

Hand Crank Starting the Model T Ford Car on Magneto

Background

When the Model T Car was originally developed Henry Ford insisted that it have a self-contained power source for the Ignition System so owners would not have to rely upon battery power. All inexpensive cars at that time used dry cell batteries to power Trembler coils for ignition. A dead battery would disable the vehicle until it had been replaced. Many people carried extra batteries, but commonly forgot to keep a supply of charged batteries on hand. These batteries were not rechargeable and were a common nuisance to maintain.

While Ford's idea sounds anachronistic today, it was a major selling point of the new Model T Ford in 1908. Henry Ford's idea was implemented by Joseph Galamb and Edward Huff in the form of the internal flywheel driven alternating current generator (the Model T Magneto); sixteen permanent magnets mounted on the flywheel rotating (rotor) near a ring of sixteen fixed field windings (stator) to produce ignition current.

In this magneto system spark timing was controlled by a combination of Magneto current pulses that occurred every 22.5 degrees of flywheel rotation and the Timer which was connected to the driver manipulated spark control lever (advance and retard) on the steering column.

For those interested in more complete details of the entire system read our article entitled "The Model T Ford Ignition and Spark Timing" and may be found at the following link.

<http://www.funprojects.com/pdf/Model%20T%20Ignition%20System-Final%20Article.pdf>.

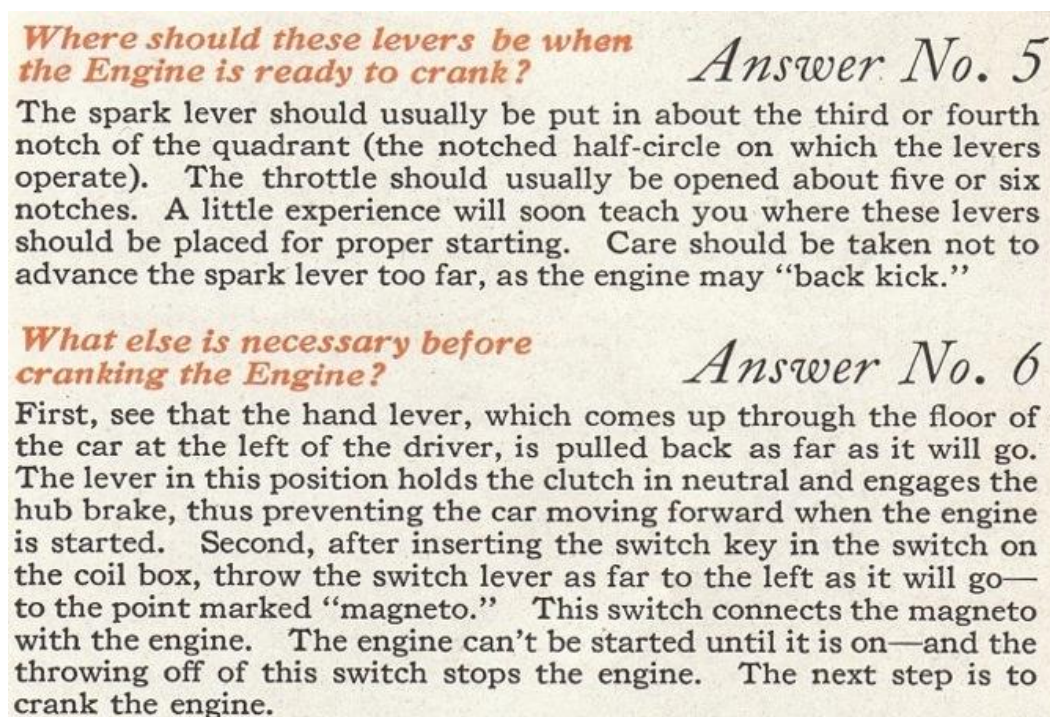


Figure 1 Ford Recommended Starting on Magneto Procedure

In my experience many early Model T owners do not understand the correct procedure for hand crank starting on the Magneto. Figure 1 is a copy of the magneto starting procedure taken from an original Model T Ford Operating Manual published in 1917 (Remember Model T's did not come equipped with a battery until late in 1918). For many Model T enthusiasts this procedure seems counter-intuitive because we are always told that the Spark Lever **should always** be fully retarded (pushed up) for starting, but that is **only** true for when starting on Battery.

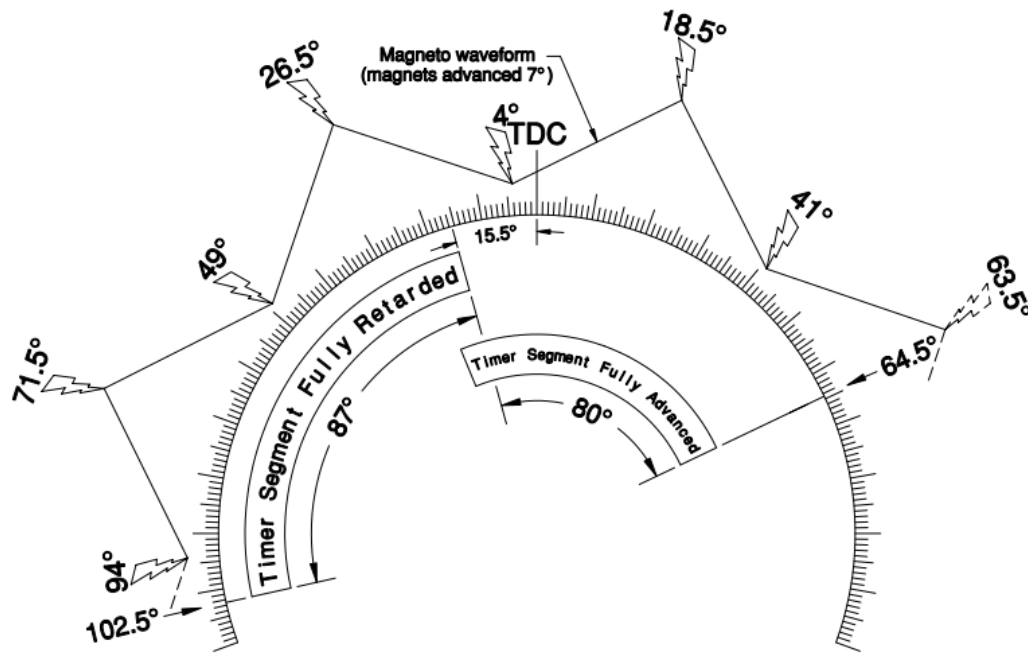


Figure 2 Model T Spark Timing on Magneto

Why Did Ford Recommend This Procedure?

Simply put, if you follow this procedure the car will be significantly easier to start. But why is that?

As you can see in Figure 2 the Model T engine factory recommended initial timing was set at 15.5 degrees after top dead center (ATDC) when the Spark Lever is fully retarded. But remember the spark lever is only part of the timing control when starting and running on the Magneto. The other part is when a magneto current pulse occurs with respect to piston travel to operate the ignition coil and fire the spark plug.

Study Figure 2 and you will see that if you try start the engine on Magneto **without advancing** the Spark Lever the first available magneto current pulse occurs is at 26.5 degrees ATDC. Starting the engine with the spark lever fully retarded is be very difficult because the piston has travelled 26.5 degrees ATDC when the first magneto current pulse is available to operate the coil and fire the spark plug **and** most of the compression of the air/fuel mixture in the cylinder has been lost. But, starting the engine on Magneto with the spark lever **advanced 3-4notches** the first magneto current pulse is available to operate the coil and fire the spark plug at 4 degrees ATDC when the cylinder still has most of the compressed air/fuel mixture still available. This is why starting the engine on with the spark lever advanced as Ford recommended makes the engine much easier to hand crank start on the magneto.

Why is it dangerous to start the engine on battery with the spark lever advanced?

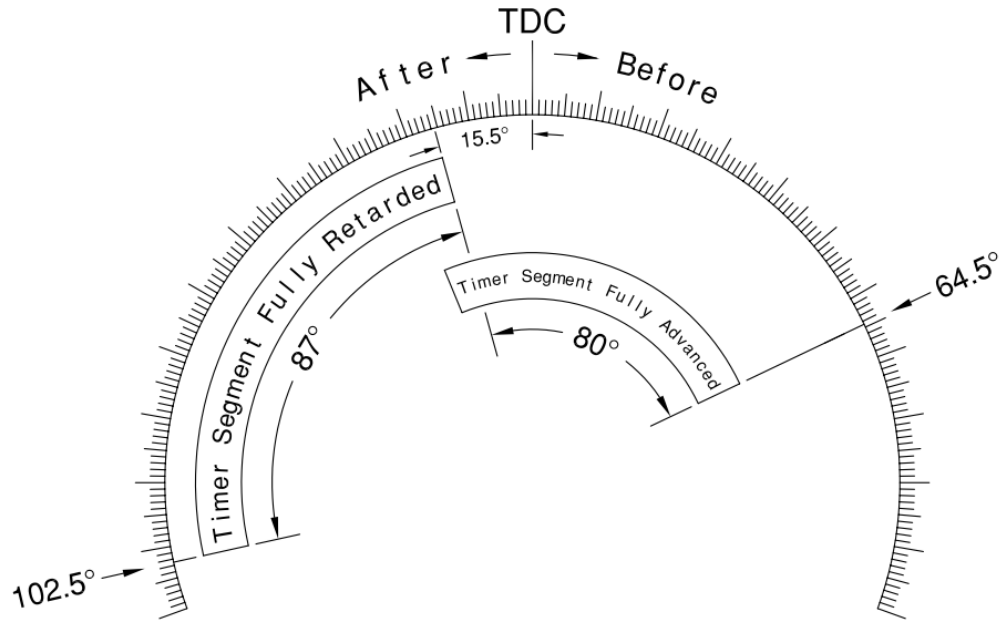


Figure 3 Model T Spark Timing on Battery

Figure 3 shows what can happen if the initial timing is set at less than the Ford recommended 15.5 degrees ATDC. If the initial timing is set too close to Top Dead Center (TDC) or Before Top Dead Center (BTDC) or the spark lever is advanced to a position BTDC it is possible for the ignition to operate a coil before compression is complete and the piston is still travelling toward TDC. If ignition occurs at that point there will be kick back of the piston with tremendous force trying to rotate the engine opposite direction which can seriously harm the operator and possibly bend an engine connecting rod.

Before I start working on any Model T I am not familiar with, I always check to see where the initial timing is set and correct it if necessary to avoid any possible physical accidents or engine damage. If Model T is kicking back while hand cranking on battery with the spark lever fully retarded something is wrong with the initial timing setting of the engine. This should be corrected immediate to avoid possible harm to the vehicle operator or the engine.

Tony Wiltshire developed an easy to use timing indicator tool shown in Figure 4 that is available from Model T parts suppliers. This tool comes with complete instructions to help you check and properly adjust Model T engine initial timing.

Ron Patterson 12/1/18



Figure 4 Initial Timing Adjustment Tool