

A Torque Wrench Tester

Make Your Own Testing Instrument From Spare Parts

You Probably Have in Your Garage by Joseph P. Cannon

THE 15TH ANNIVERSARY issue of *Auto Restorer* discussed 15 Top Restoration Tools, including a nice write-up emphasizing the importance of a torque wrench.

I agree that a torque wrench is of great importance to a restorer, but, obviously, only if it's accurate.

Several years ago I wondered if my torque wrenches were accurate and wondered how I could test them. So, I put some thought into the matter and came up with a tool/instrument to verify the accuracy of my wrenches. (I've included a couple of photos of the instrument that resulted from my work.)

It's not fancy looking and I hesitate to refer to it as an instrument, but it is dead-on accurate.

Test Instrument Details

I used an old clutch slave cylinder from my Triumph and several pieces of scrap steel, such as a couple of inches of 1½-inch square tube, 1½-inch angle steel and a scrap of flat stock.

I calculated that the arrangement shown would produce 295 pounds of pressure in the gauge tube at 60 ft.-lb. of torque, so I bought an inexpensive 300-PSI gauge that's 3 percent accurate at full scale (\$15 at W.W. Grainger).

I made the dial face on my CAD program by working backwards from 295 lbs. = 60 ft.-lbs., divided equally to zero. I then glued it in place.

It's not necessary to use a fluid-filled type gauge because the brake fluid in the cylinder never fills up in the bourdon tube of the gauge; it is only trapped air pressure that the gauge "sees".

The ¾-inch hex head bolt used as the input (note the arrow in the photo at the bottom right of the page) must be a grade 8 bolt. Lesser strength bolts will break.

Running Some Tests

Once the instrument was ready, I decided to try some accuracy tests.

My Craftsman beam type torque wrench was accurate but my clicker wrench was 15 lbs. off. Then my Triumph club buddies brought their wrenches over and three out of five were from 5 to 15 lbs. off. One fellow's Craftsman clicker wrench was 20 lbs. off, so we took it back to Sears and, even though it was more than a year old, they exchanged it for a new one.

The new wrench was 10 lbs. off, so we decided to calibrate it instead of going back to Sears.

As it turned out, calibration is not that

difficult once you find the calibration screw hidden inside the handle. It is only a spring pressing against a pivot inside the wrench body and an Allan screw adjustment under the plastic cap at the bottom of the wrench.

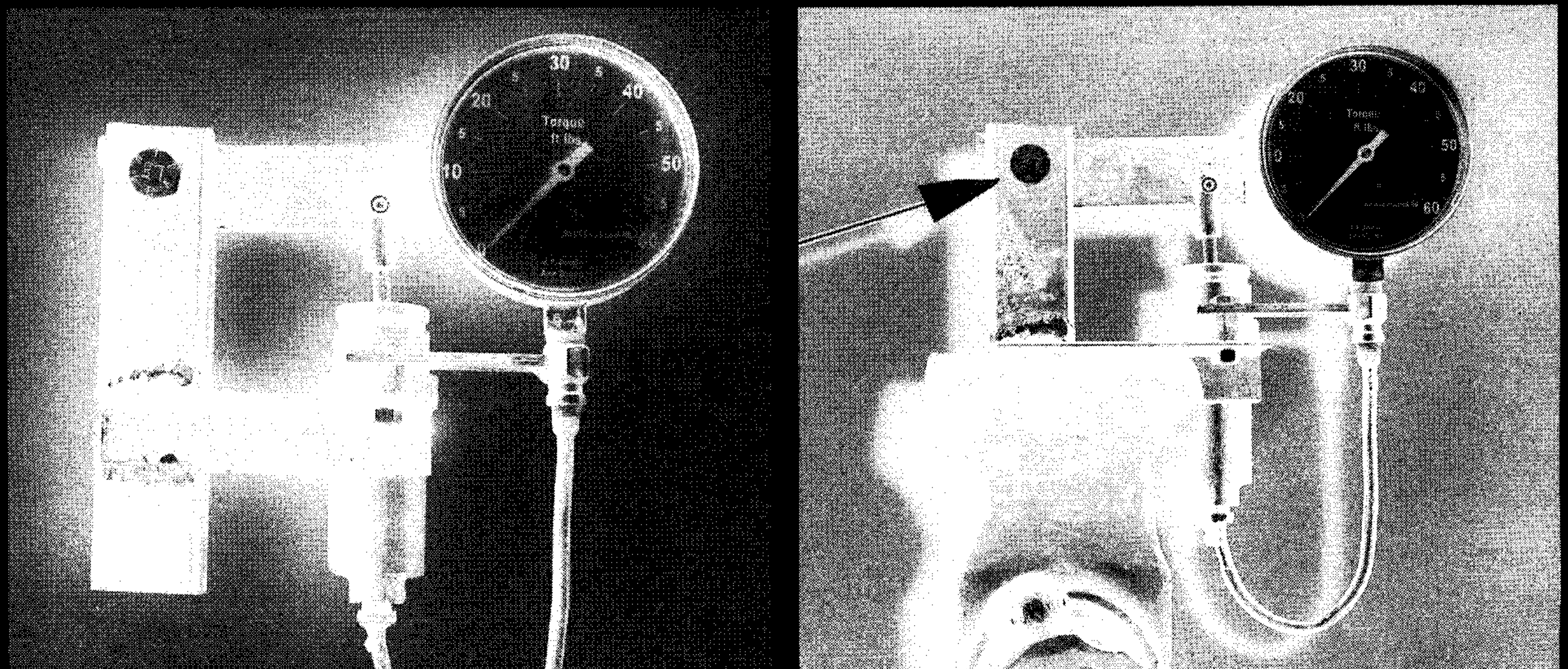
The spring is the critical part of the wrench and it appears that in this case the manufacturer was diligent in selecting the proper tension only the assembly person failed to calibrate it correctly.

If the spring is correct, then the torque setting would be linear through the range, which I found to be true in setting my wrench and my buddy's. The test "instrument" only reads to 60 ft.-lbs. but if the wrench is correct at 40, 50 and 60 ft.-lbs., it will be accurate at all settings beyond.

The error in all the wrenches I checked was always on the low side, which leaves me wondering about all those engines out there with rod and main bearings at 50 ft.-lbs. torque when they should be 70 ft.-lbs.

If any readers have questions or comments regarding my test device, I don't mind discussing this with my kindred souls at jpc8904@yahoo.com.

Also, I'd like to add a good bench vise to *Auto Restorer's* list of essential restoration tools, and I don't mean a cheap, loose-working foreign-made vise, either. ■



The torque wrench tester is made from scrap pieces and an inexpensive gauge. At right, it's been placed in a vise and is ready for use, and the arrow is pointing to the ¾-inch hex head bolt that's used for wrench input. The bolt must be a grade 8 or it might break during a test.