INSTRUCTION MANUAL

KEENEY'S BONUS SUPER BELL

SINGLE AND TWO CHUTE CONVERTIBLE REPLAY MODELS

MFD. BY

J. H. KEENEY AND COMPANY

2600 W. 50TH STREET - CHICAGO 32, ILLINOIS
THREE-QUARTER VIEW OF SINGLE COIN MODEL
WITH DESIGNATION
THREE-QUARTER VIEW OF TWO-CHUTE MODEL WITH DESIGNATION
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ING UP

Place game in desired location.

Open the top and remove back panel. Back panel is held by latches shown in Figure ___.

Remove the RED BLOCK attached against the side of the slug rejector. Figure ___. The purpose of this block is to keep the slug rejector in place during shipment.

Attach light box to top of machine by means of carriage bolts furnished.

Draw cables from the light box down through the large openings to the mechanism shelves below.

Insert cable plugs into corresponding sockets.

Make sure that cash drawer in front of machine is arranged for replay or cash operation, as desired. See headings entitled "Replay" or "Cash Operation".

Run service cord through slot at bottom side of back panel, Figure ___. Replace back panel.

Fill coin tube if for cash operation. See "Cash" heading.

Cabinet must stand level for proper operation of slug rejector and anti-tilt pendulum.

Weights may be placed in bottom compartment if so desired.

SERVICE OUTLET

Insert the service plug into a 115 volt, 60 cycle A.C. outlet.

BE SURE THE PLUG-IN CONNECTION IS TIGHT AND THAT THE OUTLET IS IN GOOD CONDITION.

While this machine will ordinarily operate at voltages below 100, don't, if at all possible, plug it into a heavily loaded line which has refrigerators, neon signs, etc., connected to it, as there may be momentary light fluctuations to as low
as 60 volts, at which time some of the coils may fail to operate properly. Likewise, if there is a momentary interrup-
tion in current, as from a loose plug-in connection, the anti-tilt relay will "fall off", causing intermittent fail-
ures to pay out.

1-15 DO NOT PLUG INTO DIRECT CURRENT WITHOUT PROPER CONVERTER EQUIPMENT. See heading "Direct Current Operation".

CHECKING FOR PROPER OPERATION AND ADJUSTMENT

1-16 See inside of back cover of this Manual. All points mentioned should be checked individually.

REPLAY OPERATION ADJUSTMENTS

1-17 Move adjustment plug on lower mechanism panel to replay side of socket. Figure _____.

1-18 Change spring on reset arms of free game unit as shown in the instruction card alongside of same so that it will reset one game at a time. Figure _____.

1-19 Remove payout tube through and place in clips on the side wall of cabinet.

1-20 Close payout tube opening in coin trough with plate furnished in spare parts kit. Ears on this plate should be twisted to maintain it in position, if necessary.

1-21 Lock payout drawer as follows:

(a) Remove both upper and lower mechanism shelves. See heading "Removal of Mechanism Shelves", paragraphs 4-78, 4-80

(b) Remove wooden cover over payout drawer held by wood screws, Figure _________.


(c) Remove cleat attached across top of payout drawer and refasten it to the top of the payout drawer as close to the front panel as possible, preventing drawer from being pulled open.

(d) Replace parts removed above.

1-22 ADVISE THE MERCHANT OF THE METHOD OF REDEEMING FREE PLAYS, WHICH IS AS FOLLOWS.

(a) The player is entitled to one coin for each number shown on the backboard in the total score column.

(b) At the time of redemption, the free play reset button on the side of the cabinet near the rear should be depressed momentarily. Fig.____.

(c) The number of redeemed replays are then registered on the meter which is located alongside of the spinner mechanism. Fig.____.

1-23 NOTE! On the Two-Chute Models there is a free play reset button on each side of the cabinet.

1-24 Replays can be played off by the player in the same manner as cash by depressing the bent coin reject button on the coin chute housing.

1-25 NOTE! Coins will be rejected by the coin chute as long as free games appear on the corresponding total score column.

CASH OPERATION ADJUSTMENTS

1-26 Adjustment plug on lower mechanism panel should be on CASH SIDE OF SOCKET. Fig.____

1-27 Spring on reset levers of free game unit should be connected (as shown on instruction card alongside of same) to reset the unit completely to zero position with each play. Fig.____

1-28 Payout drawers should be free to be pulled out. If they are
fastened closed, change position of cleat on payout drawer to the
rear of the drawer by applying the reverse procedures of paragraphs

1-29 Install payout tube. It is held down in proper position by the
spring stretched between a hook on the tube and a hook on the front
panel of the cabinet.

1-30 Fill payout tube by removing slug rejector and dropping coins in
carefully one at a time as shown in Figure ____.

1-31 NOTE -- VERY IMPORTANT! Do not allow coins to fall into the payout
tube in groups—they are likely to lodge sideways, preventing pay-
outs when the sideways coins reach the slide at the bottom.

SUPER BONUS REGISTER UNIT (FIGURE ____)

1-32 Each time that a player scores a SUPER BONUS by having the three
bars come up when five coins are played, it will be indicated on the
backboard by the "Plus 500" light coming on as well as one of the
stars for that especial coin chute lighting up.

1-33 The player is then entitled to, in cash operation, an over-the-
counter award of 500 points, which would be $25.00 in the case of
nickels, $50.00 for dimes, and $125.00 for quarters.

1-34 On the next play the "Plus 500" light will go out. One of the stars
however, will stay lighted until the Bonus Register unit is reset by
the operator.

1-35 This unit is arranged alongside of the spinner mechanism. The
method of resetting it is shown in Figure ____.

1-36 IMPORTANT! One of the meters so designated also registers the
number of times this award has been paid.

1-37 The "Plus 500" awards each have two light bulbs so that should one
lamp burn out, the other will continue to show. A habit should be
made of checking these lamps frequently to eliminate possibilities
of disagreement.
WINNING ROW FREQUENCY

1-38 Winning Row Frequency may be changed by means of a plug and socket alongside of the spinner mechanism. SEE FIGURE____.

1-39 Plug in position closest to upright post so that all 8 sockets are filled and will light maximum number of winning rows. The next position away, leaving 2 blank sockets as medium, and the third position, leaving 4 blank sockets is conservative.

REEL BRAKES

1-40 After setting up and trying the machine, it may be found that the reels do not stop properly. In this event, the reel brakes should be adjusted in accordance with heading "Reel Brake Adjustment". Paragraph 4-62.

Likewise, after the machine has been in operation for a time, the reel brakes will have become "broken in" and will require adjustment.

TO EMPTY PAYOUT TUBE

1-41 Set up a High winner manually on the reels by pushing the tops away from you. Hold the V-belt pulley on the spinner mechanism main shaft, drop in a coin, and depress starting handle. When payout occurs, hold the payout sequence stop coil (Figure____) so that it cannot release at the end of the payout. When the payout is converted, close commutator reset cam No. 5 with the fingers. Repeat until tube is empty.

OR

Operate payout slide manually.

FUSES

1-42 IMPORTANT! Never replace fuses with any other sizes than designated. Fuses are shown on Figure____.

1-43 The 5-ampere fuse closest to the side panel protects the 110 volt input circuit.
The 10-ampere fuse, second from the side panel, protects the 6 volt lamp circuit (white wire).

The 15-ampere fuse, third from the side panel, protects the main control circuit (red wire).

The 5-ampere fuse closest to the spinner mechanism protects the spinner unit proper.
Its purpose is to prevent the small wiper blades in the spinner unit from being burned up, should a short circuit occur anywhere ahead of the spinner assembly in the payout system, that is, the multiple step-up switch, bar relays and payout commutator unit. NEVER REPLACE WITH ANY OTHER SIZE.

**LIGHT BULBS**

1-47 Light bulbs in the light box and in the coin chute are Keesey No. 127K 401 or Automotive No. 55.

1-48 Procedure for replacement of the light box lamps is shown in Figure _____.

1-49 Winning Row lamp bulbs are special 27-volt type, Keesey No. 127K 402.

1-50 Procedure for replacement of Winning Row lamps is shown on Figure _____.

**LUBRICATION**

1-51 IMPORTANT! Never use vaseline for lubrication of any part of this machine! A special lubricant is supplied with each machine.

1-52 Correct lubrication procedure is as follows:
   (a) The bearings on the two motors should be lubricated as described on the tag attached to each motor.
   (b) All rotating parts in the spinner mechanism operate on OILITE bearings which should never require re-oiling. However, should the mechanism at any time be torn down, these bearings should be saturated with No. 10 motor oil before
(c) Step-up switch levers and other sliding or oscillating parts should be very lightly greased with the special grease furnished with the machine not oftener than every six months.

(d) Contact blades and rings in the spinner mechanism and on the step-up switches will require lubrication with the special grease only after the grease is completely evaporated (3 to 12 months, depending upon the climate) or should the film of grease become dirty. In either event, clean the plates thoroughly with benzol, naphtha, or white gasoline, then reapply an extremely thin coating of the special grease with a fine camel's-hair brush.

(e) Solenoid plungers and payout slides should not have a lubricant of any kind. Should there be a tendency to sluggishness, the parts should be cleaned with a solvent and flaked graphite applied on reassembly.

(f) Start handle shaft can be oiled by oil hole in stationary casting.

1-53 IMPORTANT! Again we emphasize DO NOT USE VASELINE ON ANY PART OF THIS MACHINE. Vaseline is not a true lubricant. It leaves a dirty and gummy residue and it becomes very thick when cold.

1-54 The special lubricating grease furnished with each Keeney device leaves no residue, rather it evaporates very slowly and does not change consistency when subjected to ordinary temperature changes.

1-55 OVER-LUBRICATION causes far more trouble in coin operated equipment than under-lubrication. Practically all contact trouble is caused by too much lubrication on various parts, causing specks of oil or grease or oil vapor to be deposited on relay and sequence contacts where they form a residue which will not allow current to pass through.
ADJUSTMENTS

During the life-time of this machine, adjustments of various functions may be required. This information may be located by referring to the various headings on the index page.

DIRECT CURRENT OPERATION

For safety reasons, all controls and lamps of this device are operated on low voltage supplied by a transformer requiring the use of a 300 watt rotary converter for direct current operation.

Input voltage to the converter should be suitable to the local line. Output must be 110-120 volts, 50 to 60 cycles A.C. Capacity must be 300 watts minimum.

WARNING!

Many direct current lines are not of sufficient capacity to handle a converter. Trouble will be experienced if the direct current power supplied goes below 105 volts at any time.

Because the coins are registered electrically, the converter must operate continuously.

The converter can be bolted to the inside bottom compartment, if so desired. However, the noise may be objectionable and it is suggested that the converter be installed away from the machine. Simply plug the converter into a local output socket and plug the BONUS SUPER BELL service plug into the outlet provided with the converter.

25-30 CYCLE OPERATION

25-30 cycle operation special motors and transformers can be furnished at extra cost.
This description of functions of the various parts is for the purpose of acquainting the serviceman with the same so that he may be better able to service and maintain this equipment.

The following will be comparatively simple for a serviceman to understand if the wiring diagram is referred to while studying this data.

**NOTE!** This outline of operation covers a Single Coin Chute machine operating for cash. There are slight differences in free play and two-chute operation. These differences are described at the end of this section.

When the game is plugged into the proper service outlet, sequence cams, Fig. ___, should be in or will go into the initial or "zero" position, at which point the contacts on sequence cam No. 2 (the start circuit control cam) are closed.

The light on the coin chute will come on (providing there are no free plays showing when operating on Free Play) and the coin chute coil will become energized, allowing the machine to accept coins.

Notice that the coin chute lock will only allow coins to pass when the coil on it is energized, preventing loss of coins if current is off, or free games are showing.

The start circuit control cam supplies current only at the very beginning of the sequence operation through the gray-yellow wire. When a coin is deposited, the coin switch is closed momentarily, whereby current from the gray-yellow wire goes through the green-yellow wire to the multiple relay. The multiple relay locks itself down by means of one pair of contacts on it to the green-white wire which goes to a contact which breaks at the end of the forward drive stroke of the multiple step-up switch, Figure ___. The multiple relay will therefore
stay locked down until the multiple step-up switch has reset and advanced one position.

The second set of contacts on the multiple relay furnishes current from the gray-yellow wire through to the orange-green-red wire, through a set of double pole contacts on the hold relay to energize the RESET COIL on the multiple step-up switch through the brown-yellow wire, allowing the multiple step-up switch disc to return to initial ("zero") position.

When the multiple step-up switch attains "zero" position, it will be seen from the diagram that the current from the gray-yellow start circuit goes through wipers and rivets at the "zero" position to pull in the hold relay, which relay locks itself down by means of contacts on it to the gray-yellow line.

The HOLD RELAY switches the double pole contacts on it which were receiving current through the multiple relay, switching over this current from the multiple RESET coil to the multiple STEP-UP COIL, to advance the multiple unit.

When the multiple step-up coil is pulled in all the way, the end of stroke contact is broken, allowing the multiple relay to fall off.

The above procedure therefore means that when the first coin is inserted, the multiple step-up switch is reset completely and then stepped up one position to indicate that one coin has been played.

The hold relay stays locked down through the contacts on it until after the machine is started. This means that when succeeding coins are dropped, the multiple relay is closed momentarily with each coin, furnishing current through the double pole contacts on the hold relay to the multiple step-up coil so that each succeeding coin after the first one steps the multiple unit up one position.
The sequence motor is started with the first coin by means of one of the pairs of contacts on the hold relay, red to brown-yellow-red wires. The purpose of this is to provide a mixing action while the reels are spinning, as the position of the lobes on the mixer cam (Figure__) when the starting handle is depressed will determine how long the reels will spin.

The start handle receives its current from the multiple step-up switch through the brown-red wire. It will be seen that there is no current in the brown-red wire when the multiple step-up switch is in its most reset position, which prevents starting of the machine until the multiple step-up switch has made its full stroke.

Depressing the start handle then energizes the sequence release coil (Figure__) through the red-brown wire, allowing the sequence clutch arm to engage the drive ratchet, turning the sequence shaft.

Immediately after the sequence shaft starts to rotate the tilt relay step-up cam No. 1 closes momentarily, pulling in the anti-tilt relay which locks itself down through the double pole contacts on it, white-gray to red wires.

The anti-tilt relay controls the payout circuit. It will stay locked down indefinitely until such time as current to the machine is shut off by disconnecting the service plug, or should the machine be tilted, whereupon the plumb bob will short circuit the anti-tilt relay coil to the 25 ohm resistor, allowing the relay to fall off.

The sequence motor control cam No. 3 closes immediately after starting, supplying current to the sequence motor until it opens at the end of one revolution. (The hold relay in the meantime falls off—therefore, all current to the sequence motor after
starting is handled by sequence cam No. 3).

2-20 Spinner cams No. 4 and No. 8 close, energizing the spinner motor. Two cams are used here in order to provide adjustment of the starting and stopping positions of this motor so that the reels are given only enough speed to give proper spin and stop action without "bounce".

2-21 Winning row selector disc is at the same time released mechanically by the cam on the sequence shaft closest to the spinner motor. The winning row selector disc proper rotates immediately inside of the No. 1 reel. (Fig. ___)

2-22 Within a few seconds after starting, the sequence shaft clutch roller will come in contact with the mixer lever, (Fig. ___) which will disengage the sequence shaft until one of the cam lobes, which are being constantly rotated, releases the mixer lever. This action provides an indeterminate length of spin of the reels.

2-23 Sequence cam No. 5 closes momentarily to energize the payout commutator reset coil through the orange-brown wire, bringing the payout commutator to "zero" position.

2-24 Sequence spinner control cams No. 4 and No. 8 open, stopping the spinner motor and allowing the reels to coast.

2-25 As each reel slows down, its brake arm, Fig. ___, is brought into contact with the reel hub momentarily to bring the reel down to slow speed where it can be stopped by stop levers without "bounce" immediately after which reel brake drops away from the reel hub and the stop lever is released to engage the star wheel.

**IMPORTANT!**

2-26 The brakes for each reel should be adjusted so that they bring the reel down to where it is turning over slowly and then disengage before the stop levers fall in. See Paragraph 4-52.
Immediately after No. 3 reel stops (see Figures ____ and ____), sequence cam contacts Nos. 6 and 7 close to perform payout functions, if any, as follows.

The reels have three complete and separate sets of payout circuits through them to handle center, top and bottom row winners. The top and bottom sections are energized from the winning row selector assembly. The center row is energized directly from the red-black line.

Each of the payout circuit outputs from the reels go to corresponding sections on multiple step-up switch. The prime purpose of the multiple step-up switch is to increase each winner in accordance with the extra coins played.

Payout outputs from the multiple step-up switch go to wipers which engage rings on the payout commutator.

If a payout is indicated on the reels when sequence cam No. 6 closes after No. 3 reel is stopped, current will flow through the spinner assembly and multiple step-up switch to the proper wiper on the payout commutator. This wiper energizes one of the payout commutator rings, all of which are connected through the green-yellow wire to the payout relay.

The back connection of the payout relay goes through a contact on the anti-tilt relay through the black-red-wire through No. 6 payout cam.

NOTE! Payout and bar relays are the only coils on this device wherein the back connections are not made directly to the common BLACK line.
2-34. Bar relay cam No. 7, which closes at the same time as the payout reel, closes the back circuit of the three-bar relays. There is a bar relay for each winning row. Its purpose is to connect the various payout circuits across No. 3 reel whenever a bar shows for that row on No. 3 reel.

2-35. When the payout relay is pulled in as described above, the following functions are performed by it:

(a) One contact on it, red to white-red, energizes the sequence stop coil, Figure 1, stopping the sequence shaft until the payout has been completed.

(b) Another contact on the payout relay receives pulsing current from the impulse switch, Figure 2, through the green-red wire, sending these pulses through the red-yellow-black wire to the payout commutator step-up, the free game step-up, and, if the game is being operated for cash, to the payout solenoid.

2-36. Pulses therefore step up the three units mentioned above simultaneously.

2-37. In order to reduce the pulsing load on the impulser contact in cash operation, a pair of drive stroke make contacts on the payout commutator (see Figure 3) is connected directly between the red (25 volt) line and the free game step-up switch. The free game step-up then functions only to show amount of payout. When the payout commutator drive lever is pulled in, current goes through this contact to the free game step-up.

2-38. When the payout commutator unit has advanced to such a point that the ring runs off the energized wiper, the payout relay is released, opening the circuit to the sequence payout stop coil. The sequence shaft is now free to turn and will do so. Sequence motor control cam No. 3 opens, stopping the sequence motor and ending the play.

2-39. Immediately before No. 3 cam opens, sequence start control cam No. 2 closes, energizing the coin chute locking coil so that coins may
2-40 Should the winner be three bars with five coins played, entitling
the player to a SUPER BONUS score, these circuits are handled as
follows:

(a) A contact on the payout commutator is closed by the ratchet
wheel in the topmost or 42nd position. This contact receives
its current from the multiple step-up switch through orange-
black line, current leaves it through the blue-black wire
and goes to the BONUS meter and BONUS step-up (Figure____)
which are connected in parallel. The back connections of
each are connected through the black-white wire to the back
connection of the payout relay.

2-41 The SUPER BONUS step-up switch does not reset automatically. It
must be reset manually by the operator.

FREE PLAY OPERATION — SPECIAL FUNCTIONS

2-42 When the game is operated on free play, the spring position on
free game register unit allows this unit to reset one position
at a time.

2-43 The payout solenoid is disconnected by the free play adjustment
plug.

2-44 The coin chute release coil instead of receiving current directly
from the gray-yellow start line receives current only through the
yellow-white line which is connected to the "zero" position button
on free game register through the 95 position switch. This keeps
the coin chute release coil unenergized as long as any free games
are showing so that coins cannot be played during this period.

2-45 Games are played off by depressing the bent coin release button
on the coin chute. This button goes to the multiple relay the
same as the coin switch—however, it receives its current from
the ring on the free game register unit which is contacted by the
bent finger in any position off the "zero" position.
The free game unit makes two revolutions, giving it a total capacity of approximately 196 free games. In passing over the hundredth position, the finger contact button runs off the ring and onto the "zero" position contact button. In order to continue to furnish current to the free play play-back push button, a pair of contacts closes in the 96th position, short-circuiting the button to the ring. See Figure____.

When free plays are to be redeemed and the merchant's reset push button on the side of the cabinet is depressed, the following occurs:

(a) One set of contacts on the reset push button, black to blue lines, shorts across the anti-tilt relay, causing it to drop out.

(b) One set of contacts under the reset push button energizes one of the coils in the free game reset relay (Figure____), latching the relay in the reset position.

(c) One pair of double pole contacts on the reset relay, which was receiving current through the white-green wire from the free game register when it was off "zero" position supplying it to the free play play-off push button, is now switched over to the brown-yellow-red wire to the sequence motor. The sequence motor will stay energized until the free game unit is brought back to "zero" position.

(d) A pair of contacts on the reset relay, green-orange to black-green, connects the free game unit reset coil in parallel with the free game meter, so that each time the reset coil is energized, the meter registers once.

(e) Current coming from the impulser switch (Figure____), green-red wire, goes through a double pole contact on free game reset relay, supplying pulses from the impulser through the black-green wire to the free game reset coil, which is now connected
(f) Notice that the free game reset relay is mechanically latched in and can be released when the set-up relay coil on it is energized. One pair of contacts on the free game reset relay, yellow-white to orange-black, connects the set-up relay in parallel with the coin chute coil.

(g) When the free game register is impulsed back to "zero" position, current from the "zero" position button will go through the yellow-white wire to the coin chute coil, at the same time energizing the set up relay coil which unlatches the relay re-set to normal positions, disconnecting (a), (b), (c), (d), (e) and (f) above and restoring them to normal.

IMPORTANT! The free game register, Figure____, while not critical in adjustment, does require care in making settings on its contacts and obtaining proper tension on the return spring. See section headed "Free Game Register - Adjustments" for proper procedure. (Paragraph No.: 4-19).

TWIN COIN CHUTE OPERATION

(2) For the main, all functions of control for both cash and free operation are the same as in the single coin machine, however, with exceptions which are outlined below.

(a) The first is that the hold relays are not pulled in directly by the multiple set-up switches in the "zero" position. This circuit goes through a pair of make contacts on their corresponding multiple relays.

(b) Secondly, current to the start handle switches goes through contacts on the corresponding hold relays from the multiple set-up units instead of directly as before.

(c) The third and main difference is that the payout outputs from the spinner mechanism, instead of going directly to
the multiple step-up units, go first through the SWITCHER RELAY. In the initial position of the switcher relay all of the output circuits are connected to the left-hand multiple step-up and related payout commutator, etc. After the left-hand payout, if any, the switcher relay energizes, disconnecting the spinner output lines from the left-hand multiple unit to the right-hand assembly. The switching is done as follows.

When the switcher relay is not energized, the payout circuits go to the left-hand payout assemblies. Referring to the diagram, it will be seen that if the left-hand payout relay is energized, no current can go to the switcher relay. When the left-hand payout relay is released, current can go to the switcher relay providing the left-hand payout commutator has advanced at least one position. Therefore, when the left-hand payout is completed, the switcher relay energized throws out all output lines from the spinner over to the right-hand equipment, pulling in the right-hand payout relay starting that payout.

Should the left-hand coin chute not have been played, its multiple step-up unit will be in "zero" position and it will be seen from the position of these wipers that the switcher relay will be energized instantly when payout com No. 6 closes, starting the right side payout immediately.
Necessarily there is a time interval between dropping out of the left-hand payout relay, operating the switcher relay and pulling in the right-hand payout relay which would ordinarily allow the sequence payout stop coil to release enough so that the sequence would start and completely miss the right-hand payout. In order to obviate this, it will be seen that there is a second impulser contact and a contact blade at the sequence stop coil (see Figure ___) which is closed when the sequence stop coil is energized. The sequence stop coil is therefore locked in energized position through these two contacts until the impulser disc advances sufficiently to open the contact on it thereby providing the necessary time interval to allow the right-hand payout relay to pull in.
3-12 Check 5 ampere 100 volt fuse.

3-13 Check all multiple plugs and sockets for clean, tight connection. BACK PANEL AND DISPLAY LIGHTS DARK

3-14 Check 10 ampere fuse on white line. CONTROLS DEAD - WINNING ROW LIGHTS DARK

3-15 Check 15 ampere fuse on red line. REFUSES COINS - COIN CHUTE LIGHT DARK

3-16 On cash operation make sure that sequence start circuit cam No. 2 is closed, furnishing start current through gray-yellow wire (sequence motor might have stopped before complete revolution). See paragraph headed "Sequence Motor Stopped".

3-17 On free play operation coins will not be accepted with free game registers off "zero" position. If this unit is on "zero" position, check that start circuit control cam No. 2 is supplying 25 volts current to the free game unit, that wipers on free game unit are making good contact to supply current to the coin chute coil through the yellow-white wire from the "zero" position riveted between segments on the free game unit.

REFUSES COINS - COIN CHUTE LIGHT ON

3-18 Slug Rejector is probably dirty. It should be cleaned by opening as shown in Figure _, using carbon tetrachloride or white gasoline with a fine camel's-hair brush. See paragraph 4-33_.

3-19 CAUTION! Do not change position of envyis, etc., in the slug rejector.

3-20 Slug rejector may not be perpendicular due to one or both of the following:

(a) Cabinet not standing level.

(b) Slug rejector is incorrectly located in its mount.

3-21 Check coin chute lock coil. When pulled in, the armature stud should come out far enough to allow good coins to go into the trip switch opening. This coil may possibly be burned out or the
ACCEPTS COINS – REFUSES TO RESET AND STEP UP, MULTIPLE UNIT

3-22 Coin trip switch may not be making proper contact when the arm is engaged by coins. Check it manually by either closing the contacts with the fingers or short-circuiting from the gray-yellow to the green-yellow wires to ascertain whether other elements are failing. See paragraph 4-45, "Coin Trip Switch Adjustments".

3-23 If coin switch and circuit are O.K., multiple relay should pull in and stay locked down by contacts on it, green-yellow to green-white wires, which are in series with the multiple step-up end of stroke brake contacts, Fig. green-white to green-yellow wires.

3-24 If the step-up drive arm on the multiple step-up unit is held against moving with the fingers, the multiple relay should stay locked down, the multiple step-up should try to complete its stroke, and, after doing so, breaking the end of stroke contacts, the multiple relay will fall off.

3-25 If the above O.K., multiple relay locks down but multiple reset coil does not pull in, check contacts on multiple relay, green-yellow to green-red, which lead to the hold relay, (Par. 2-20). One set of double pole contacts on the hold relay receives current from the multiple relay through the green-red wire. When the hold relay is not energized, the normally closed contacts should send current through brown-yellow wire to the multiple reset coil. When the multiple unit reaches "Zero" position, energizing the hold relay, these contacts are switched over so that current should go through black-green-red wire to the multiple step-up coil.

3-26 If multiple reset coil is being pulled in but step-up of the same unit does not follow immediately, the hold relay contacts above are either out of adjustment or dirty or hold relay is not pull in.
green.

3-35 Check wipers on free game unit, especially the one with bent tip riding on ring and single button.

3-36 If trouble appears only when free game register is in 100th position, check adjustment of 96th position switch. See Fig.____.

3-37 Free plays taken off at end of game without depressing button is caused by free game play-off contacts being held closed because of one or more of the following:
(a) The actuating lever on slug rejector is improperly resting on top of the retainer blade. See Figure _____.
(b) The contact blades are out of adjustment and are not opening. See Figure _____.
(c) The adjustment on the bottom of the play-off button is down too far so that when the top is closed, it holds the contact closed.

MACHINE SHOWS TWO OR MORE COINS PLAYED WHEN ONE IS INSERTED

3-38 Generally caused by return spring on multiple unit being too tight and allowing ratchet wheel to "bounce" to second position.

3-39 On free play, can be caused by poor contact due to dirt or not enough tension of contact fingers on free play unit, especially where the contact arm which is bent at the tip and rides on a ring except at the zero position.

MACHINE DOES NOT START - COINS ACCEPTED AND REGISTERED

3-40 Sequence release coil, Figure ____., may be out of adjustment mechanically, insert coins, operate sequence release coil solenoid plunger by hand to determine whether this assembly is O.K. See Paragraph 4-71.

3-41 Hold relay may be falling off account of poor lock-in contact on it.

3-42 Start handle switches may not be receiving current through the brown-red wire from the wipers on the multiple step-up unit in
SEQUENCE MOTOR IS STOPPED DURING PLAY

3-43 Check sequence cam No. 3.
3-44 Check levers, brakes, etc., for binding parts or bearings.

SEQUENCE MOTOR DOES NOT START IMMEDIATELY WHEN FIRST COIN IS ACCEPTED

3-45 Check contacts on hold relay, red to brown-yellow-red wires. Also, make sure that hold relay is locking itself down.

SEQUENCE SHAFT DOES NOT TURN - SEQUENCE MOTOR RUNS

3-46 Either or both the sequence release coil or payout stop coil may be out of adjustment. See Figure ___ and paragraph 4-71.
3-47 Mixer lever may not be operating properly due to bent parts or broken spring.

SEQUENCE MOTOR REFUSES TO STOP

3-48 In free play operation check contacts under play-off push button mounted on slug rejector. Make sure that lever which actuates these contacts is in proper position so that it is not holding the contacts closed when the top of the cabinet is lowered. See Fig. ___ for proper adjustment and position of these contacts.

3-49 Check sequence cam contact No. 3 for proper opening at end of play.

3-50 Check hold relay for proper releasing of its coil when start circuit control cam No. 2 opens. Also, check contacts on hold relay which parallel cam No. 3 contact. These blades are connected to the red and brown-yellow-red wires.

3-51 If trouble occurs after taking off free games with merchant's reset button, it may be caused by set-up coil on free game reset relay, Figure ___, not restoring reset relay to normal position. The set up coil receives its current from the free game step-up switch; zero position, through the 96th position switch on the free game unit, and through contacts on the free game reset relay, yellow-white to orange-black. Possible difficulties are:
(a) 96th position switch assembly has been turned out of adjustment, closing the switch but preventing the free game unit from going back to "zero". See Figure _____ for proper adjustment.

(b) The contact finger with bent tip on the free game unit may not be making good contact with the single button between the ends of the ring at "zero" position.

(c) The contacts on free game reset relay, yellow-white to orange-black, may not be closing properly.

GAME PLAYS FREE BY DEPRESSING HANDLE

3-52 Coin trip switch contact remains closed, not opening after coin leaves same or possible coin is hanging up on trip arm. See Figure _____ and Paragraph 4-45.

3-53 Coin trip switch closed because of coins piling up in run-off trough. See paragraphs 4-43 and 4-49.

3-54 In free play operation check contacts under play-off push button mounted on slug rejector. Make sure that lever which actuates these contacts is in proper position so that it is not holding the contacts closed when the top of the cabinet is lowered. See Figure _____ for proper adjustment and position of these contacts.

DOES NOT PAY OUT — WINNING ROW LIGHTS DARK

3-55 Check 5 ampere fuse closest to spinner unit (Figure _______).

IMPORTANT! Never replace this or any other fuse with a fuse or other object of a higher rating. This fuse is for the purpose of protecting the wiper blades in the spinner unit, multiple step-up switch payout unit, etc., against overloads. These blades will last indefinitely if not overloaded but will burn out in one play if a short circuit is present.

DOES NOT PAY OUT OR OCCASIONALLY PAYS SHORT — SHOWS "TILT"

3-56 Most common cause: Loose or damaged service plug connection or
disassembly, parts must be cleaned in hot water with a good
cleaning compound, dried thoroughly and replaced. Carbon tet-
trachloride or similar solvents will not remove sugar residues.
On reassembly, lubricate sliding parts with flake graphite.
(a) Solenoid on payout unit may have become loosened so that it
is out of alignment with payout slide. Turn solenoid to
where stroke is the freest, then retighten screws.

DOES NOT PAY OUT ANY COMBINATION—PAYOUT DOES NOT REGISTER ON BACKBOARD

3-63 Set in a winning combination manually and watch sequence control
mechanism, Figure __. Immediately after No. 3 reel stops,
sequence payout stop coil should energize, pulling in lever to
stop sequence shaft.
(a) If when this coil is pulled in or, if when held in manually,
the sequence shaft does not stop, the assembly is out of
adjustment. See Figure ___ and Paragraph 4-71.
(b) On depressing the payout relay armature manually and holding
it thusly, the sequence payout stop coil should be energized,
stopping the sequence assembly in payout position. If it
does not, check contacts on payout relay, red to white red wire.

3-64 In holding sequence stop coil plunger in manually, watch for the
payout relay to pull in after No. 3 reel stop lever drops into
place on a winning combination. The payout relay should be re-
ceiving 25 volt current from one of the rings on the payout commu-
tator unit, and the circuit on the back contact on the payout relay
coil should be continuous through the contact on the anti-tilt
relay, black-white to black-red wires, and No. 6 payout cam
should be closed connecting the black-red line to the common
black line.

3-65 Still another method of checking for the source of trouble is to
set up a winning combination manually, start the machine, hold the sequence payout cam in manually, and when the sequence assembly stops, check as follows:

(a) Run a jumper from either the red or red-black lines directly to the green-yellow terminal of the payout relay,

(b) If payout relay does not pull in with jumper from the 25 volt side when a winning combination is shown and the payout sequence stop plunger is held in manually, remove the jumper and connect one end of it to the black common line. Touch the other to the back side of the payout relay, black-white wire. If the relay now pulls in, go back over the black-white wire, past the contacts on anti-tilt relay, and then check the black-red line from the anti-tilt relay to the No. 6 payout cam. Then short out the payout cam. The relay pulling in at any of the points above will designate that that point is at fault.

CONTINUE ON WITH "DOES NOT PAY OUT WHEN THIRD REEL BAR SHOWS - OTHER PAYOUTS O.K." ON NEXT PAGE.
3-66 If the bars do not score on any of the winning rows, check sequence contact No. 7 for proper closing at the same time as No. 6. This contact closes the back connection of the bar relays when a bar appears on reel No. 3.

3-67 If the difficulty is found on one winning row only, check the contacts on the corresponding bar relay for that row. See Fig____.

3-68 Trouble would be located in lines from No. 3 reel output in multiple switch, or payout commutator. In single coin operation, payout lines from reels on through to payout commutator are common for similar values with the exception of the cherry-cherry combinations, which for each winning row go to their own section on multiple step-up switch and then to their own individual small sectors on the payout commutator.

3-69 The multiple step-up switch or payout commutator may have burned-out wipers or, more probably, dirty contact discs. The discs should be cleaned with white gasoline or other petroleum solvent and then relubricated with special coin machine grease. See heading "Lubrication".

3-70 Payout lines can be checked as per paragraph 3-73 below.

3-71 Check wipers and disc on the payout commutator. Clean these parts if necessary with white gasoline or other petroleum solvents. Relubricate with special coin machine grease supplied with machine.

3-72 Make sure pigtailed and other connections to that wiper are in good order.

3-73 NOTE: Any payout wiper may be checked after it is located on the commutator disc by the color of the wire leading to it, as follows.
(a) Depress anti-tilt relay.
(b) Reset multiple step-up switch to "zero" position manually.
   (In this position there is no connection between the payout commutator and reels. No connections are made at the "zero" position of the multiple switch).
(c) Release sequence release coil manually.
(d) Hold sequence payout stop coil manually.
(e) When sequence clutch arm engages payout stop, the sequence will stop. Tie or hold the solenoid plunger in.
(f) A jumper at this time from the red-black line to a wiper on the payout commutator will start all of the payout mechanism into action. When the desired payout has been run off, the payout commutator can be reset manually or by momentarily closing No. 5 sequence cam.
(g) This procedure may be repeated as many times as desired to check all payouts and also check back through the multiple step-up switch.

DOES NOT INCREASE CERTAIN VALUES WITH ADDITIONAL COINS

3-74 This difficulty would be in the multiple step-up switch. It could be caused by either bad wire connections or possibly dirty wipers and contact discs.

3-76 The multiple step-up disc may be checked electrically by following the same procedure as described immediately above in paragraph 3-73. First, the individual payouts should be checked with multiple step-up switch in "zero" position, the step-up unit to the multiple which was causing the trouble, and then apply the jumper from the red-black line to the input circuits of the multiple switch (colors of which can be determined from the wiring diagram).

FAILS TO PAY OUT OR SHORT PAYS OCCASIONALLY -- TILT "O.K." OR

3-76 Most common cause: No. 3 reel still "bouncing" when payout
sequence contacts Nos. 6 and 7 close. No. 3 reel should be completely stopped with the stop lever in place when these contacts close. If this is not the condition, adjust reel speeds and brakes.

See paragraphs 4-57, 4-60 and 4-82.

3-77 Payout relay not holding down tightly—generally caused by dirty contact on payout commutator.

3-78 Payout commutator might not be resetting due to one or more of the following:

(a) Commutator reset cam switch No. 5 being dirty or not closing properly.

(b) Mechanical bind in payout commutator, preventing complete reset.

(c) Payout commutator reset coil not properly adjusted to pull in for complete reset.

3-79 Impulser contacts not properly timed with actuating disc. See "Impulser Contact Adjustments", paragraph 4-75.

SUPER BONUS METER AND STEP-UP FAIL TO REGISTER

3-80 Could be caused by 42nd position make switch on payout commutator (Figure ___) not closing at this position.

PAY OUT MORE THAN INDICATED AMOUNT

3-81 Check step-up solenoid, etc., on payout commutator to make sure that it STEPS UP ONE FULL TOOTH EACH TIME THE COIL IS ENERGIZED. Its step-up may be checked at any time with the machine stopped by holding the payout relay closed manually and closing the impulser switch blades (Figure ___) with the fingers.

REPEATING OR CYCLING

3-82 This may be checked by watching the sequence clutch arm while the machine is in operation. Immediately after the sequence assembly begins to rotate, the clutch arm should engage the mixer lever (Figure ___) which will in most cases release the clutch arm, stopping the sequence shaft until the next mixer cam lobe engages the mixer lever to release it. Should the springs on the mixer lever be disengaged, the mixer lever will not function.
WINNING ROW LIGHT CHANGING WHEN REELS ARE STOPPING

3-83 The winning row selector must stop by its arm being released immediately after current to the spinner motor is cut off. If the arm drops in too soon, there will be considerable noise and wear; if too late, the selector disc will probably stop out of registration because it depends upon rotation of the spinner shaft to bring one of its teeth up against the stop arm. See heading "Winning Row Selector Adjustment", paragraph 4-53.

NOISY COIN CHUTE LOCK COIL

3-84 The armature on this coil (Figure______) must positively seat against the core of the coil. If reject stud is binding, noise will result.

3-85 The armature spring is adjusted and sealed at the factory. If its tension has been increased, noise may result.

REELS "BOUNCING" OR NOT CENTERING CORRECTLY

3-86 Reel brakes should be adjusted for smooth, quiet operation. Adjustment may be required within a few weeks on a new machine after brake surfaces have become "worn in". See heading "Reel Brake Adjustments", paragraph 4-62.

COINS MISSING PAYOUT TUBE

3-87 May be caused by slug rejector not being properly located in its mount.

3-88 Coin "bounce" stud may not be properly adjusted. See Figure______ and paragraph 4-43 and 4-44.

3-89 Coin run-off trough may be bent out of adjustment. Its lip should clear the edge of the payout tube by 1/32" and it should be so aligned that a line drawn down it will come through the centerline of the payout tube. See paragraph 4-44.

(PAGE 36-A FOLLOWS)
REELS DO NOT TURN OR ARE SLUGGISH

3-90 Can be caused by low voltage. Release stop levers with the fingers. Make sure each reel spins freely.

3-91 VERY POSSIBLE! Make sure cables to contact discs are not pressing forks connecting reels to cross-rod under the reels sideways, binding the spinner shaft.
ADJUSTMENTS
AND
OVERHAUL INFORMATION

Following hereewith is covered the adjustments of various elements of the device which are not discussed elsewhere in this Manual. Should the especial adjustment in question not be found in this section, refer to the index.

SPINNER WIPER REPLACEMENT — FIGURE 4-1

The wipers on the reels and winning row selector can be replaced without major disassembly of the reels. The wipers which are readily visible are easily accessible with a long screwdriver. The inner wipers, such as those inside the reel drums, are accessible through holes in the reel drums.

4-2 To replace a worn wiper, loosen the screw holding the wiper only enough to allow the wiper to be pushed out. DO NOT COMPLETELY REMOVE THE SCREW. Slide the new wiper under the screw and UNDER THE LOCKWASHER. Retighten the screw.

RELAY ADJUSTMENT — FIGURE 4-3

All relays are adjusted and sealed at the factory.

Should a relay fail to actuate the unit or lights to which its contacts are connected, the difficulty might possibly be due to either dirty relay contacts or a broken pigtail wire on the relay—HOWEVER, DO NOT blame the relay until the rest of the troublesome circuit has been checked with a jumper lead (see paragraphs 3-3-3-4).

4-4 To clean the contacts, use only a burnishing tool or, if not available, a narrow folded strip of clean white paper. Place the strip between the relay contacts and close the armature manually if "A" contacts are being cleaned. Slide the strip back and forth three or four times. DO NOT USE A CLEANING FLUID ON RELAY CONTACTS.
Should the contacts be very badly burned or melted, they should be removed from the relay and smoothed off with "Crocus" cloth. **IMPORTANT! IF CONTACTS ARE DEEPLY PITT ED OR BURNED, THEY SHOULD BE REPLACED, AS REMOVAL OF TOO MUCH OF THE SURFACE WILL RESULT IN REDUCED "FOLLOW THROUGH" WITH RESULTANT POOR RAPID DIRTYING AND BURNING OF THE CONTACTS.**

Slight pits or burns, or even blackness caused by sparking, should not require replacement.

Contact blades must never be bent! They are mounted absolutely straight at the factory. A bent blade will indicate that it has been tempered with. Tension of the blades is determined by the thickness of the blade metal. In ordering replacement blades, be sure to specify the number of poles on the relay so that a blade of proper thickness can be shipped.

The relay coil can be replaced by unsoldering its connections, straightening one solder lug, and removing the coil holding screw. Do not, however, replace a coil unless it is certain that the coil is at fault. In many cases it will be found that soldered connections at the coil terminals or in other assemblies of the device are not supplying current to the coil proper. The coil may be checked by using a jumper from the red line as described in paragraphs 3-3 to 3-5 inclusive.

Should it ever be necessary to completely disassemble the relay, the spring adjusting nut must be unsoldered for removal. In reassembly, the spring should be given only enough tension so that when voltage is brought up gradually, the relay will pull in at 18 volts.
SPINN MOTOR BELT ADJUSTMENT

4-10 The spinner motor is adjustably mounted (Figure 1) in slots in the end plate of the mechanism so that proper belt tension may be obtained. Adjustments should not be required excepting that the belt is noticeable slipping. If adjustment is necessary, proceed as follows:

(a) Loosen, but do not completely remove the four screws holding the motor to the side plate.

(b) Remove belt and clean it and pulleys, if necessary, with carbon tetrachloride or other solvent to remove any accumulations of grease, oil or dirt. Replace belt.

(c) Move motor towards rear of mechanism until when the belt is lifted up and down with the fingers midway between the two pulleys, it will have about 1" of total up-and-down movement. If the belt is too tight, proper action of the reels will not be obtained.

It is preferable to have the belt slightly looser than above rather than tighter.

WINNING ROLL FREQUENCY ADJUSTMENTS

4-11 See Figure 2 and Paragraph 1-38.

PAYOUT COMMUTATOR ADJUSTMENTS

4-12 This unit can be checked electrically as described in paragraph 3-73.

4-13 Drive stroke make contact blades, Figure 3, should be replaced when they become too badly pitted.

They should be adjusted to close when the plunger is pulled in approximately 1/4".

4-14 Operation of these blades and their circuit can be checked at any time that the free play-cash changeover plug is in the "cash" position. When the contacts are then closed manually, the free same register will be stepped up.
4-15 The 42nd position makes contact, figure ___, closes the circuit to the SUPER BELL register unit and meter.

It can be checked by setting up a 3-bar winner with five coins played, which cash payout should bring the ratchet wheel around to the 42nd position, whereupon the register and meter will be advanced.

This contact is more likely to become dirty because of its infrequent operation—therefore, it should be cleaned occasionally with either a strip of polishing material or folded clean white paper.

4-16 Other points and adjustments are covered under heading "Step-Up Switches – General Adjustments", paragraph 4-23.

MULTIPLE STEP-UP SWITCH ADJUSTMENTS

4-17 This unit can be checked electrically as described in paragraph 3-73.

4-18 The contact blades which break towards the end of the drive stroke should be checked carefully—they lock down the hold-in relay to insure a complete drive stroke.

This contact must be kept clean and adjusted so that it opens immediately as the drive arm lever drops into the next ratchet tooth. There should also be ample follow-through, at least 1/32" when the drive lever is returning to insure proper "wipe".

Other points and adjustments are covered under the heading "Step-Up Switches – General Adjustments", paragraph 4-23.

FREE GAME UNIT ADJUSTMENTS

4-19 The free game unit, while not critical, does require that certain elements of it be in proper adjustment. Refer to Figure ___.

Special caution must be used to avoid turning or jarring the 96th position switch unit into the wrong position. It will be seen by study of Figure ___ and the unit itself that the 96th position switch cam acts as the "zero" position stop. Should it therefore be turned out of proper phase, the unit could be returned one more
complete revolution before hitting "zero", whereupon it will be found that there will not be enough tension on the return spring to bring the unit correctly to "zero" position. Conversely, if after the unit has advanced past the 100th position and the 96th position cam is turned back, the unit will then be free to advance another complete revolution forward. In this event, the return spring will probably be too tight and the step-up coil will not be able to advance the ratchet into the high scores, especially should low voltage be prevalent.

The return spring therefore should only be strong enough initially to briskly return the ratchet wheel to "zero" position from No. 1 position when the reset coil is operated manually.

4-20 Now advance the ratchet wheel manually to where it engages and fully turns the 95th position switch cam—in other words, to about position No. 110. Then operate the reset solenoid plunger manually and make certain that the return spring has enough tension so that the 95th position ratchet is changed over on the return stroke. If this ratchet does not switch over readily, make sure that there is not too much tension on the switch blades, also that the cam is free to turn on its shaft. If these points are clear, then give the return spring one more turn for more tension.

4-21 In adjusting reset spring tension, never reduce tension on the contact wiper fingers. They are very accurately tensioned at the factory so that the blades which ride over rivets have 10 to 15 grams pressure and the single blade running around on the ring has 40 grams pressure. If the ring blade is not making good contact on playing off replays, the multiple unit may show 2 or more instead of 1 only.

4-22 Contact blade adjustments are shown in Figure ______. These settings must be correctly made. DO NOT PUT TOO MUCH TENSION on the blades or it will be necessary to increase return spring tension which may
cause failure to register on high scores at low voltages.

Other points and adjustments are covered under the heading "Step-Up Switches - General Adjustments", paragraph 4-23.

**STEP-UP SWITCHES - GENERAL ADJUSTMENTS**

4-23 Most common difficulties experienced with step-up switches (when it is proven that circuits controlling them are O.K.) are sluggish resetting and intermittent failure to step up. Occasionally a step-up switch will completely refuse to step up or reset—however, for the main, this type of trouble is due to a broken or disconnected spring or loosening of the screws which hold the coils. Sluggish operation or intermittent failure can be due to dirt, corrosion or wear on either electrical or mechanical parts.

Correct service procedures are as follows.

**ELECTRICAL PARTS**

4-24 Operate solenoid plungers with the fingers to determine whether the plunger has worn out the tube into which it rides, so that it "hangs up" occasionally in the step between original and worn diameter of the tube. In this event, it is necessary to replace the solenoid coil and, if worn also, the plunger.

4-25 Wipers and contact discs should be gone over as follows.

(a) Remove rotating contact disc or fingers which are held in place by a hexagon nut.

(b) Clean contact segments and rivets on contact disc very thoroughly with white gasoline, naphtha or other petroleum solvent. If blackening remains, remove with "Crocus" cloths.
(c) Apply a very thin coating of Keeney Coin Machine Grease with a fine camel's-hair brush.

(d) Clean the shanks of all the wipers with petroleum solvent using a camel's-hair brush while moving the wipers in and out.

(e) Replace any wipers which have burned tips.

(f) Worn wiper blade shanks (on the edges are one of the most prevalent causes of failure to reset after a very long period of time. Press the wipers individually in and out, giving a little edgewise tension in both directions as would be given to the wiper in stepping up or resetting. If binding is noticed, replace that wiper blade.

(g) Check pigtails on wipers. Make sure that each in in good order, firmly connected and without broken strands.

4-26 IMPORTANT! In replacing pigtails, be sure that the new pigtail is long enough and DO NOT ALLOW SOLDER TO FLOW INTO THAT SECTION OF THE PIGTAIL WHICH WILL BE FLEXED IN OPERATION, OR THE PIGTAIL WILL BREAK WITHIN A FEW OPERATIONS.

MECHANICAL PARTS

4-27 "Binding" or wear can most easily be located when the wiper disc assembly is off.

4-28 First check drive lever, set lever and ratchet wheel. If wear is evident, the parts should be replaced. The shaft assembly can be checked by holding the levers out of engagement with the ratchet wheel and operating the wheel with the fingers. The most important point at which there should be no "bind" is always between positions No. 1 and "zero" because here the return spring has the least amount of return tension.
Should there be evidence of mechanical "bind" in the ratchet wheel shaft, it might be caused by dirt or grease in the ball bearing assembly.

4-29 This assembly can be removed by taking off all parts on the shaft, removing the four screws holding the outboard bearing support, and drawing the shaft assembly out through the contact disc side. The shaft should be free to spin when turned with the fingers in its ball bearings. If it does not, immerse the complete assembly in clean white gasoline or other petroleum solvent and "swish" it around thoroughly. Allow the parts to dry and apply a few drops of 3-in-1 oil (or equivalent) to each set of ball bearings.

This bearing assembly must not be taken apart outside of our factory. Do not apply grease or heavy lubricants to these ball bearings.

4-3c After complete reassembly of the unit, adjustments may be required as follows:

(a) Lubricate lever pivots, etc., with a very small amount of Keeney Coin Machine Grease. Do not apply grease to ball bearings!
(b) Wind up ratchet wheel return spring only enough to bring the ratchet wheel back to its "zero" position and stop FIRMLY when the ratchet wheel is advanced manually only one-half position and released.
(c) The drive stroke lever on coil energization should be pulled back far enough to clear the lip of the next tooth plus one-quarter tooth. On its return stroke, it should drive the ratchet wheel only far enough so that the reset pawl drops into place. The length and position of the drive stroke are determined by the position of the step-up solenoid and drive lever adjusting screw. Note! On free game units, drive stroke should be two and one-quarter teeth.
(d) Reset solenoid should be in such position that when it is operated manually, the reset lever will clear the ratchet wheel far enough so that it becomes engaged under the pawl (on most units) which holds both levers out of engagement with the ratchet wheel until the first step-up stroke is made.

(e) Adjust various drive stroke contact blades, etc., in accordance with figure showing the especial step-up unit in question.

**SUPER BONUS Award Register Unit Adjustments**

4-31 The SUPER BONUS Award Register Unit, Figure ____, is a three-position step-up switch which indicates when one or two BONUS awards have been made by closing contact to cause one or two stars to light up in the backboard.

4-32 It must be reset manually by the operator.

4-33 Star light circuits are closed by their switches as shown in Figure ____. Should a star fail to light, its corresponding blade switch should first be cleaned with a strip of burnishing material or folded white paper. These contacts, being used so infrequently, are more likely to become dirty than out of adjustment.

4-34 Should unit fail to step up, check it for broken or unhooked springs or loose screws attaching parts.

Also check position of drive pawl limit stop which should be adjusted so that the ratchet wheel can be moved forward one full tooth when solenoid plunger is pulled in.

4-35 Should one impulse light up both awards in the backboard drive pawl limit stop is probably out of adjustment. Its correct position is as follows.
When plunger is drawn in all the way and locating roller is down to its full depth in the second or third teeth, the position of the drive pawl limit stop should hold the drive lever against gear tooth so that the gear cannot be moved in either direction.

**Slug Rejector Adjustment**

4-36 No adjustments are to be made by the operator in parts of the slug rejector proper—however, the slug rejector must be cleaned every two weeks at least if machine is receiving steady play. This unit will rapidly collect lint and dirt from coins and will get to a point where it will become very tiring for players to have most of the coins dropped in returned to them or "hung up" in the slug rejector.

4-37 To remove for cleaning, see Figure ______.

4-38 For cleaning procedure, follow Figure ______.

4-39 In cleaning, never use a screwdriver or other sharp object which might cause scratches on inner walls of the slug rejector.

4-40 If spare slug rejectors are kept on hand, they should be wrapped carefully in wax paper at all times. The magnets in them are extremely strong and will attract iron filings or small pieces of steel very readily. These particles will be very difficult to remove.

4-41 In replacing slug rejector in machine, make sure that it is properly mounted on the three locating pins. If this is not done, rejector will not be level and will reject good coins.

4-42 Also, on replacing slug rejector, check coin run-off trough to make sure that it is properly aligned with payout tube. See "Coin Run-Off Trough Adjustments".

**Coin Run-Off Trough Adjustments**

4-43 The coin run-off trough should be so aligned that a line drawn down the center will come at the centerline of the payout tube.
The coin "bounce" stud (Figure ____ ) should be adjusted to the size of the coin being used by loosening the nut and bolt which hold it, and moving it up and down in its elongated slot. It should clear the coin being used by 1/32" when that coin is held straight up and down between it and the bottom of the trough.

COIN TRIP SWITCH ADJUSTMENTS

The coin switch contacts are normally adjusted with a gap of 1/32".

This spacing is made by means of a contact lever adjusting screw, Figure ____, which is held in place by a locknut on it.

The coin trip wire should ride directly in the center of the circular slot in the coin guide. This is attained by adjusting the position of the coin trip switch.

IMPORTANT! It must be possible, when the trip arm is slowly lowered with the fingers with a coin riding on top of it, that the WEIGHT OF THE COIN depresses the trip arm to where the coin can fall free.

Should coins fail to register on going through, check as follows.

(a) Remove entire slug rejector assembly, Figure ____.
(b) Remove cover of coin trip switch. Make sure that all springs and parts held by screws are securely in place.
(c) Clean contacts by using a strip of burnishing material or clean white paper, drawing same through the contacts while held closed with the fingers.
(d) Make sure that pigtails are not binding, preventing levers from moving.
(e) Make sure that there is spring tension on the right-hand contact lever.
(f) If parts appear dirty, remove trip and contact levers, clean their bearings and the screws thoroughly with clean white gasoline. Wipe thoroughly dry with clean cloth.
(g) Apply a minute amount of 3-in-1 oil to each bearing surface on reassembly, using the pointed end of a toothpick.
**4-48 Coin Registers More Than Once**

(a) Generally caused by dirty contacts, loosened parts, etc. Check and adjust the same as above.

**COIN GUIDE ADJUSTMENTS**

4-49 Coins coming down through the coin guide and activating the coin trip switch arm are centered in proper position by an adjustable guide piece, Figure ___.

4-50 The proper position of the guide for various denominations of coins is as follows:

(a) For nickels, the hole in coin guide should line up in alignment with the hole in the coin guide cover.

(b) For dimes, the coin guide should be moved as close to the trip switch arm as possible.

(c) For quarters, the coin guide should be moved as far away from the trip switch as possible.

4-51 Coin trip arm should be in the middle of its slot in all positions. If out of adjustment, see paragraph 4-49.

**SEQUENCE CAM ADJUSTMENTS AND SETTINGS - FIGURE ___.**

4-52 With sequence cam shaft at normal "end of sequence":

(a) Cam contact No. 3 should be "open". Its lifter riding on No. 3 cam should be in the center of the cut-out of the cam.

(b) Sequence contacts Nos. 6 and 7 should be "open", their lifters about 1/16" past their cam lobes.

(c) The cams which operate the reel stop levers should be immediately in front of their corresponding stop lever cam faces, ready to lift the levers out of engagement with the star wheels on the next movement of the cams. (The stop lever cams are permanently pinned in position).
(c) The sequence shaft clutch roller should be in approximately the position shown in Figure ___. (Please provide a figure)

WINNING ROW SELECTOR RELEASE ADJUSTMENTS

4-53 Immediately after the sequence cam begins its rotation, but BEFORE spinner motor cam Nos. 4 and 8 close, the winning row selector cam must pull the winning row selector lever out of engagement with the notched disc. The notched disc is allowed to spin for the length of time that the spinner motor is energized.

4-54 Immediately after sequence cam Nos. 4 and 8 close, cutting off the spinner motor, the lever should drop back into engagement with the selector disc.

4-55 IMPORTANT! This cam is adjustable as regards the point at which the winning row selector lever is released. BE SURE THAT:

(a) The arm is not dropped into the notches while the disc is still rotating at motor speed or noise and very rapid wear will result.

(b) The disc is still rotating before the lever falls in so that it will index with the lever in one of the notches.

(c) If the disc is not indexed correctly, it may come to rest between notches, whereupon winning rows will be energized by extra contacts which are used as "flashers" only.

4-56 Adjustments of the winning row selector cam proper are as follows:

(a) Lifting position of lever can be changed by loosening the Allen head set screw hub of the cam and turning cam on sequence shaft. Retighten set screw securely.

(b) "Drop in" is adjustable by loosening the 1/4" hexagon head cap screw with an open end wrench on the side of the winning row selector cam. This will allow the "drop in" section of the winning row cam to be changed.
SPINNER MOTOR CAM ADJUSTMENTS

4-57 Spinner motor starts when sequence cams No. 4 and 8 close, which will be immediately as the stop levers are lifted out of the star wheels.

4-58 Stopping of the spinner motor is controlled by the position of cam No. 8. This point is quite important because if the reels are allowed to spin too long, it will be necessary to stop them more quickly by adjusting the brakes to heavier pressure. If sequence cam No. 8 opens too soon, the reels will not spin long enough, and even with brakes loosened completely, the reels may stop spinning before the stop levers engage the star wheels.

4-59 Average position of the opening point of No. 8 cam is such that at the "end of sequence" position, the lobe of cam No. 8 has lifted the lifter of cam switch No. 8 and past approximately 1/4" beyond the lifting point.

REEL BRAKE CAM ADJUSTMENTS

4-60 It is extremely important that the reel brake cams be positioned on the sequence cam shaft so that they release the reel brakes IMMEDIATELY BEFORE or with release of the stop levers. If out of adjustment, so that the brakes stay on after the stop levers fall in, it is very possible that the reels will not register properly and payoffs will be missed.

4-61 It should be noticed that the brake as well as reel levers are pivoted on one shaft and can be moved horizontally by loosening collars. Be careful that these levers are in line with their cams and do not in any way interfere with the reel clippers, levers or with each other.
REEL BRAKE ADJUSTMENTS

4-62 The reel brakes do not stay in engagement continuously on the BONUS SUPER BELL as they do in other types of reel machines. During the coasting period they are brought into engagement with the reel hubs momentarily and then are released immediately before the stop levers drop in.

4-63 The brakes should be adjusted so that when the stop levers drop in reels have coasted down to an extremely slow speed. If the reels are turning too fast due to not enough brake pressure, there will be excessive shock, much noise, and a possible tendency for a reel (especially No. 3) to "bounce" back out of position as the payout starts, causing a payout failures. (If the reels come to a dead stop before the stop levers fall in, the effect on the player will not be good. Also, there is a chance that the stop lever will engage a point of the star wheel, whereupon during payout the reel is liable to fall out of position.

4-64 Brakes are adjusted by means of the screw shown in Figure ___. Before turning this screw, loosen the locknut holding it, and after making the adjustment, tighten the locknut securely. The screw turned inwards or clockwise will tighten the brakes—in or counter-clockwise releases brake pressure.

NOTE: It is extremely important that the brake operating cams be adjusted so that the brakes are released before stop levers fall in. See paragraph 4-60.

REEL STOP LEVER CAMS

4-65 The reel stop lever cams are adjusted for position at which the stop levers are released. The forward sections which lift the stop levers out of engagement are fixed by pinning to the shaft—therefore, the only adjustment is the release position.
Factory settings are as follows.

1. No. 3 stop lever cam is adjusted so that when it releases the stop lever there will be about 5/16" to 3/8" to go on the No. 6 payout sequence cam before the sequence cam lifter closes. This adjustment is important. It allows time for the No. 3 reel to come to a complete rest and be indexed before the No. 6 payout contact sequence closes.

2. When No. 1 stop lever cam releases, there should be approximately 3/4" measured with a flexible rule on the No. 3 dropping cam to go before No. 3 stop lever is released.

3. Stop lever cam is adjusted so that it drops its stop lever midway between the stopping of No. 1 and No. 3 reels.

Reel Brake and Stop Lever Positions

Reel brakes and stop levers are mounted on a horizontal shaft, each set being positioned by means of collars.

Proper position of this assembly is when the stopping block which engages the star wheel contacts the star wheel with approximately 1/16" from the base of the stud which holds the stopping block. Be careful that the stop lever does not in any way interfere with the wiper pigtails.

Both levers in each set must line up properly with their respective cams.

There should be no interference with each pair of levers. If there is some, the brake lever may be bent manually for clearance.

Sequence Shaft Clutch Control Adjustments

Sequence control assembly with its solenoids and linkages are shown in Figures _____, ____, and ____.
The positions shown are the approximate positions in which the clutch arm roller should stop for each of the functions shown. This assembly is adjustable as follows:

(1) The wedge-shaped steel stop is adjustable in all directions to obtain the condition shown in Figure ____.

Loosen the single screw which holds this wedge and adjust the wedge so that the "start" coil linkage is a straight line (see Figure ____), and the "payout" coil linkage drops the "payout disengaging cam" low enough so that the clutch roller clears it as it passes above it (see Figure ____).

(2) Both solenoid coils are adjustable slightly so that when energized, the coil seats properly.

Loosen the four screws (but do not remove them completely) which hold the payout coil and adjust the coil so that when energized its linkage is a straight line or is slightly bent in the manner shown in Figure ____ (payout coil energized).

(3) Similarly loosen the four screws of the "start" solenoid and readjust so that the linkage for this coil pulls the "start" coil, disengaging cam down far enough to clear the clutch roller as the roller passes above it. It is permissible to have the roller touch the hooked tip of the disengaging cam as it passes so long as it does not disengage the clutch.

If the payout or start solenoids are noisy, this can usually be remedied by adjusting the coil so that the plunger seats more squarely.
(a) Remove V-belt pulley from end of reel shaft.
(b) Remove self-centering bearing mounting plates from each end of reel shaft.
(c) Remove wing nuts on all multiple connectors.
(d) Remove winching row selector release arm. This is done by removing the hexagon nut on the outside of the frame plate and taking out the release arm assembly with its pivot stud as one unit.
(e) Lift reel shaft clear of the spinner mechanism.
(f) Starting from the third reel side, remove all parts down to the retaining ring. Then remove all parts on the opposite side of the retaining ring. It is not necessary to remove the retaining ring itself.
(g) In removing the driving dog assemblies it is necessary to use a No. 10 Allen wrench.

(a) Clean all parts with white gasoline and inspect carefully. Replace worn or broken parts.
(b) Place the reel shaft in a vise or any other device which will hold it in upright position with pulley end down. Use lead or wood vise jaws to prevent marring the shaft.
(c) Coat the shaft with light machine oil of approximately No. 10 grade. As each reel is slipped over the shaft, apply 6 drops of oil INSIDE the reel hub between the bearings.
(d) Make sure that the retaining ring is seated properly in its groove.
(e) Place the parts on the shaft in the following order, starting from the retaining ring and building up on the long end of the shaft:
1. Large washer (1" O.D.)
2. Spring washer
3. Large washer (1" O.D.)
4. Leather washer
5. Winning row selector disc. (This is the notched disc and should be placed so that its commutator rings are facing upward and its contact wires are facing downward).
6. Leather washer
7. Woodruff key
8. Driving dog holder. (Slide the driving dog holder over the Woodruff key and press downward so that there is a slight friction on the winning row selector disc. Tighten the screw on the driving dog holder. Make sure that the winning row selector disc is now under a slight tension. Do not compress too tightly! The driving dog holder should be placed on the shaft so that its studs face upward.
9. Driving dogs. (These are the small Bakelite pieces which fit over the studs on the driving dog holder. There are no springs or other means of holding these dogs. These dogs must be placed on the studs in such a manner that they drive the reels in a counter-clockwise direction.
10. Small steel washer
(11) No. 1 reel assembly. (The reel assembly should be placed on the shaft so that its driving notches fit over the driving dogs. The No. 1 reel has four bar symbols).

(12) Small steel washer.

(13) Contact drum assembly. (This is the drum assembly which does NOT have a cable attached to it. Place the drum on the shaft in such a way that the offset of its fork is facing downward.

(14) Small steel washer

(15) Woodruff key

(16) Driving dog holder

Tighten this driving dog holder to the shaft in such a manner that there is 1/32" clearance between the steel washer and the driving dog holder.

(17) Driving dogs (2). (Make sure the driving dogs are placed on the studs so that they drive the reals in a counterclockwise direction.

(18) Small steel washer

(19) No. 2 reel assembly

(20) Small steel washer

(21) Contact drum assembly. (This is the contact drum assembly with the cable attached).

(22) Small steel washer

(23) Woodruff key

(24) Driving dog holder.

Tighten this driving dog holder to the shaft in such a manner that there is 1/32" clearance between the steel washer and the driving dog holder.
(25) Driving dogs (2). (Make sure the driving dogs are placed on
the studs so that they drive the reels in a counter-clockwise
direction).

(26) Small steel washer

(27) No. 3 reel assembly

(28) Small steel washer

(29) Contact disc. (This is the contact disc with the small "3"
stamped on its face or rivet side. Place this contact disc
on the shaft so that the offset of its fork is facing down-
ward.

(30) Small steel washers (3)

(31) Hold the loose parts at the top of the shaft, turn the shaft
over, and place parts on the opposite end as follows:

(32) Small steel washers (2)

(33) Contact disc. (This is the contact disc with a small "1"
stamped on its face or rivet side. Place this disc on the
shaft so that the offset of its fork is facing towards you).

(34) Small steel washers (3).

(a) Place the two self-centering bearings back on each end of the
shaft and replace the entire assembly in the mechanism. Make sure
that the contact disc forks are centered on the bar at the bottom
of the mechanism. Make sure that when the two self-centering
bearings are tightened to the frame plates the entire shaft and
assembly have at least 1/32" endwise clearance.

(f) Replace the multiple connectors. Make sure that the cables do not
in any way bind the reel shaft or create a drag on the reels.

(g) Replace the winning row selector release arm. Adjust in accordance
with paragraph 4-55.

(h) Replace the V-belt pulley.

(i) Adjust reel brakes, etc., if required.
IMPULSER CONTACT ADJUSTMENT - FIGURE

4-75 Unless the impulser contact is properly synchronized, it is liable to give too short an impulse at the start of the payout so that payouts may be missed.

4-76 The impulser contact is adjustable horizontally and should be positioned so that when sequence payout contact No. 6 closes, the impulser blade is BETWEEN its activating rivets.

4-77 On the two-coin machine there is another pair of blade contacts under the impulser contacts also adjustable horizontally. These lower contacts are for the purpose of locking in the payout stop coil while the switcher relay is changing over from the left-hand to the right-hand payout sections. They should be adjusted so that they alternate with the payout contact—in other words, when the payout contact blade opens, the lower contacts should close.

UPPER MECHANISM SHELF - REMOVAL OF:

4-78 Remove slug rejector assembly. Pull multiple electrical plugs out CAREFULLY and STRAIGHT UP. Pull service cord in through back opening of machine and lay it on top of the panel.

4-79 Remove screws which hold shelf to side rails. Shelf can now be lifted up through the top of the cabinet.

LOWER MECHANISM SHELF - REMOVAL

4-80 Empty and remove payout tube. Payout tube is held in position by a spring between it and the cabinet. Pull out all electrical plugs CAREFULLY and STRAIGHT UP.

The shelf can now be pulled out through the back opening.