Distributor Advancement Characteristics

Two differently designed distributors were used for small block V8s in the 1960s. The first, which was similar in design to those of prior years, was used in 1962 through 1964 production. The second design was introduced for 1965 production, and continued well past 1969. The two designs differed substantially in how they controlled spark advance.

The earlier design employed pivoting fly-weights that were opposed by spring forces. As distributor shaft rpm increased, centrifugal force attempted to pivot the weights further outboard. This motion was opposed first by one spring, and then in combination with a second. Spark advance was achieved by keying the fly-weights to the distributor cam via the cam's slotted holes (*see bottom left photo*). As the weights pivoted, the cam was rotated in the same direction.

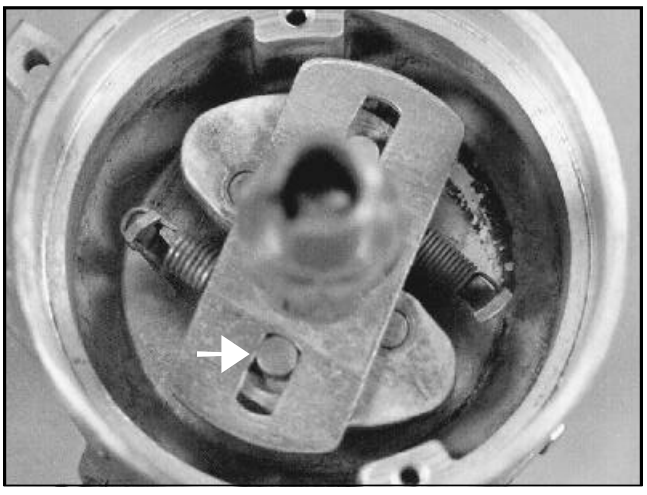
Because the centrifugal force increased by the square of the rpm (doubling rpm causes centrifugal force to increase by a factor of four), Ford designed the mechanical arrangement to decrease the centrifugal force's torque effectiveness on the fly-weight as the cam was advanced. At the same time, the moment arm of the opposing springs was increased, effectively making the springs act stronger and stronger. Both of these factors helped compensate for rapidly rising centrifugal forces, but still did not produce a truly linear spark advancement curve.

For 1965, Ford completely altered the distributor design and achieved what the earlier design could not—a nearly linear advancement curve. By using a unique fly-weight/distributor cam arrangement (*see bottom right photo*) that applied increasing fly-weight torque to the cam along a changing contact surface, Ford was able to vary the length of the moment arm of the centrifugal force acting on the fly-weight, torque applied to the distributor cam, and force felt by the calibration springs. The end result was to allow the springs to see a linear increase in force with increasing rpm. For example, doubling the distributor shaft rpm would produce only about double the force against the springs, even though centrifugal forces had increased by a factor of four. This created a nearly linear advancement with rpm. The curve was then easily modified by selecting different calibration springs and adjusting their anchor points.

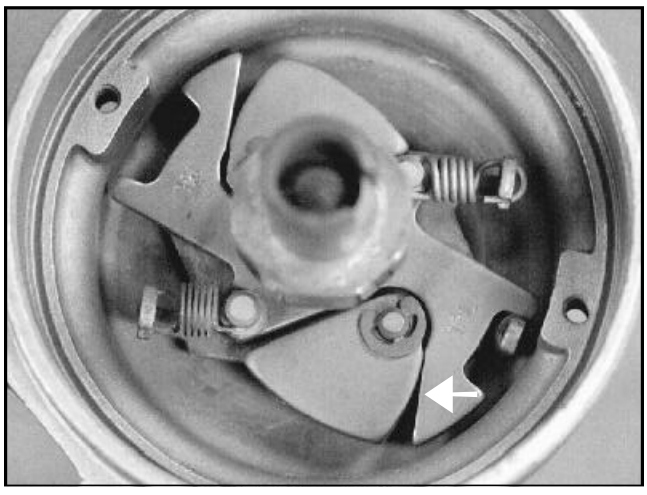
Commencing on the next page are the advancement characteristics for all distributor identification numbers. These characteristics were obtained from a number of sources including shop manuals and technical service bulletins. In addition to tables, the centrifugal advance specifications are graphed for a clearer presentation of the numbers. The limit to the advancement curves, if given, is shown by a horizontal line at the top.

In the graphs, 1962/64 advancement curves are plotted point-to-point from the data contained in the tables. This method was chosen because the curves were not truly linear. The 1965 and later curves are shown as straight lines that pass through the table's data points. Each curve has a distinct "knee" bend which indicates when slack in the second calibration spring disappears and the spring becomes effective. The linear curves also allow extrapolation to 2500 rpm and zero advance.

When the new 1965 replacement distributors were released to replace the older 1962/64 designs (*see page D–5*), Ford did not publish their advancement characteristics. However, they should be close to the specs for the distributors they replaced.



1962/64 distributor design. The fly-weights were directly opposed by spring forces. The cam was advanced as the fly-weight pins moved along slots in the cam (*arrow*).



1965/69 distributor design. Fly-weights acted against a changing contact surface (*arrow*) to reduce centrifugal forces acting against the calibration springs.