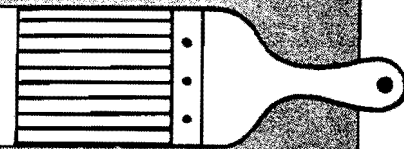
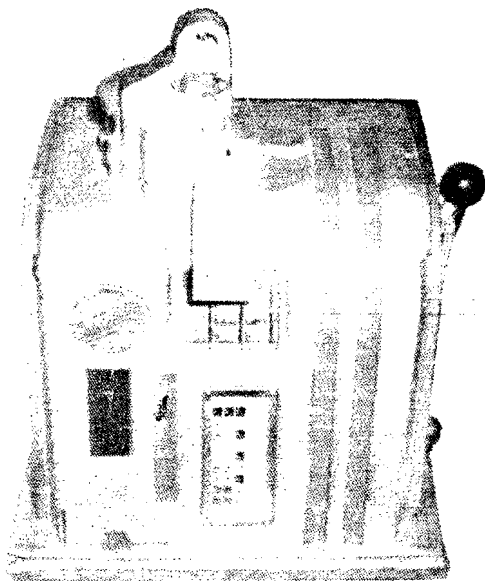


RESTORATION & REPAIR



By Marc Harrison

GROETCHEN COLUMBIA



Regarded by many as a poorly working and undesirable example of a slot machine, the Columbia is indeed a radical departure from conventional bell machine construction. Despite its limited success, it represents a most ingenious design approach which incorporates many interesting features, and when properly adjusted in accordance with the following instructions, it can give long and trouble-free service.

An inspection of the Columbia mechanism will reveal its distinctive central feature, a large 80 position coin carousel, which serves as the heart of the mechanical operation. When a coin is inserted into the machine, it is first carried around in a small octagonal turret, which serves the same function as an escalator. After advancing to the eighth position of the turret, the coin is dropped into an unfilled slot at the beginning of the

carousel, which advances counterclockwise one space with each play. When a payout situation occurs, the carousel backs up in a clockwise direction the appropriate number of spaces to deliver coins to the payout cup. Coins which are not payed out are eventually rotated to the far end of the carousel, where they are released one-at-a-time into the take. This clever design provides a positive method of coin movement and discourages slugging by paying out the most recently played coins.

When a payout is needed, the carousel is rotated clockwise by a concentrically mounted arm and pinion assembly. Rotation of this assembly is controlled by a payout finger attached to a rack, which is engaged with the payout arm pinion. The distance moved by the payout finger and rack is determined by which disc holes the finger enters and then regulated by an adjustable stepped stop-plate which limits the exact distance traversed. This lateral movement is converted to rotational movement by the rack and pinion, whose arm is allowed to engage the toothed undersurface of the carousel and rotate it the number of spaces required.

Before the payout and carousel adjustments can be made, the reel assembly must first be correctly positioned. The reel axle is supported at either end by two bushings, one on the left which is fully adjustable and one on the right whose position is fixed but which has an adjusting screw and locknut in its center. Release the locknuts on the left bushing and the right adjusting crew, and push the reel assembly to the left firmly against the bushing. Insert the mechanism in the cabinet and observe how the reels register in the windows. The reels can be moved further left by backing out the left bushing or moved right by backing out the right adjusting screw and turning the left bushing inwards. When the reels are hard against the left bushing and centered in the windows, tighten the left locknut first, then turn the right adjusting screw in until there is no endplay in the reel axle, then back the screw out 1/2 turn to provide working clearance and tighten the locknut.

The second adjustment to be made is to position the semi-circular payout arm guide plate. One end of the payout arm rests on this plate as it travels through its arc until it reaches the end of the plate, where it drops off the edge, forcing the opposite end upwards to engage the carousel and rotate it. The mounting holes of this plate are slotted, allowing its movement through a small arc for adjusting purposes. When the reels are

set on two cherries, the payout arm should rotate the carousel enough spaces to deliver the exact number of coins needed for the minimum payout, usually three coins. Note that the carousel must back-up more than three spaces since the coin in space number one must move approximately three spaces back before it is delivered to the payout cup. If the carousel does not rotate far enough, then the guide plate must be moved counterclockwise to allow the payout arm to drop earlier. If the carousel rotates too far, then move the guide plate clockwise for the reverse effect.

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Next adjustment is the carousel detent pawl release camplate. This device is located adjacent to the payout rack, and is in contact with the roller arm of the carousel detent pawl. Proper positioning of this camplate is such that the pawl disengages from the toothed underside of the carousel at the exact moment that the payout arm engages the carousel. If the pawl releases the carousel too early, then the carousel would be free to rotate in either direction without control. If the pawl releases too late, then the mechanism would instantly jam, and no payout could occur. Simply move the camplate left or right until the proper action is achieved.

Final adjustment to the carousel payout system is to limit the movement of the payout finger and rack assembly. For each payout combination beyond two cherries, the payout finger will move through the discs until it contacts the stepped stop plate. Set the reels on three plums and observe that the carousel moves the correct number of spaces. If necessary, slacken the fixing screw and move the plate left or right by turning the adjusting screw until proper payout is obtained. When correct payout for the plums is achieved, then the payout for the other combinations will automatically be correct, and the plate can be firmly tightened in place.

At the end of each play, just before a payout, if any, is made, the carousel moves counterclockwise one space, providing an empty space for the coin in the turret to drop into. This movement is accomplished by an advance lever which pushes against the coin in the

first space and then retracts. If there is no coin in this space then the carousel will not advance, thus preventing incomplete filling of the carousel with resultant short payouts. Should the carousel fail to advance fully when a coin occupies this space, then the turret will attempt to deliver a second coin to the same slot, creating a jam which causes most of the problems that the Columbia is heir to. Movement of the coin advance lever is regulated by an adjustable linkage fulcrum located at the upper right rear corner of the mechanism frame. There are two types of adjustment systems; one consisting of a moveable slotted fulcrum plate, and the other simply an adjusting screw with locknut. In either case, adjustment is correct when the advancing lever moves the carousel exactly $1\frac{1}{2}$ spaces. Importance of accuracy in this adjustment cannot be overemphasized.

The only adjustment now remaining is that of the coin vestibule gate linkage. When a coin reaches the eighth position in the escalator turret, it is dropped into a small vestibule where it is retained until the carousel advances, when it is allowed to drop into the empty carousel slot. Dropping of the coin is controlled by a pivoting gate linked to a leaf-type spring attached to the top of the turret advancing lever. This leaf spring can be adjusted to move the gate earlier or later as required to ensure that the coin in the vestibule is not released until the carousel advances.

This completes the sequence of adjustments on the Columbia, all of which are directly related to the coin handling portions of the mechanism. Since the majority of problems encountered in the Columbia are basically coin jams of one sort or another, correct execution of the adjustments covered above usually rids the mechanism of any further problems, allowing you to more fully enjoy an interesting and unusual machine with a fascinating and unique action.

THIS MONTH'S HINT:

Next time you visit your local hobby shop, you should take the opportunity to stock up on brass tubing. Supplied in twelve inch lengths of various diameters in $1/32$ " increments, each size will nest accurately inside the next larger size, allowing you to create what ever wall thickness you need. Easily cut to length with a tubing cutter, these brass tubes can be made into bushings or bearing sleeves, spacers on shafts, or combined with standard screws to make shoulder screws. You can also resize worn out holes by drilling the piece to be repaired to the size of the tubing with the same bore as the original hole, cutting to length, inserting it into the new hole and soldering it in place. Priced in the 40¢ to 80¢ range according to size, you will find endless applications for this inexpensive and versatile material.

*Please send your mechanical questions to Marc Harrison, in care of **The Coin Slot**, and help promote the exchange of knowledge amongst your fellow collectors.*