350 V. Lytic
C21	87571	25 Mfd. 50 V. Lytic
LS-1	125665	Loud Speaker
P7	401515	4 Prong Plug
R36	82433	5.6 K ½ W.
R37	82441	27 K ½ W.
R38	82428	2.2 K ½ W.
R39	82446	68 K ½ W.
R40	82834	47 K 2W.
T-3	126626	Output Transformer
W-7	308265	Cable 6 Conductor

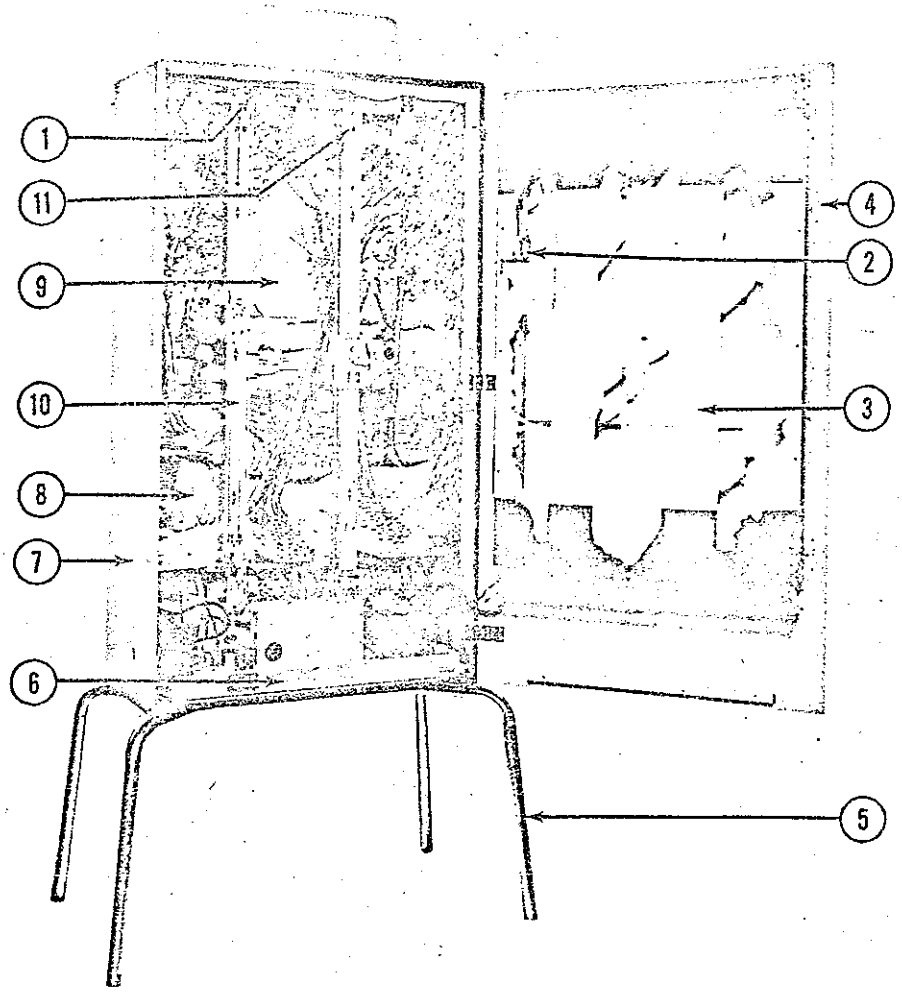
SEEBURG COON HUNT
RAY-O-LITE RANGE
Model G-5

MECHANISM ASSEMBLY – PARTS LIST



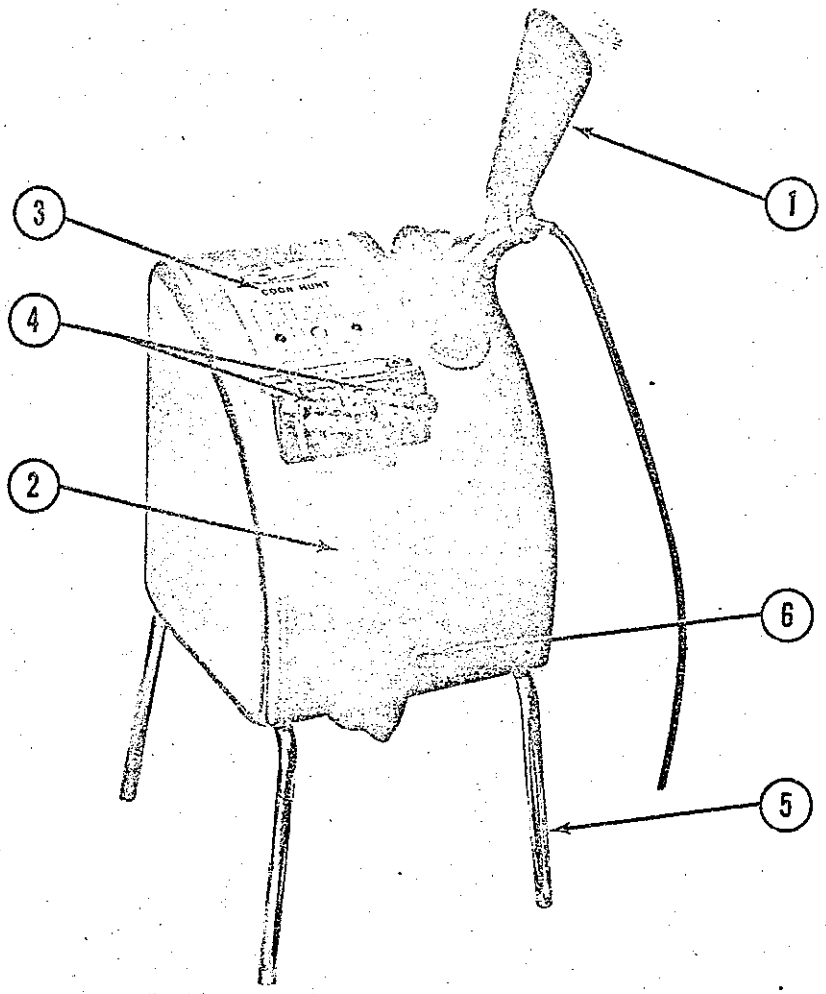
PARTS LIST

Item	Part No.	Part Name
1	127426	Plastic Sign Assembly
2	127367	Score Glass
3	127396	Door Glass
	127358	Scenery Corner – Lower R. H.
	127359	Scenery Corner – Lower L. H.
	127360	Scenery Corner – Upper R. H.
	127361	Scenery Corner – Upper L. H.
4	127368	Score Grade Glass



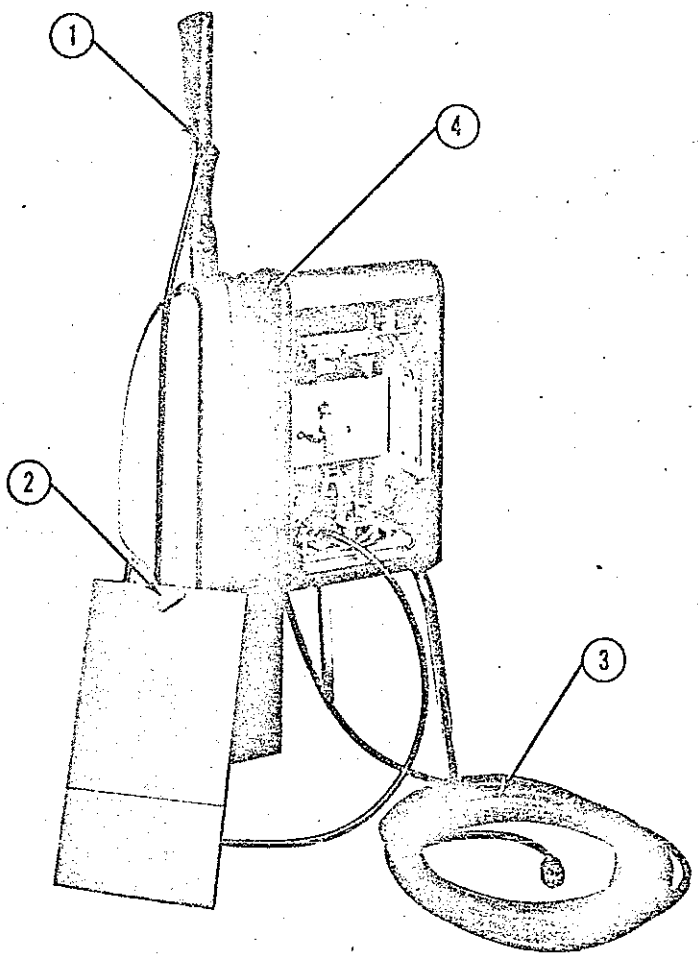
PARTS LIST

Item	Part No.	Part Name
1	127373	Pivot Plate Assembly
	127379	Top Reset Switch
2	127444	Bracket Socket Assembly
	127458	Lamp Socket Assembly
	127451	Plastic - Red (Right-Eye-Owl)
	127452	Plastic - Green (Left-Eye-Owl)
	10242	No. 51 Lamp
3	127405	Door Scenery
4	21156	Door Lock Plate
5	127363	Cabinet Legs
	127364	Leg Button
6	306150	AC2-L6 Amplifier & Power Supply Assembly
7	126038	Door Lock Assembly
8	127399	Background Scenery
9	127365	Moon
10	127000	Column (Turn) Assembly
11	127014	Switch Actuator Assembly
	127092	(Switch Actuator) Spring



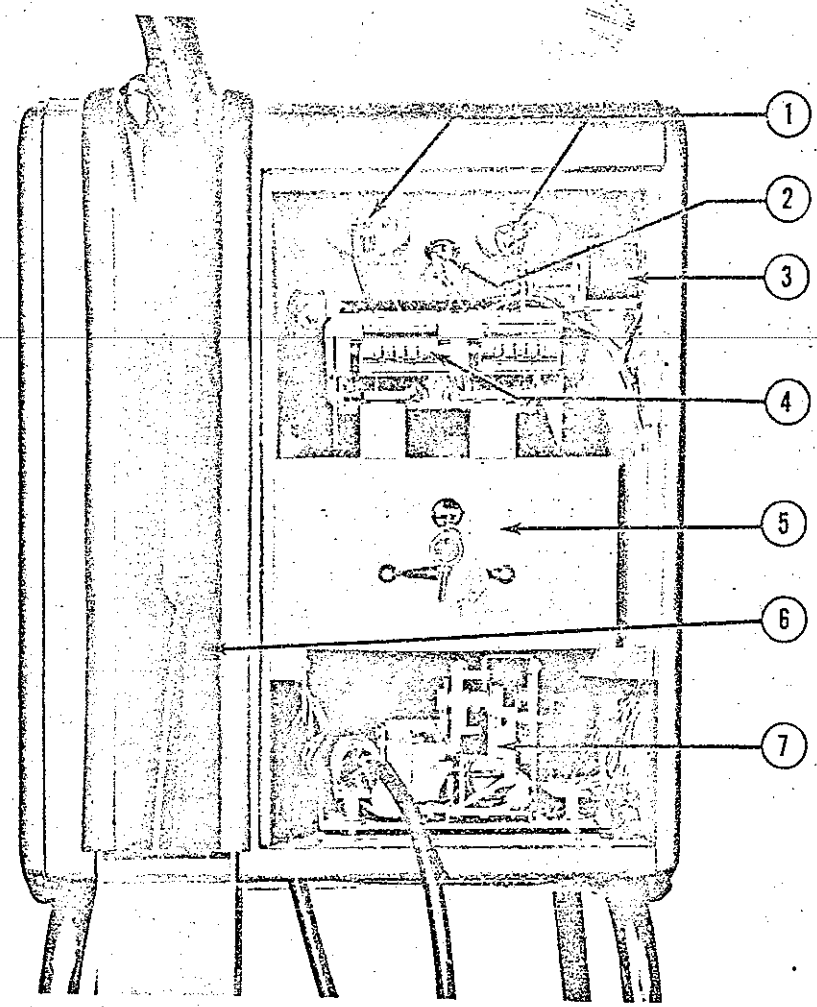
PARTS LIST

Item	Part No.	Part Name
1	125206	Gun Assembly
	125218	Gun Cable Assembly
2	126000	Gunstand & Gun Assembly
	126021	Gunstand Assembly
	126022	Gunstand Cabinet Assembly
3	126044	Name Plate - 10¢
	126045	Name Plate - 5¢
	125110	(Amber) Jewel & Socket Assembly
	125111	(Green) Jewel & Socket Assembly
	12105	Selection-Cancel-Button
4	126057	Coin Slide Mounting Bracket Casting
	125118	5¢ Slide & Bracket Assembly
	125119	10¢ Slide & Bracket Assembly
	125120	25¢ Slide & Bracket Assembly
5	126063	Gunstand Leg Assembly
6	125161	Pilot Light & Jewel Assembly



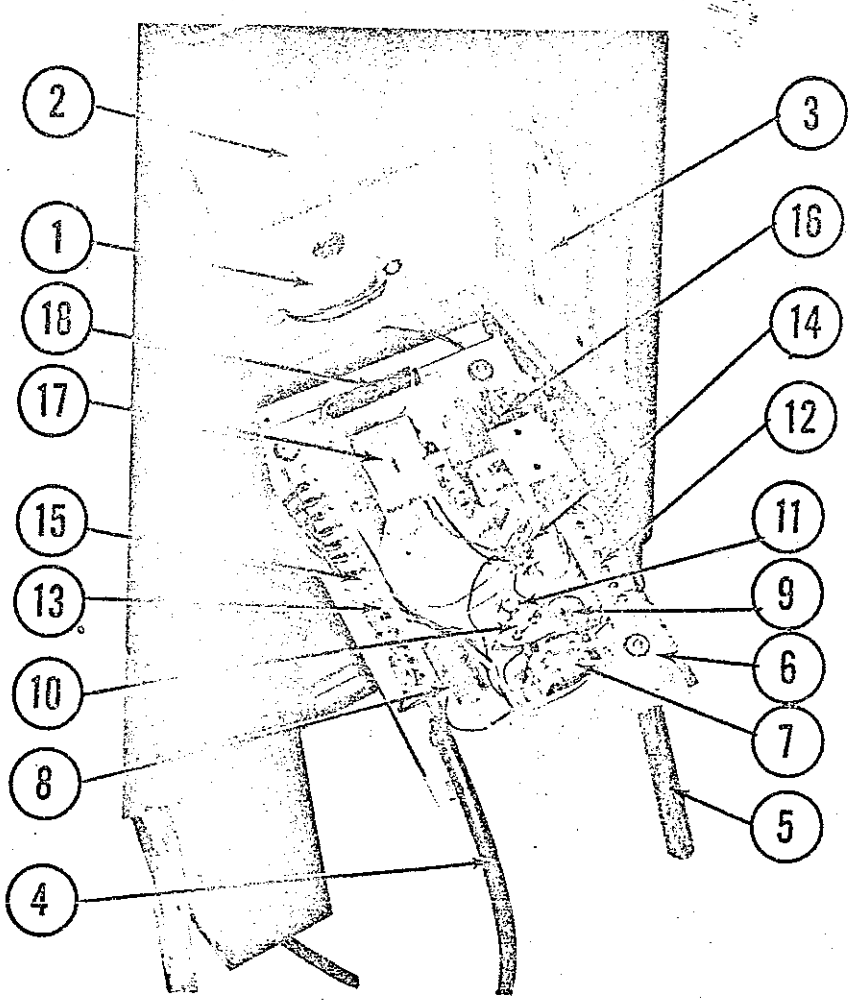
PARTS LIST

Item	Part No.	Part Name
1	125106	Gun Assembly
	125218	Gun Cable
	21852	Trigger Assembly
	21846	Gun Stock
	125204	Gun Barrel
2	126038	Lock Assembly
3	126048	Target Cable Assembly
4	126039	Gun Holster
	126060	Bottom Cushion (Gun Holster)



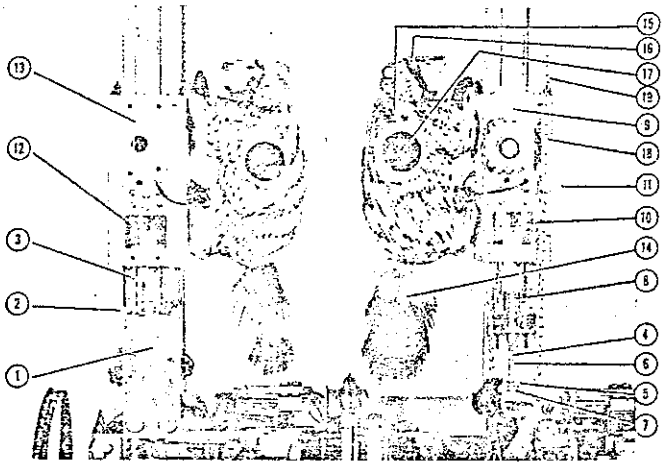
PARTS LIST

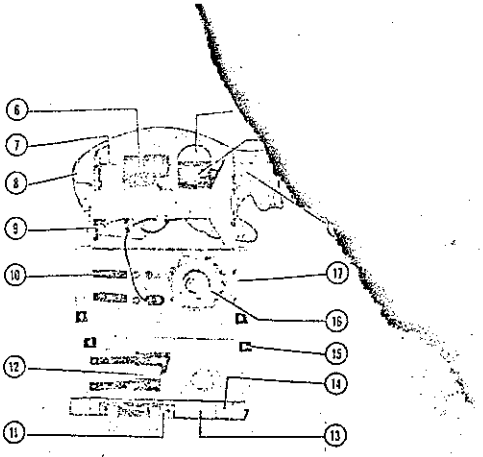
Item	Part No.	Part Name
1	125110	Jewel & Socket Assembly (Amber)
	125111	Jewel & Socket Assembly (Green)
2	12105	Push Button
3	125150	Muzzle Blast Sounder
4	200118	Counter
	126061	Counter Lever Assembly
	125122	Toggle Switch
5	125163	Coin Box Housing Assembly
	125178	Coin Box Drawer Assembly
	401011	Coin Box Lock
6	126039	Gun Holster
	126060	Bottom Cushion Holster
7	126100	Credit & Relay Assembly



PARTS LIST

Item	Part No.	Part Name
1	125178	Coin Box Drawer Assembly
	401011	Coin Box Lock
2	126000	Gunstand & Gun Assembly
	126021	Gunstand Assembly
	126022	Gunstand Cabinet Only
3	125162	Retaining Plate
4	125218	Gun Cable Assembly
5	126063	Gunstand Leg Assembly
6	126100	Credit & Relay Assembly
7	125141	Shot Timing Relay
8	87608	200 Mfd. Condenser
9	126125	Rheostat
10	81126	100 Ohm Resistor - 5W, 5%
11	81131	35 Ohm Resistor - 5W, 5%
12	125145	Terminal Strip - 9
13	125144	Terminal Strip - 5
14	126122	Carryover Switch
	400597	Tension Plate
15	125142	Terminal Strip - 7
16	505082	Solenoid Coil Assembly
	505083	Solenoid Plunger Assembly
	505140	Credit Switch
	505141	Spring
17	126112	Motor & Cam Assembly
	126113	Motor & Cam Assembly
18	81021	Wire-Wound-Resistor



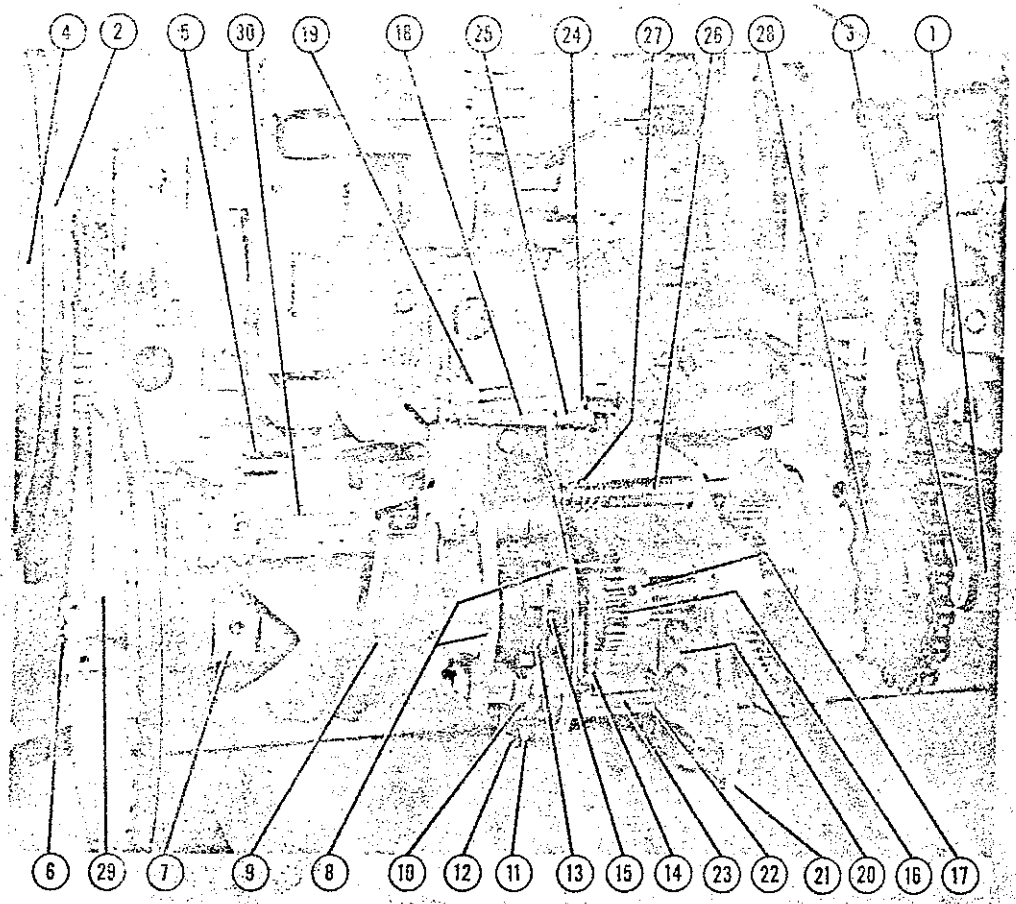


COON TARGET PARTS

Item	Part No.	Part Name
1	127087	Target Body Assembly
2	127089	Eyes
	70211	Eye Retainers
3	127081	Pilot Light Socket
4	21085	Lens
	127091	Lens Retainer
5	127064	Photo-Electric Cell Assembly
	127068	Photo Cells
	127069	Clamp (Photo Cell)
6	127059	Solenoid
7	127060	Solenoid Plunger (Tail)
8	127061	Hub (Tail)
	127062	Spring
	127063	Bracket Hub
9	81126	Resistor (100 Ohm - 5 Watt W.W.
10	127100	Contact Spring & Insulator Assembly
11	127079	Bracket Chain Guide
	79179	Rivets
12	127070	Contact Spring & Insulator Assembly
13	127077	Carriage Frame Assembly, Rear
14	127043	Shoe (Carriage Slide)
	79180	Rivets
15	70209	Speed Nuts
16	127082	Hub & Sprocket Assembly
	127033	Bearing-Clutch Sleeve
	127032	Rollers-(Roller Clutch)
	127031	Cam Plate (Roller Clutch)
	127030	Friction Plate
	127029	Friction Washer
	72239	Spring Washer
	70213	Stop Nut
17	127037	Carriage (Front) & Target Brkt. Assem.

PARTS LIST
(Overall View)

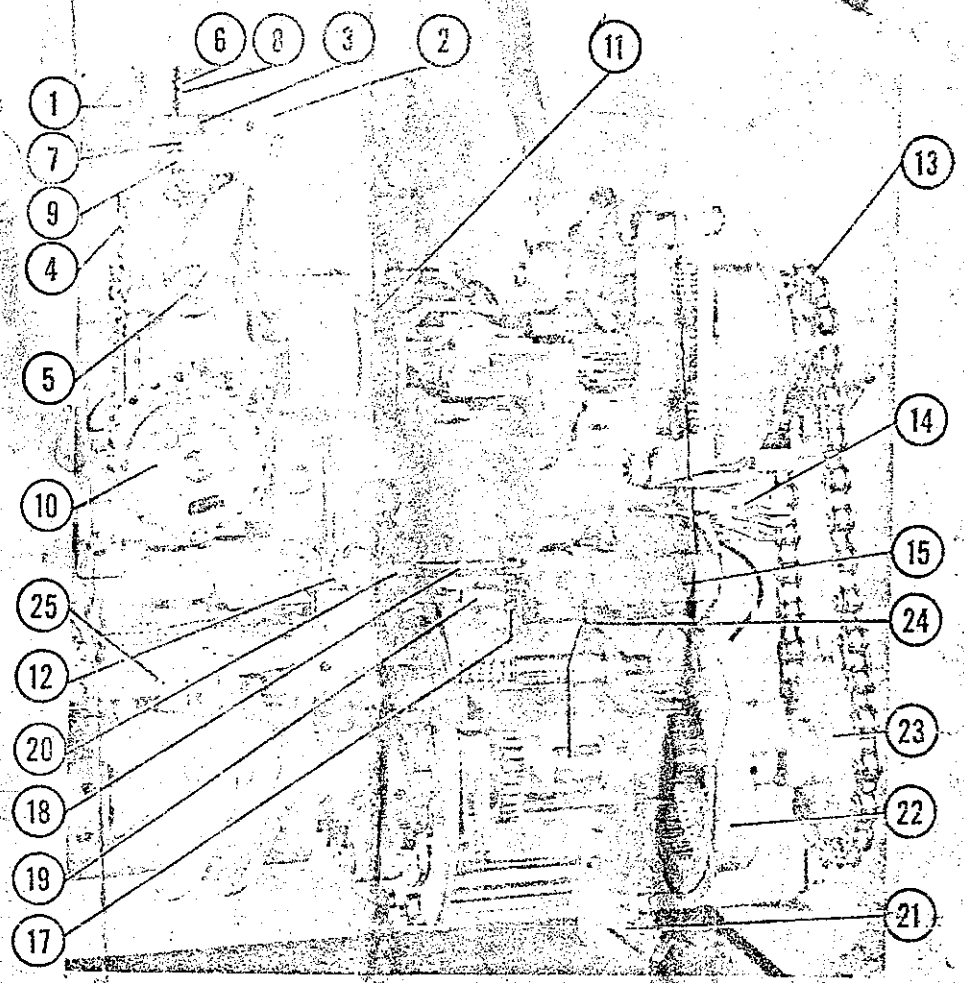
Item	Part No.	Part Name
1	127000	Column Turn Assembly
2	127011	Column (Turn) Riveted Assembly
3	127019	Contact Rail Riveted Assembly
	127053	Bumper (Carriage)
4	127380	Reset Rod
5	127381	Spacer Bushing (Reset Rod)
6	127382	Spring (Reset Rod)
7	127383	Spring (Reset Sleeve)
8	127384	Sleeve (Reset Rod)
9	127037	Front Carriage Frame & Target Bracket Assembly
10	127100	Contact Spring Assembly
	127062	Spring (Tail Hub)
	127061	(Tail) Hub
	127063	(Hub) Bracket
	127040	Carriage Frame (Front) Riveted Assembly
	81126	Resistor
	127031	Cam Plate (Roller Clutch)
	127032	Rollers (Roller Clutch)
	127082	Sprocket & Hub Assembly
	127033	Bearing (Clutch Sleeve)
	127029	Friction Washer
	127030	Friction Plate (Roller Clutch)
	72339	Spring Washer
	70213	Stop Nut (Flexloc No. 20 FK-428 Thin)
	127060	Solenoid-Plunger (Tail)
	127059	Solenoid
	127055	Bracket (Solenoid Mounting) Staked Assembly
	127064	Photo Electric Cell Assembly
	127065	Bracket & Contact Riveted Assembly
	127068	Photo Electric Cell
	127069	Clamp (Photo Cell)
11	127079	(Chain Guide) Bracket
12	127070	Contact Spring & Insulator Assembly
13	127077	Carriage Frame Assembly - Rear
14	127093	Tail Assembly
15	127087	Target Body Assembly
16	127089	Eyes
	70211	Eye Retainers (Speed Nut)
17	21085	Lens
	127091	Lens Retainer
	70805	4-40 x 3/16 B.H.M.S., Steel-Brown Ox
	72336	Spring Washer
18	127385	Chain (Ladder Type)
19	127387	Chain Retainer



PARTS LIST

Item	Part No.	Part Name
1	126302	Main Drive Shaft & Bracket Assembly, R. H.
2	125441	Belt
	126398	Motor Pulley & Bearing Assembly
	126393	Motor Drive Spring
	80136	Roll Pin (1/8 x 13/16) Steel-Plain
	80137	Roll Pin (1/8 x 5/8) Steel-Plain
3	126540	Roller Chain Sprocket Coupling
	80136	Roll Pin
	126543	Sprocket (roller-chain)
	126551	Detent Switch & Bracket Assembly
	126552	Detent Switch
4	126391	Intermediate Dual Pulley Assembly
	125466	Small Intermediate Pulley Assembly
5	126596	Brake Assembly
6	126498	Main Drive Shaft
7	126501	Collar
8	126502	Cylindrical Cam & Detent Plate Assembly
9	126503	Cylindrical Cam & Bearing Assembly
10	126509	(Locking) Pawl Assembly (Riveted)
	126508	Shoulder Screw
	126595	Pawl Assembly
11	126384	Roller (Detent)
12	125448	Retaining Ring
13	126571	Sprocket & Hub Assembly
	80136	Roll Pin (1/8 x 13/16) Steel-Plain
14	126517	(Pawl) Spring
15	126519	Spacing Washer (Turn Clutch)
16	126602	Clutch Sprocket Gear & Bearing Assembly
17	126523	Collar

Item	Part No.	Part Name
	75058	8/32 x 1/8-Socket Head-Cup Point Set Screw
	126524	Internal Gear
	80136	Roll Pin (1/8 x 13/16) Steel-Plain
18	126493	Actuator Shaft, Bracket & Terminal Assembly
19	126465	Mounting Plate Assembly
	126471	(Actuator Shaft) Bracket
20	126472	(Selecting Rod) Bracket
	126473	(Selecting Rod) Bracket
	126474	Selecting Rod Assembly
	126483	Spring
	125403	Retaining Ring
21	126486	Detent Switch
22	126487	Detent Arm Assembly
	126384	(Detent) Roller
	125448	Retaining Ring
23	126492	(Detent Arm) Shaft
24	126470	Stop (Turn Solenoid)
	126438	Shoulder Rivet
	79011	.125 Diameter x 3/16 Tub. Rivet, Steel-Cad.
25	126613	Spring (Plate & Sleeve)
26	126527	Follower (Actuator Shaft)
27	126483	Spring
	126358	Intermediate Gear Assembly
	126361	Gear Intermediate (Double "D")
	126536	(Reset-Bottom) Switch
28	126442	Center Member (Coupling)
29	126497	Pulley
30	126492	Switch & Bracket Assembly
	126469	Lock Lever



PARTS LIST

Item	Part No.	Part Name
1	126553	Chain Idler Arm Assembly, L. H.
2	126560	Chain Idler Arm Assembly, R. H.
3	126622	Spring (Chain Idler Arm)
4	127385	Ladder Chain
5	126562	Screw (Chain Idler)
6	127380	Reset Rod
7	127381	Spacer Bushing (Reset Rod)
8	127382	Spring (Reset Rod)
9	127383	Spring (Reset Sleeve)
	127384	Sleeve (Reset Rod)
	127387	Chain Retainer
	231163	Retaining Ring
10	126347	Lift Sprocket
	80108	Roll Pin
11	126406	Yoke Lever Assembly
	126623	Yoke Lever Shoulder Screw
12	126432	Yoke Switch
	200028	Switch Lock Plate
	71620	Screws
	126415	Solenoid Link
13	126386	Roller Chain
14	126627	Trim Switch, R. H.
	200028	Switch Lock Plate
15	126530	Solenoid and Link Assembly
17	126532	Spring Pin
18	126624	Link
19	126582	Spring
20	126581	Spring
21	126552	Detent Switch
22	126524	Internal Gear
	80136	Roll Pin
23	126543	Sprocket (Roller chain)
24	126541	Main Drive Shaft, R. H.
25	126458	Switch & Bracket Assembly (Turn & Hold)