DIY Distributor Dwell Setting Tool for 1942-48 Fords

The actual build, stage one (Bruce Lancaster)
https://www.jalopyjournal.com/forum/threads/ive-got-a-point.257066/page-3#post-2755137

I've made a few edits to Bruce's instructions and noted them with this highlighting, glennpm
I plan to append this to **Techno-Source for the 1932 thru 1953 Flathead Ford** posted in DropBox.

The C&G adaptor button has a ~~5/8"~~ 7/8"shank on the side towards distributor. The hole in the degree wheel is tiny...start with a step drill that fits the existing hole, as maintaining a good degree of concentricity is essential. Keep the step drill perpendicular to the wheel so the cone shaped ramps that feed the work to the next size work properly. Keep turning it by hand as it goes through step after step. If you are that high tech, a drill press can be used to hold bit and wheel, but do the rotating by hand. Keep on going till the ~~5/8"~~ 7/8"step drops through.
(I started the hole, after drilling out the protractor to rule rivet but then switched to a variable speed portable drill)
This will be close enough to the ring of writing on the wheel to allow an eyeball check of concentricity...wheel now should be a smooth exact fit on the shank of the adaptor. If you want, you can repeat the drilling with a CD and use the chrome wheel as a backup to make the numbers show better.

Next, two retainers: I first pushed on an o-ring, from a Chinese fleamarket universal kit. This snugs the wheel against the flange in a technically unchallenging manner. Next, I popped on a little wire coil keyring of the sort that garages use to append a tag to the customer's car keys. This closes the ends of the slot so adaptor stays properly centered on distributor tang with no cam or engine to pilot it.
Obviously, each part and process could be done differently by someone with lathe or even drill press, but the aim here is universal buildability.
(I had a few of these rings around but had to expand the ID of one, using a 7/8" drill bit)

The mark one dwell wheel is ready now for its test: See that it fits and stays on-center on the upside-down distributor.
For easy reading, carefully scribe or "Sharpy" in the dwell arcs described far above in this thread.
Make your pointer...the complete slob can just bend a paperclip and install under condenser bracket screw. Better, make up a bolt to fit the precision hole, the one nearer to the vac brake. Probably a typical 5/16 bolt with a layer of Coke can metal around shoulder to replicate shoulder diameter of the special Ford bolt. Wheel rim overlaps bolt holes, so use bolt that ends right below wheel and make a line on it with chisel or file.
(I used a combination of a bolt, nuts and trimmed fender washer for the pointer)

First, get your rotation as seen from rear RIGHT, not always easy...
As seen from front, distributor rotates CCW. Mark the correct direction on the back with the sharpy so you have one thing fewer to screw up.

From the zero, mark off 22.5 degrees in direction of rotation...from the BACK, this is CW.
This arc represents Right Point closed period. Now Back Up 9 degrees, from there mark off another 22.5 forward...this is left point. Check your total...should be 36 degrees of point closedness. When the right point closes, coil starts to charge up...when the left opens, the total circuit is broken and spark fire. Then nothing happens for 9 degrees, then whole thing starts over...got it??

To set up, gap the points; block each in turn by putting a piece of clean paper into the set, measure dwell of each, adjust to your satisfaction. then leave both operational and test overall dwell.
Testing is done by test light, either a commercial continuity tester or a Radio Shack battery box and bulb...one end of circuit clipped to primary terminal, other to case. As the world turns, light will be ON if either or both points are closed, OFF when both are open.
If dwell and gap aren't both pretty close to spec, something is WRONG. If one point has to be significantly off spec to bring combined total to 36 degrees, something else is wrong.

Bruce Lancaster

The Build

I marked the protractor as described but then got confused when first using it. The key for me is noting that with either set of points blocked with paper, that the closure and opening dwells are all 22.5. I rotated the protractor with the cam adaptor piece CCW 20-40° or so to remove any slack, then CW, the proper rotation direction from the back, until my test light just came on. I then aligned the protractor to be in line with my fender washer pointer, at the start of ANY Sharpie line. The protractor will slip readily by the O-ring. The light for either set of points shall then be on for 22.5°.

This photo shows the “light on” mark starting at a 13.5° arc for the left points. The right “light on” starts at 9°. As stated though, just remember that you are looking for good on and off for 22.5° for either set of points.

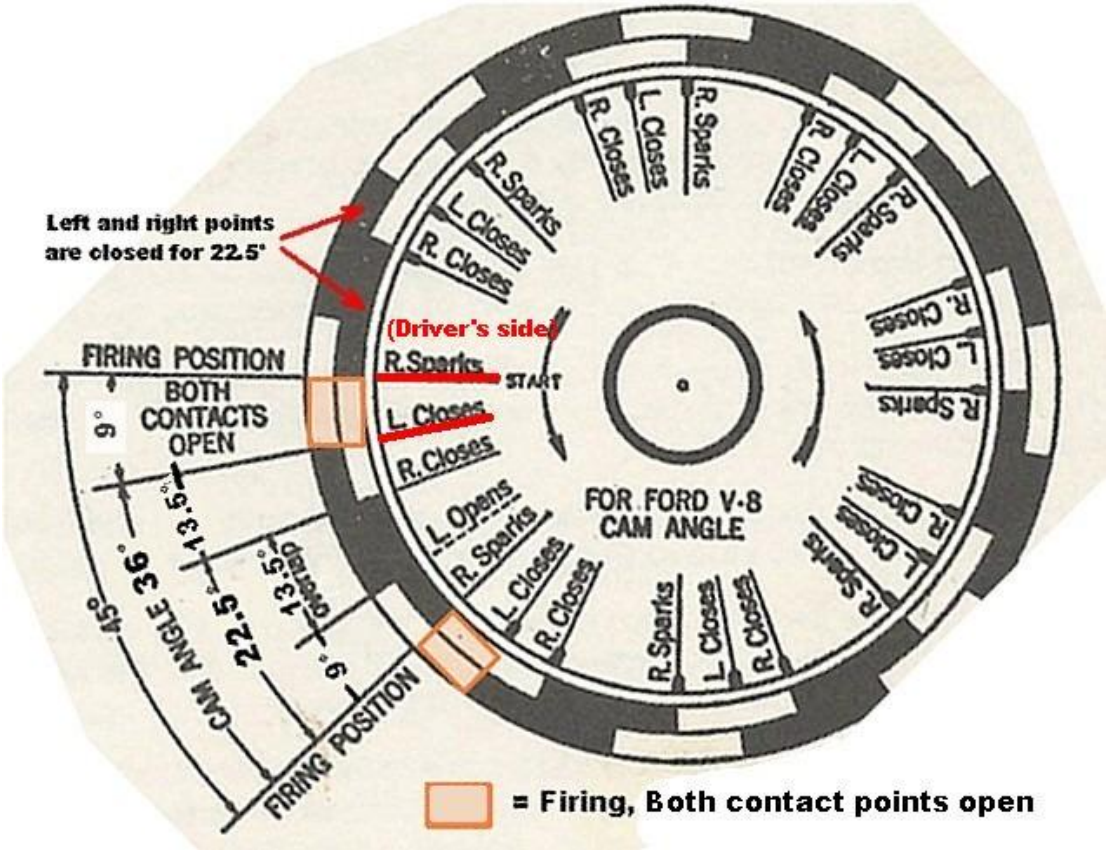
After both left and right points are set, you must check both, so no paper blocking for this test. The light shall be 9° OFF and then 36° ON, completing the distributor cycle for one cylinder. (9° + 36° = 45°)

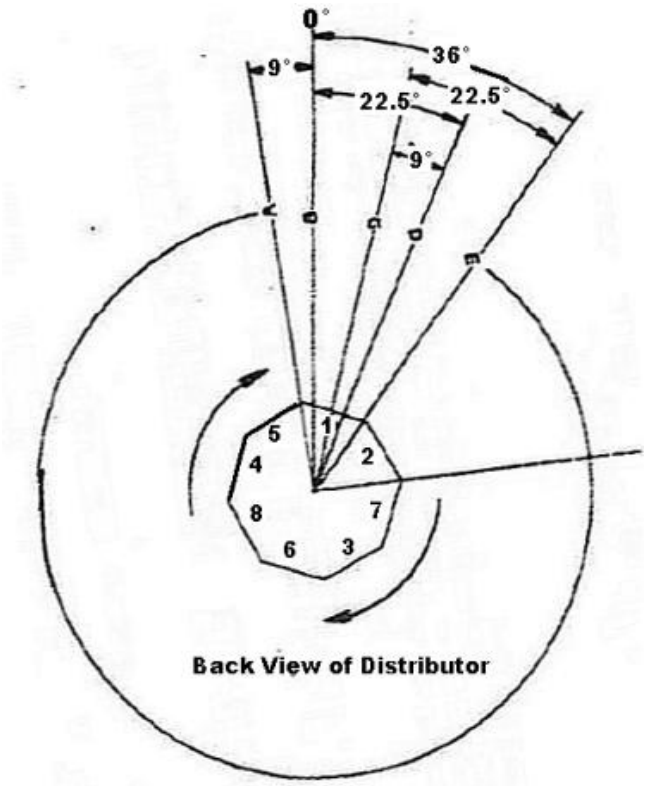


Principle of *Operation* (ref. 1932 to 1936 Engine & chassis Repair Manual with degree changes made to this text for a 1942 distributor)

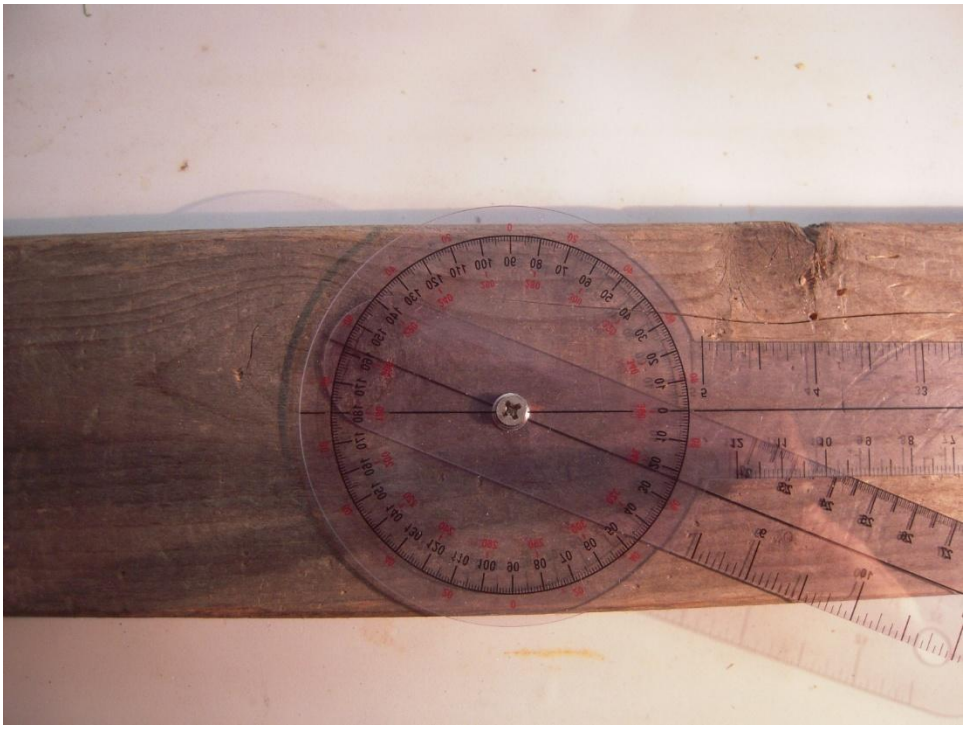
The two sets of contact points in the Ford V-8 distributor Operate on an overlap system. The right-hand contacts (GPM driver’s side), looking at the front of the breaker plate Fig. 24, break the circuit and do the firing. The left-hand contacts (GPM passenger’s side), close the circuit. When one set of contacts only is allowed to operate, the circuit is open through 22.5 ° and closed through 22.5 °. With both sets of contacts in operation, the circuit remains open for a period of 9° and closed for a period of 36 °. This cycle occurs 8 times per revolution of the cam. The number of degrees through which both sets of contacts remain closed at the same time is termed "the overlap".

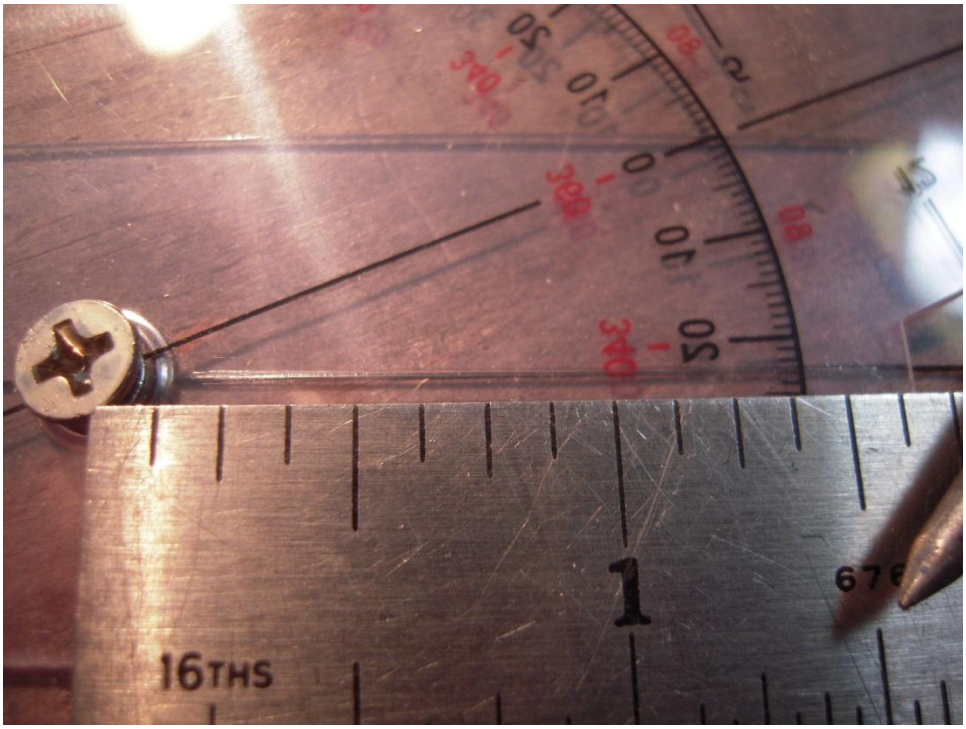
Diagram showing Intervals of opening and closing of the contact points for Ford V-8. The opening and intervals for the left set of contacts is represented by the outer circle while that fer the right set of contacts is represented by the inner. circle. The dark portion indicates the intervals the points are closed while the light section indicates the intervals of opening.





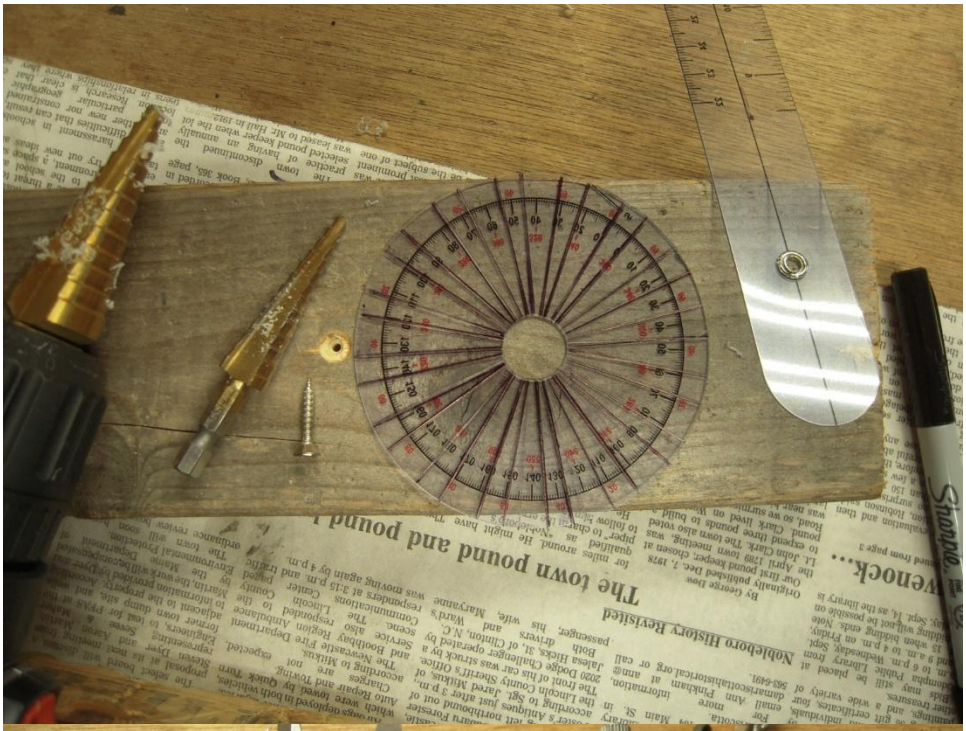
I bought a Goniometer Quick Angle Protractor Angle Finder from Amazon. I drilled out the rivet for the rule to protractor, drilled an indexing hole in a piece of scrap wood and screwed it down with a flat head wood screw. Now with a good base, proceeded to marking.

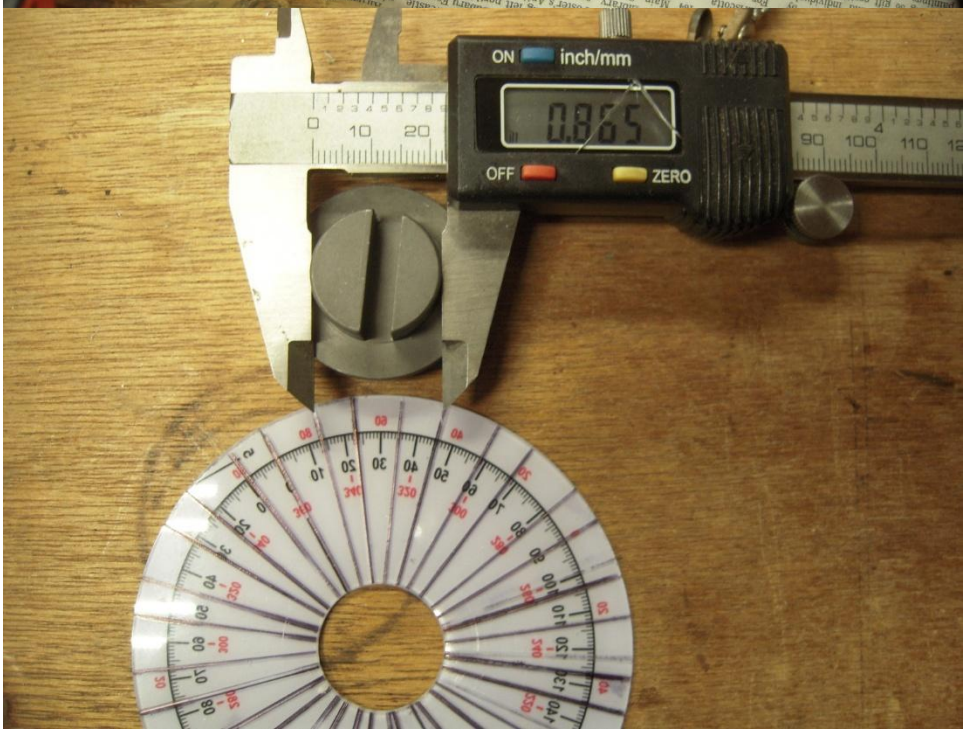




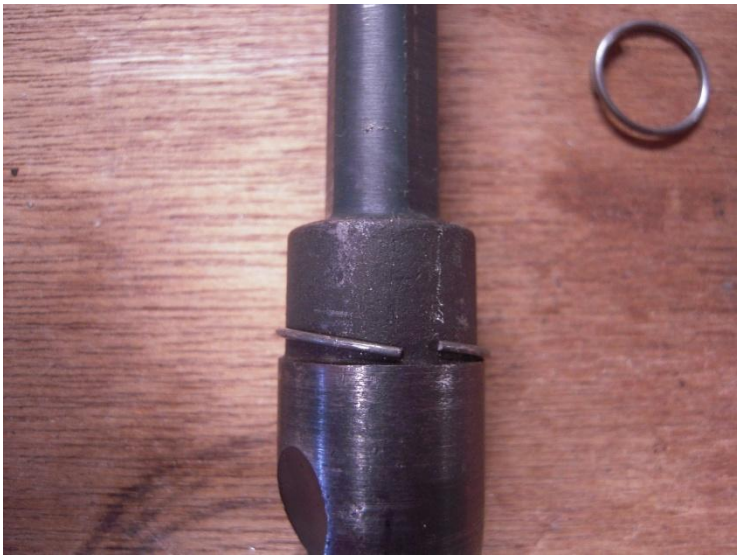
After scribing each mark, I colored the lines with a fine point black Sharpie

Next step was to drill the protractor hold carefully out to a 7/8” hole. I started it by hand but with more drag the larger the hole became; I switched to my variable speed electric drill.





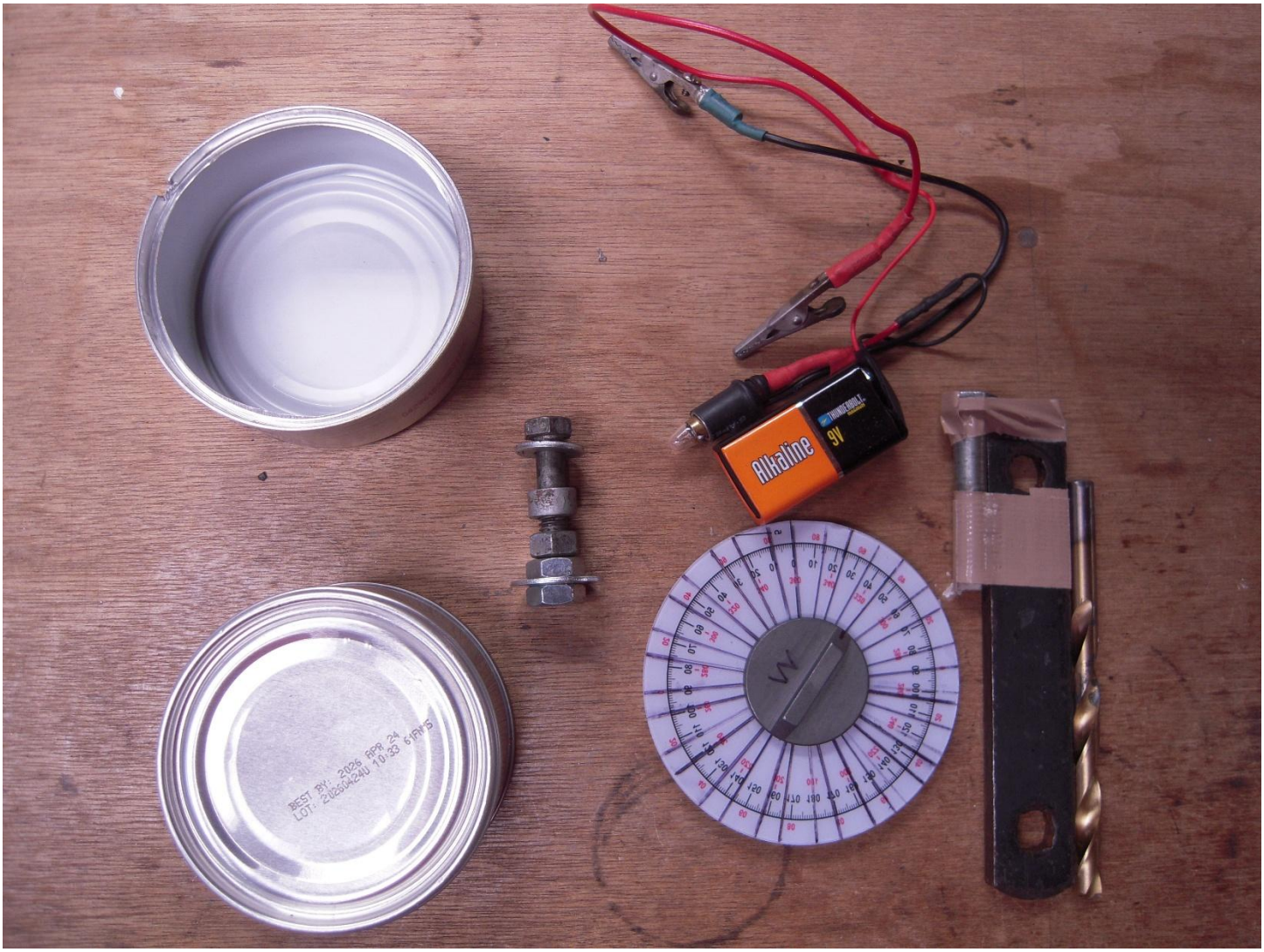
I painted the back of the protractor white for visibility, slipped it onto the cam adaptor, restrained it with an O-ring and then an expanded thin key ring holder using a 7/8” bit.







This is my test light using a dash bulb, 9V battery and clips.
Two cat food cans, one notched for the points side and one not for a distributor stand, worked great.



The Last Step is to Set the Timing

The adjustment of the points for dwell is independent of the timing setting. Point's gaps, verified by dwell adjustments shall always be done before setting timing. This setting could also be done with a timing light instead of this way. I did this and also checked with a timing light.

Note:
I found that setting with this method, that it over predicted the advance by about 4°. When I checked with my dial back timing light, I had to slide the adjustment tab about 4° CCW in the retarding direction.
No idea why this is so …

I did some minor edits to the writeup on VanPelt's site,
http://www.vanpeltsales.com/FH_web/flathead_engines_distr-timing.htm

"*These early V8 distributors (used 1942 to 48) were mounted to the front of the flathead engines. They were generally set for timing in a special fixture, but can be set in this way too.*

Adjust the breaker gap to .014 to .016 inch. Make this adjustment by bringing a lobe of the cam under the rubbing block of the breaker arm, then loosen the gap adjusting screws and rotate the adjusting screw. The point sets do not open simultaneously; they must be set separately. Check with a feeler gauge.

Then put a rule against the tang on the wide side of the distributor shaft (note that the tang is offset) and rotate the shaft until the rule is set to the position shown. Be sure to measure from the mounting hole closest to the vacuum brake.

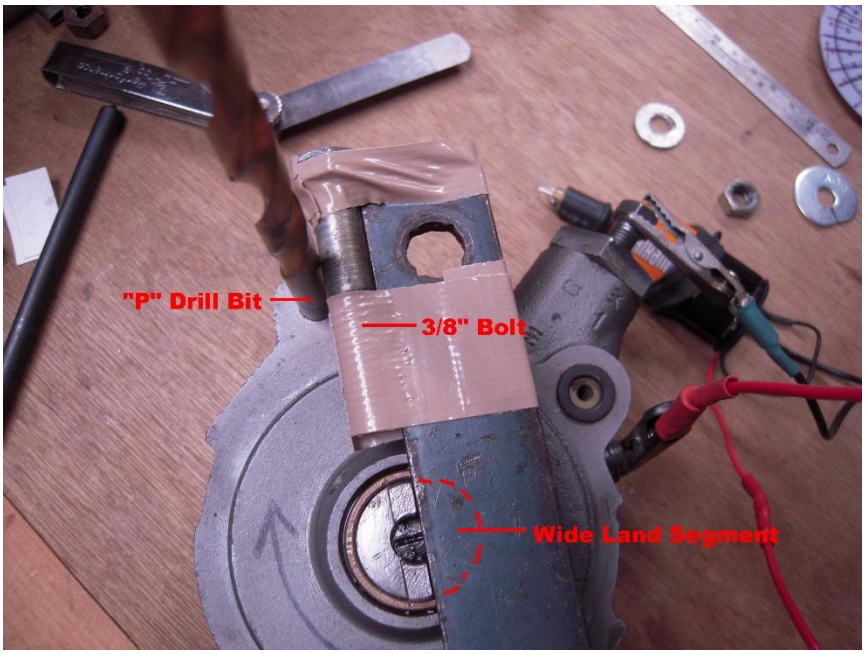
With the distributor shaft in the position shown, the left-hand, ~~when looking at the front~~ driver's side, breaker points should just be starting to open. Note: the timing is controlled by these points only. If the points are not just starting to open, move the adjustment on the right side of the distributor down to advance the timing or up to retard it.

If the correct timing is not obtained on the first try, turn the distributor shaft back at least 1/4 turn to eliminate backlash and repeat the check.

Any difference in timing, that might be necessary due to grade of fuel being used, can be established by adjusting the vacuum brake. This adjustment does not change the basic timing of the distributor. A change in the spacing of the breaker points will change timing. However, the timing will generally be reestablished when the points are correctly spaced.

To adjust the vacuum brake, back off the screw until the engine pings on a road test under load. Then turn the adjusting screw in just enough to eliminate the ping. Tighten the adjusting screw lock nut."

I started my adjustment by slightly loosening the adjusting screw on the outside graduated scale. I found an a more practical method on HAMB but replaced one of the 3/8" bolts with a P sized drill bit which fits snugly in the distributor body hole as shown below. As I previously noted, setting this way over advanced the setting and I had to move the adjustment CCW to retard it by about 4° to get the 6-7° advance I was after.



You can verify the setting is correct using an ohm meter. The driver's side "sparking" points should just be opening with a correct setting. Note that the graduating scale may NOT be exactly in the center of the strip after this adjustment.

Regarding the vacuum brake, I found turning it out all the way with my fingers and then screwing it in 1-1/2 turns was just right on the road