The Sweet Spot

(What it is, and why it's important)

by Tom Carnegie

Maybe you have heard one of your fellow T drivers talking about getting their timer set in the "sweet spot". I suppose there are a good number of T drivers that just throw the spark lever "full up" to start, and throw it "full down" to run. That may serve for casual touring (it may not too), but I am certain this isn't the way that most successful Montana 500 drivers operate their spark lever. Montana 500 drivers tend to adjust the spark lever until the engine runs its best. Some of these drivers then will mark that spot on the spark quadrant with a clamp or a pair of vise grips or something of the sort. Some continually manipulate the lever, always hunting for the sweet spot. When you find the sweet spot, you usually know it. Your T just runs better there. If you are having trouble finding or maintaining the sweet spot, there are things that you can do to help. I will list a few things to look for, or to do.

1. Make certain that the timer has plenty of advance. That is, make sure that there is enough advance to slightly over advance the timing. Then you can back off to the sweet spot.

2. Make sure the timing is consistent from cylinder to cylinder. A good test for this is to ground out the plug wires, then with the key on battery, and with some sort of an indicator on the front pulley, crank over the motor slowly, and note where each coil buzzes. Off center or poorly made or adjusted timers can cause inter cylinder timing issues. If your front cover is off center there is no fix with most timers short of realigning the cover. However, an Anderson style timer can be adjusted to compensate for a misaligned cover. It is outside of the scope of this article to go into that procedure.

3. Try to make the entire timer linkage have as little slop as possible. The little lever at the bottom of the steering column is usually quite loose. If you cannot tighten it by peening the lever rivet, you can braze it on solid. It makes it difficult, but not impossible to remove later, but certainly takes the back lash out.

4. Try to have the timer tight enough and the lever at the quadrant tight enough so that the timing doesn't tend to drift. If there isn't enough friction, the motor will tend to retard the timer. You may be able to find the sweet spot, but what exactly is it? Very simply it is setting the timer so that the rotor makes contact when the magneto is producing no voltage (the null point). There are two chief reasons why this is important. One is timing, the second is arc prevention. I will briefly explain.

When operating on magneto, where the spark is produced in relation to the position of the flywheel is somewhat fixed to the sixteen voltage pulses produced by the magneto. The spark timing is fairly stable if the timer is within seven or so degrees of the null point. At around 11 degrees it becomes very unstable - that is, the timing will tend to jump from one voltage peak point to the next. (See article "Perhaps More Than You Wanted to Know About The Model T Ford Ignition System" Montana 500 Newsletter Vol. 10 no. 2).

Even a one degree difference in timing between the timer contacts could result in erratic

timing, if the timer were set at this point. If you were to set the timer in the sweet spot the worst segment would have to be off close to ten degrees before stable timing of all cylinders would become difficult. The voltage on the T magnetos produces voltage of one polarity (say positive) for 22.5 degrees, then 22.5 degrees of the other polarity, and so on. The longer the timer makes contact on a certain polarity, the better the chance of stable and accurate timing. If the timer closes at the null point it will have the full 22.5 degrees of the same polarity to draw electricity from. If the timer makes poor contact due to bouncing or corrosion or the like, it has a better chance with more of the waveform available to use.

Timers typically close for 90 degrees of crankshaft rotation. Though theoretically 22.5 degrees should be enough, I think there are two reasons for this. One is to make certain that there is enough dwell to utilize the entire pulse of voltage (in case you are not in the "sweet spot", or have poor timer contact). The other reason is that if the timer has a dwell that is close to a multiple of 22.5 degrees, it is more likely that for it to close and then open the circuit when there is little or no current. Closing the circuit on a null point not only helps make the timing stable, it also prevents arcing. If the timer closes when there is no voltage - there can be no current and hence no arcing. If the timer opens on a null point, though there is no voltage being producd by the magneto, there will likely still be some current in the circuit (for various reasons) but, there shouldn't be much, and hence arcing is reduced upon the opening of the circuit at this point.