Model A Ford Engine Test Stand
By Tom Endy

A number of us Model A folks banded together and conspired to build an engine test stand that we could run a newly assembled Model A engine in to determine that all was well before installation in a car. Various people donated parts, components, and skills to create what today is a magnificent Model A engine test stand. Donors include Larry McKinney, Bryan Thompson, Rick Hall, and myself.

The engine stand is a roll-around of sufficient height so as not to cause bending over and back strain. Bryan Thompson donated the rolling frame and did all the welding. Everything that is painted red belongs to the test stand. The stand is designed to accept a full up long block engine with head and oil pan installed. Rick Hall donated the radiator. Larry McKinney came up with the fuel tank and control panel that attaches to the two mounting bosses where the throttle linkage attaches to the rear of the block. Larry also came up with the 1930 Model A radiator shroud, four blade fan, and temp gauge boss contraption on the outlet hose. I donated most of the accessories, and did the painting and assembly. All of us contributed engineering expertise.

Test engines are easily lifted in and out of the test stand with a cherry picker engine hoist. The muffler and header pipe remain with the stand and are mounted on springs to easily accept the engine as it is dropped in.
The engine stand is electrically powered from a 12-volt battery with a negative ground, which only required installation of a 12-volt coil, as a generator is not part of the test stand. If the battery needs charging it is connected to a trickle charger for an overnight charge. The test stand is very portable. It can be rolled in and out of the garage and a test engine fired up at any time for a run.

When an engine is not in the stand the radiator is stored on mounting bolts on the side of the test stand and the accessories are stored on the platform below. The muffler and header pipe remain in place and are disconnected from the engine at the muffler clamp.

A donor 12-volt battery of any size can be accommodated in the battery tray at the back of the test stand. The current battery is on loan from Bryan Thompson.

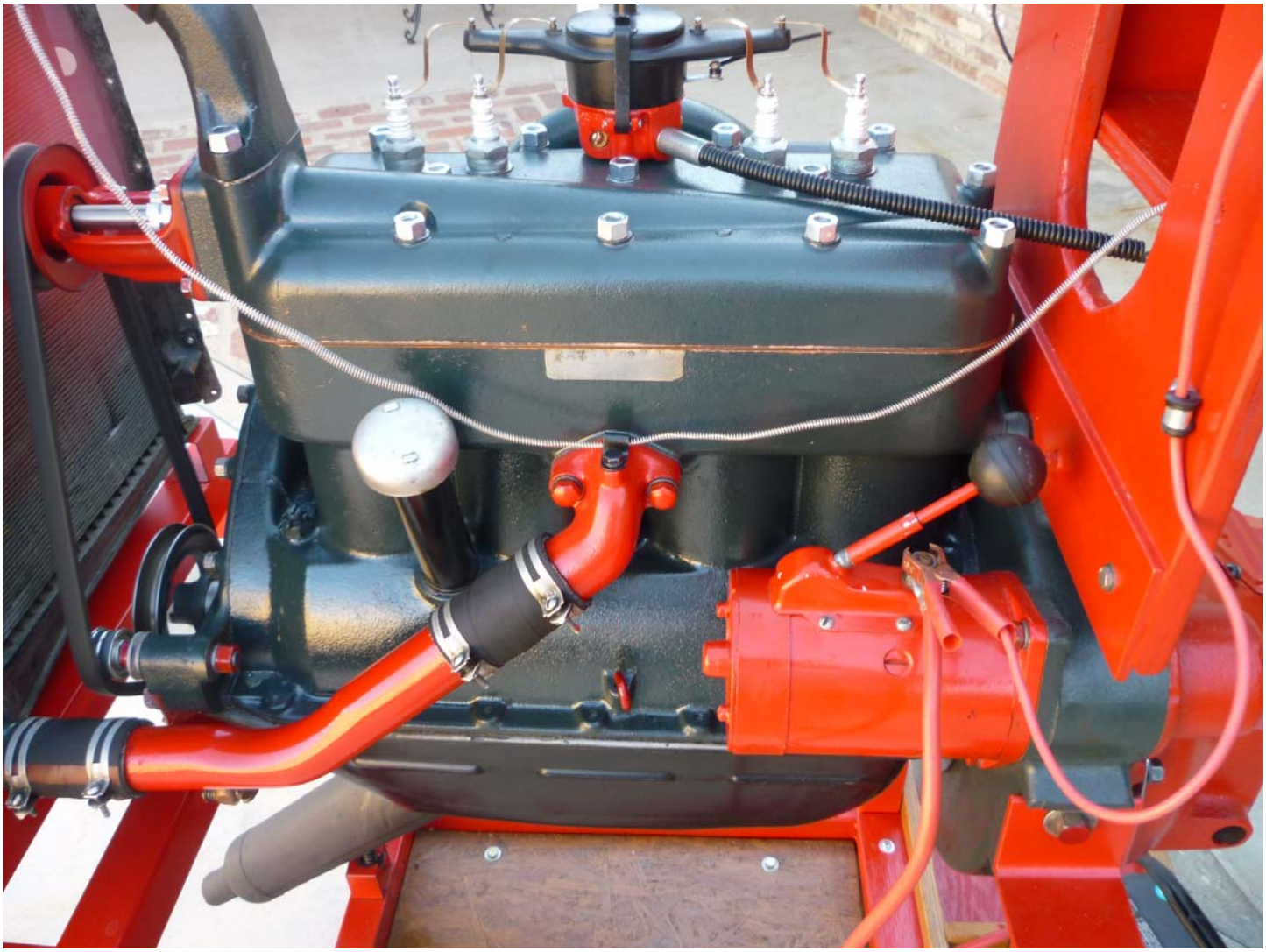
Everything that is painted red belongs to the test stand.

In the above two photos (and in some of the subsequent photos) the engine is running at about 2000 RPM. Note the blurred radiator fan.

The fuel tank is mounted to the control board that mounts to the rear of the engine. The board also mounts the ignition coil and the ignition switch seen at right with the red handle and green ignition on indicator lamp. The backside of the board also contains a water temp gauge, a running time meter, a tachometer, and an EGT gauge. When an engine is not in the test stand the control board with fuel tank and everything else remains attached to the board and is removed by two bolts, and then easily set aside with everything intact.

The tool tray mounted to the top of the board is there as a convenient place to set tools and components as the engine is being installed or removed from the test sand.

The clip lead seen on the bottom of the coil runs down to the cable that is screwed into the base of the distributor.



The starter is hand operated by pushing on the Model A gear shift knob attached to a short rod.

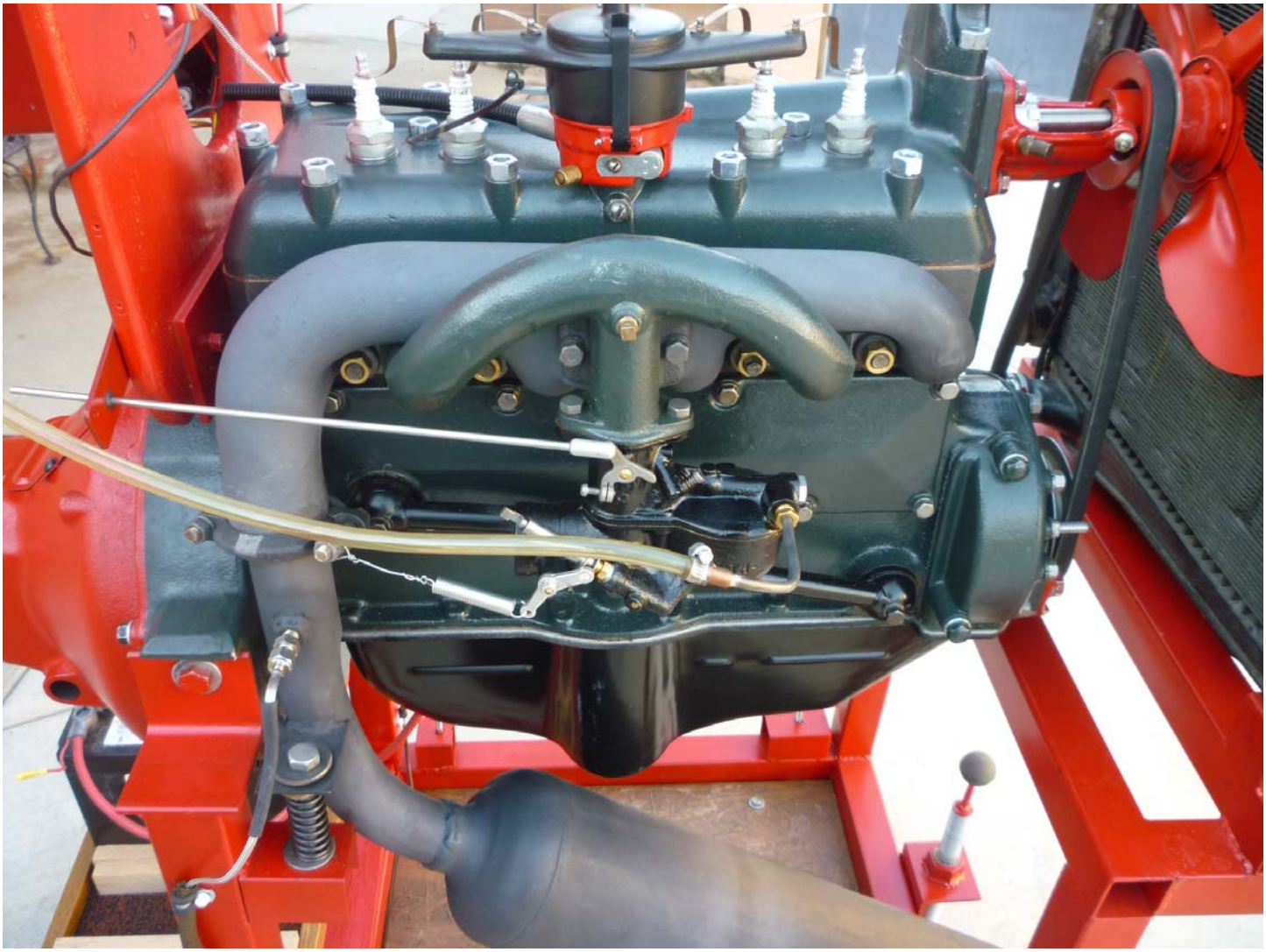
The clip lead on the starter switch terminal takes battery power up to the ignition switch panel and all the gauges.

Battery power from the coil to the distributor is through the short cable screwed into the base of the distributor. A clip lead on the other end is attached to the low side of the primary of the ignition coil.

The fan belt is routed around a bearing supported idler pulley that is installed in place of a generator.

The cable for the water temperature gauge is seen routed along the side of the block and restrained where the normal wiring harness would mount.

The various mounting bolts are pained red to signify they are part of the test stand. When the engine is removed each of the bolts are placed in plastic bags with the mounting location indicated on each bag.



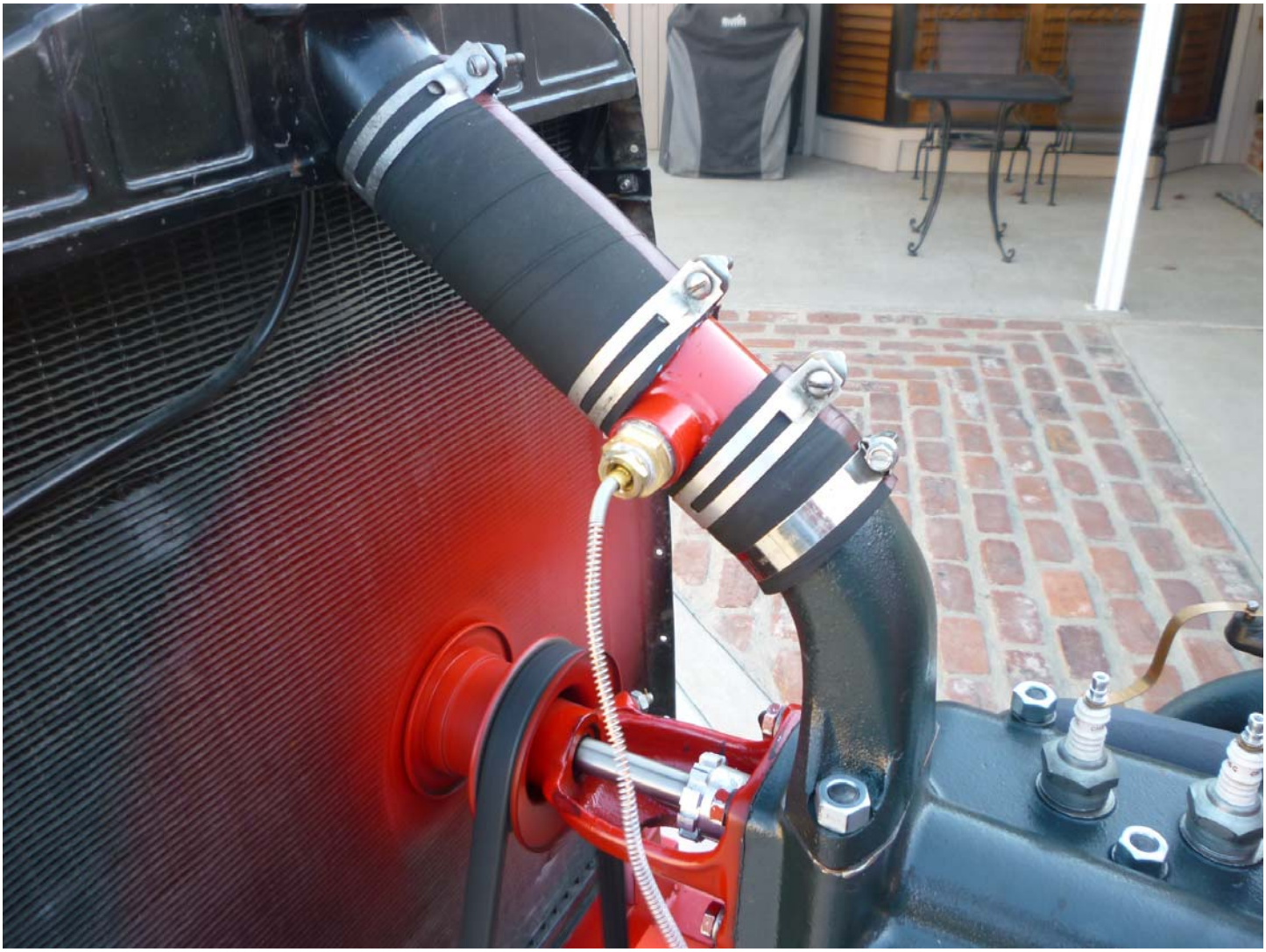
The spring load mount for the top side of the muffler can be seen at left. The muffler remains in place whenever there is no engine in the test stand. A temperature probe for an EGT meter is installed two inches down from the muffler clamp. The probe remains in place when the engine is removed from the test stand.

A clear plastic tube delivers fuel from the tank shut off valve to the carburetor. A spring is mounted to the choke lever to keep it open. To start a cold engine the choke is manually closed by hand.

The throttle is controlled by the rod that travels through a hole in the bracket mounted to the control board. The hole in the bracket mounts an O-ring that provides enough friction to keep the throttle lever set at a desired rpm level.

The parking brake can be seen at lower right.

A tie wrap is attached to the spark advance lever on the distributor to allow for advancing the timing.



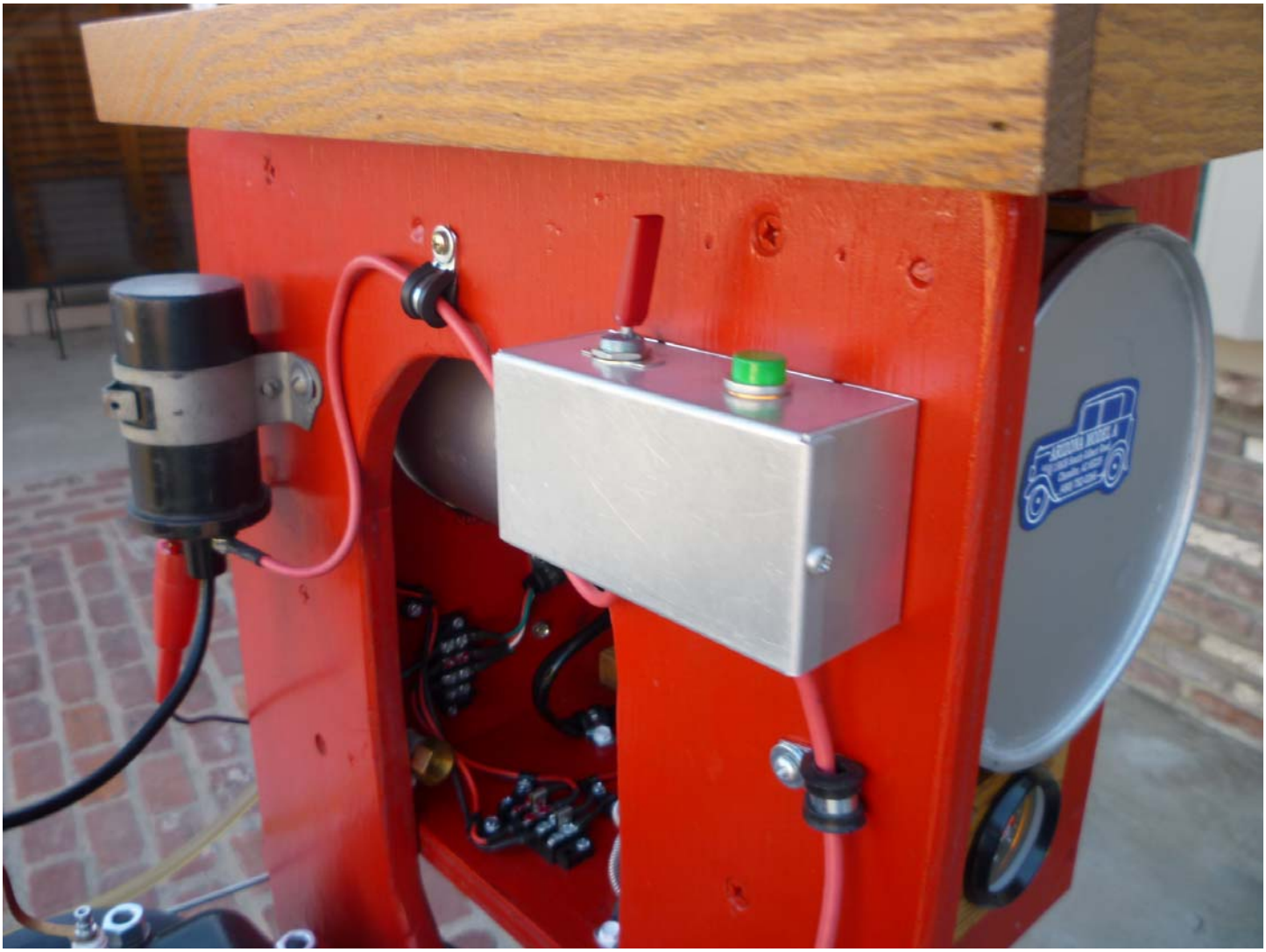
A boss is shown inserted into the water outlet hose to accommodate a water temperature probe that is connected to a temperature gauge.

The water temperature gauge is mounted to the left side of the control board just below the fuel tank. The gauge contains a backlight connected to 12-volt power for nighttime operation.

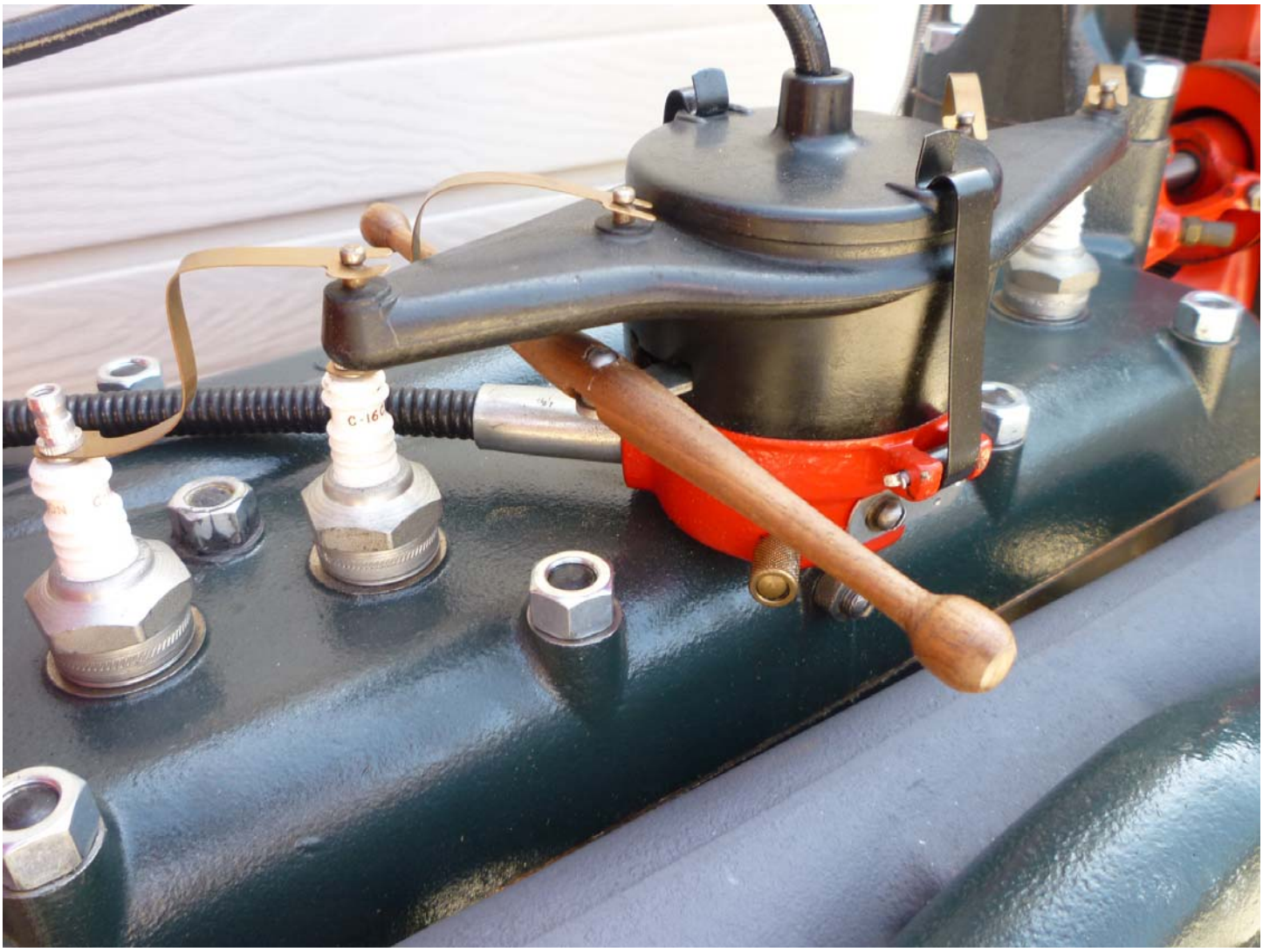
The EGT gauge is mounted below the water temperature gauge. The gauge contains a backlight for nighttime operation.

When the engine is removed from the test stand the probe is removed from the boss in the water outlet hose and screwed into a fitting mounted inside the control panel during storage

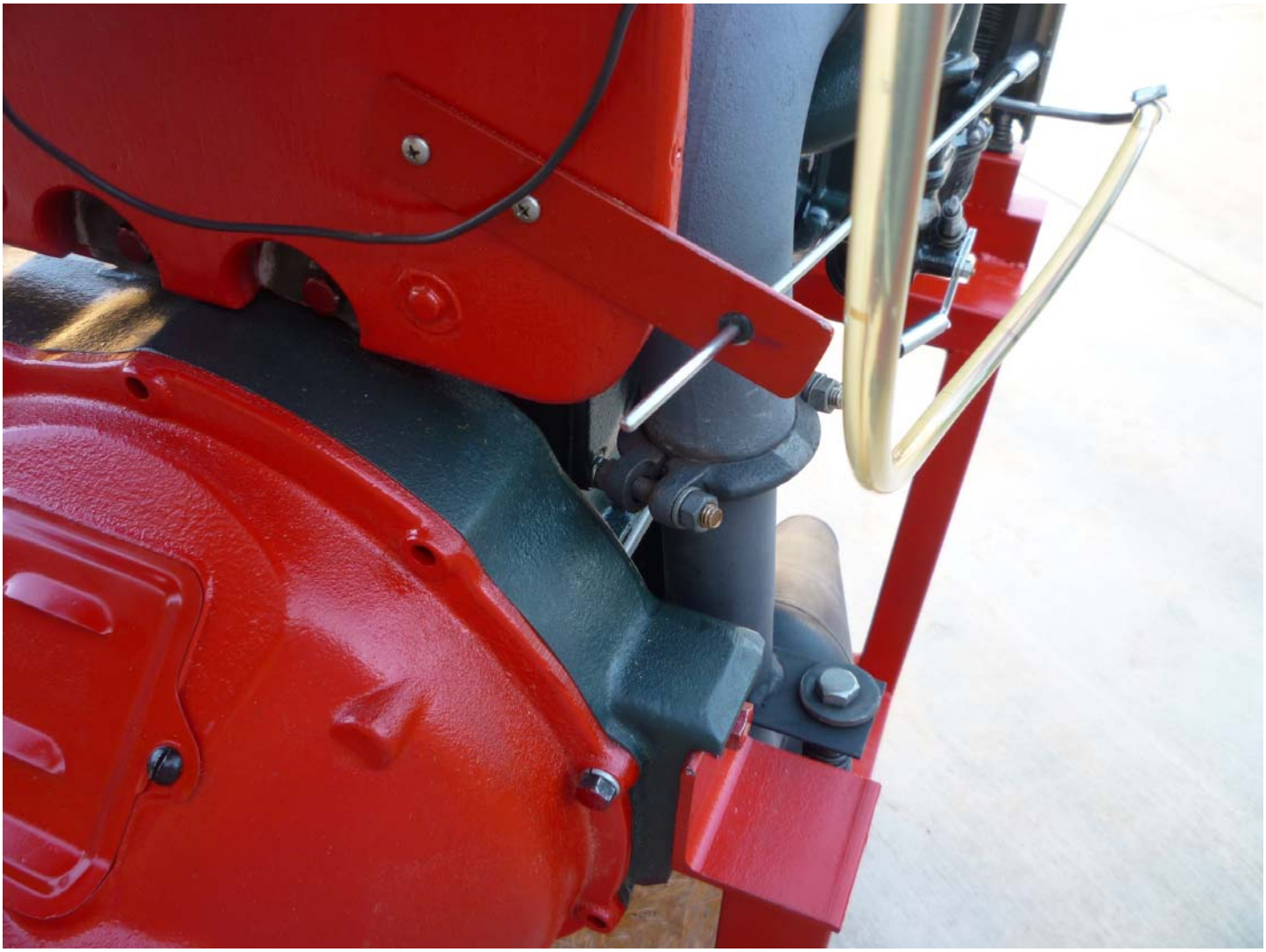
The EGT probe remains mounted in the muffler header pipe with the feed cable disconnected from the gauge at the control panel.



The ignition control panel is shown at right; the 12-volt coil is mounted at left. The water temperature gauge can be seen below the fuel tank at right on the right side of the mounting board. The red handled switch is the ignition switch.



The timing advance rod is exquisitely made of the finest hardwood by Bryan Thompson such that it can be adjusted from either side of the engine without encountering a spark plug or hot exhaust manifold.



The throttle control rod can be seen at right; The O-ring provides enough restriction to hold the rpm level in place where set.

The control board with fuel tank is mounted to the back of the engine by two bolts in the location where the throttle linkage would be installed. A metal bracket at the base is where battery ground is picked up for the control panel.

The fuel tank is mounted to the top of the control board. A tool tray is located above. The running time meter and tachometer are located below the fuel tank. Running time meter on the left, tachometer on the right.

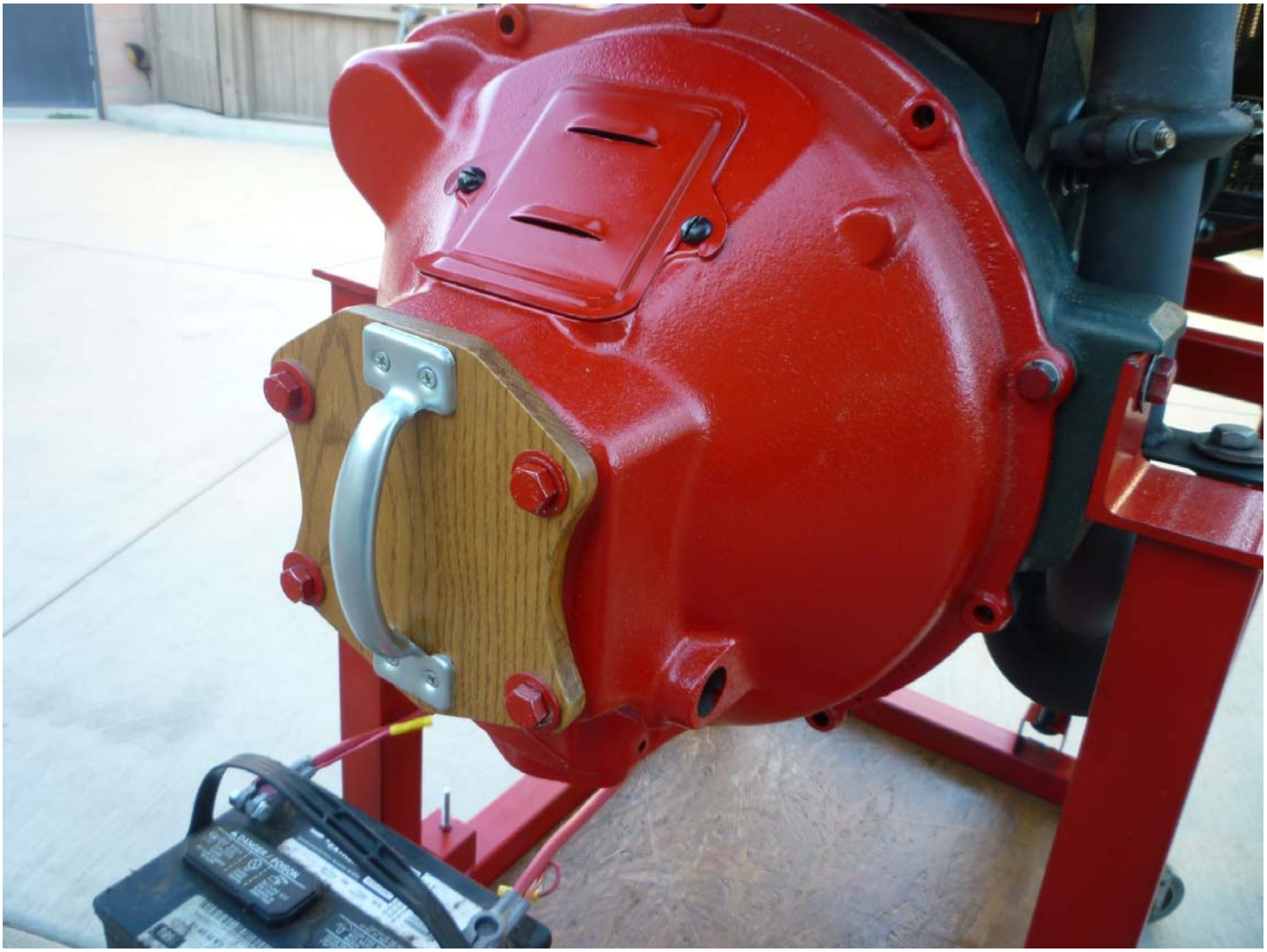
The running time meter and tachometer are mounted to the backside of the control board. Below are two clips to retain notes about the engine status. The gas tank is directly above.

The distributor has a tie wrap attached to the spark advance lever for convenience of setting the advance. When timing a test engine the distributor upper section has to be temporarily mounted and the spark advance lever pulled toward the manifolds until it is up against the stop. This is the fully retarded position and duplicates the position it would be in if it were connected to the advance lever in a Model A.

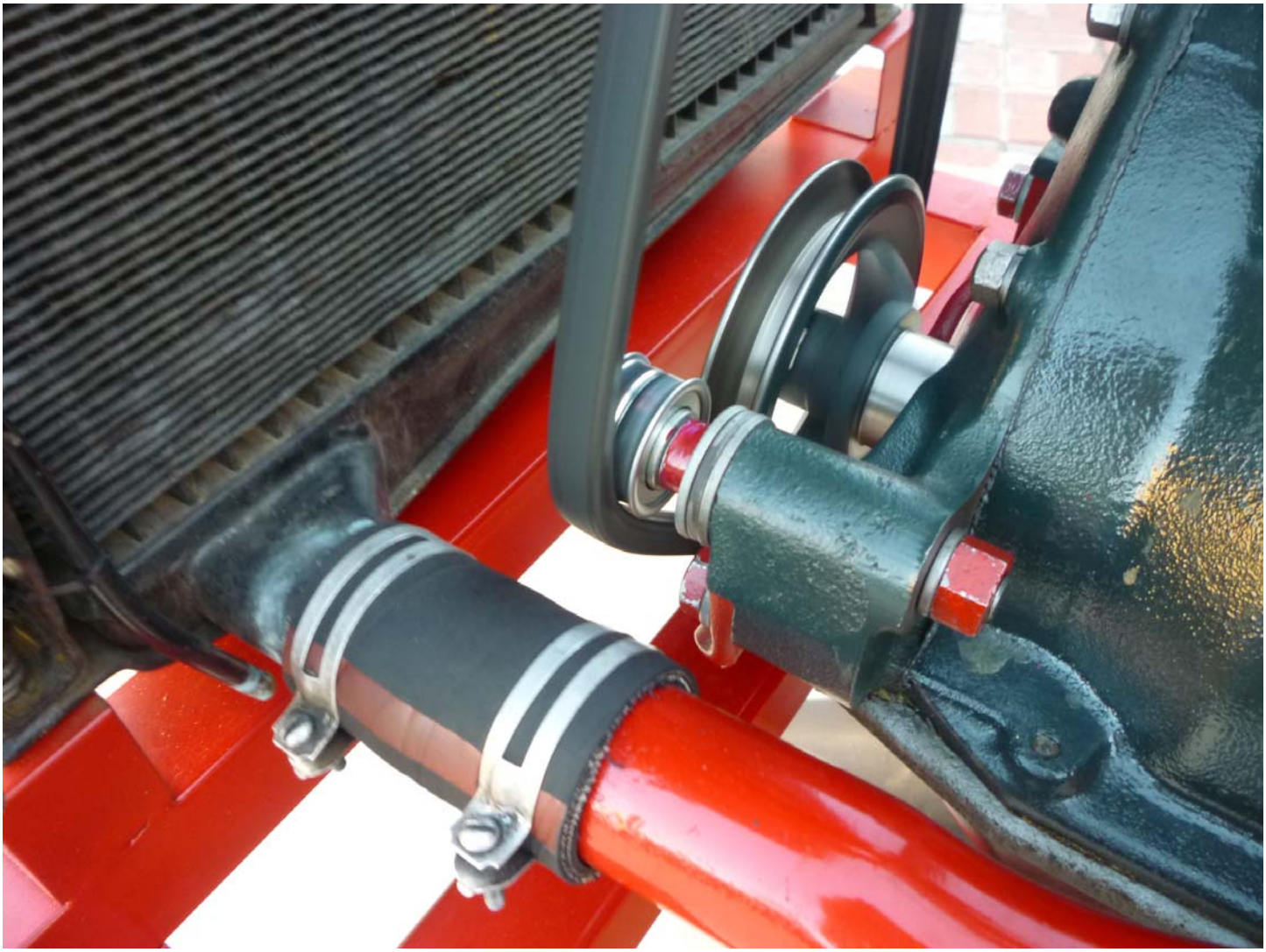
Two mounting studs are provided to store the radiator on when there is no engine in the test stand. The platform behind is used to store other components when there is no engine in the test stand.

A running time hour meter records the total time the engine has been run in the test stand. The reading is cumulative. When a new engine is installed in the test stand a notation has to be made of the current reading on the gauge before starting the test.

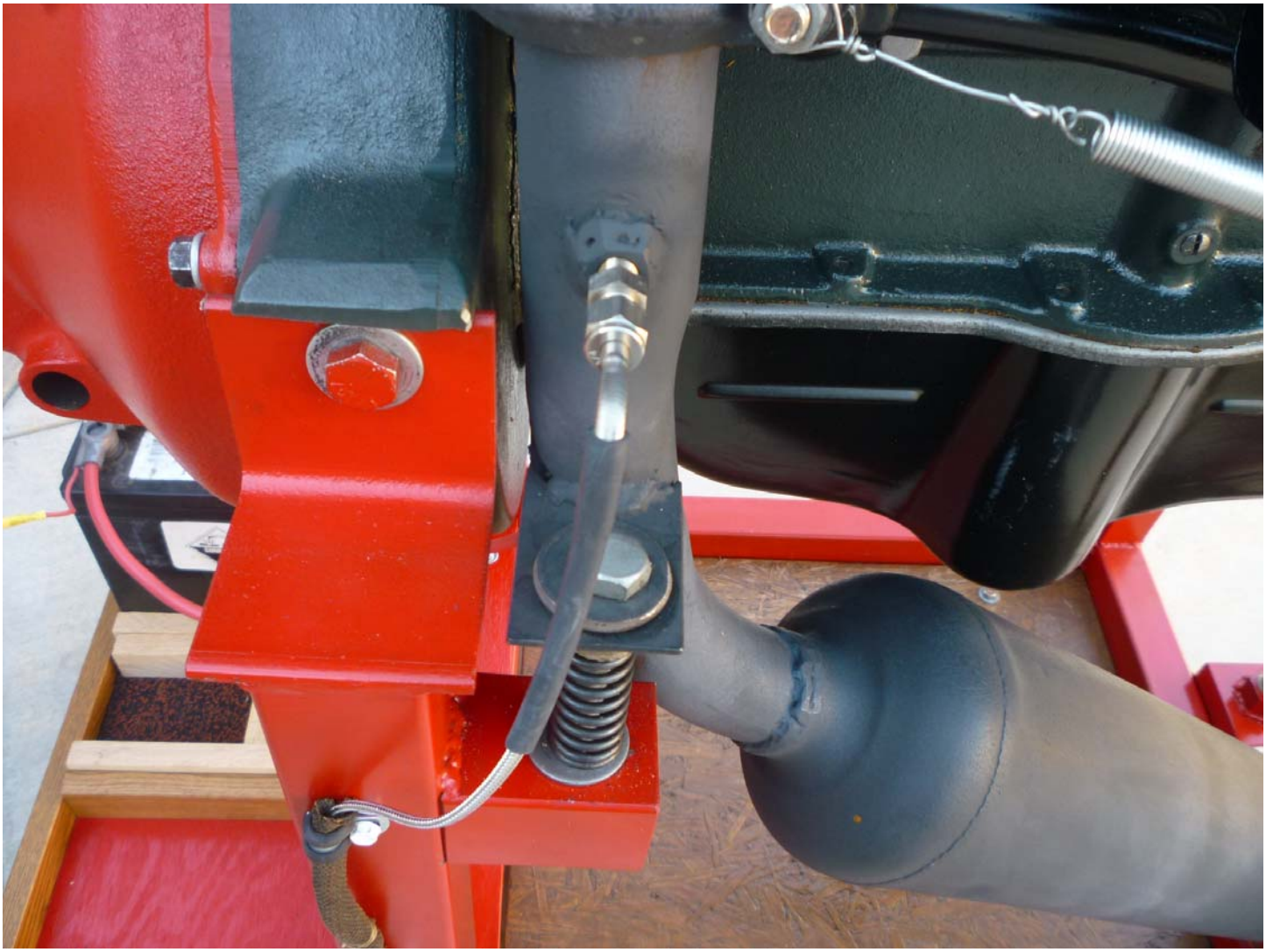
A dummy temperature gauge fitting is added to store the temperature gauge probe whenever there is no engine in the test stand.



A dummy bell housing is installed as a safety feature to enclose the flywheel. The handle it to facilitate moving the test stand around.



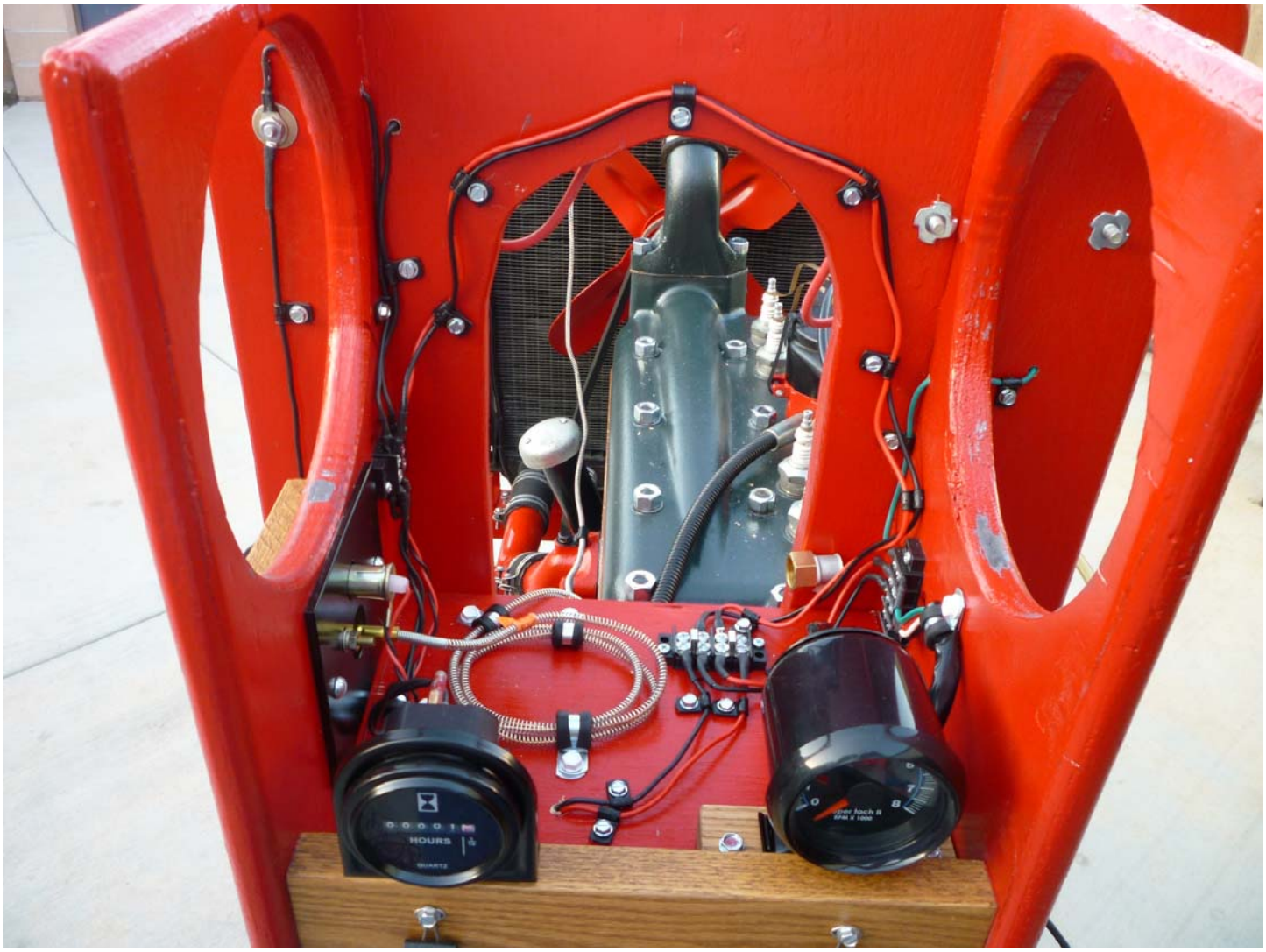
An idler pulley supported by two bearings is mounted in place of a generator and takes up the slack of the fan belt.



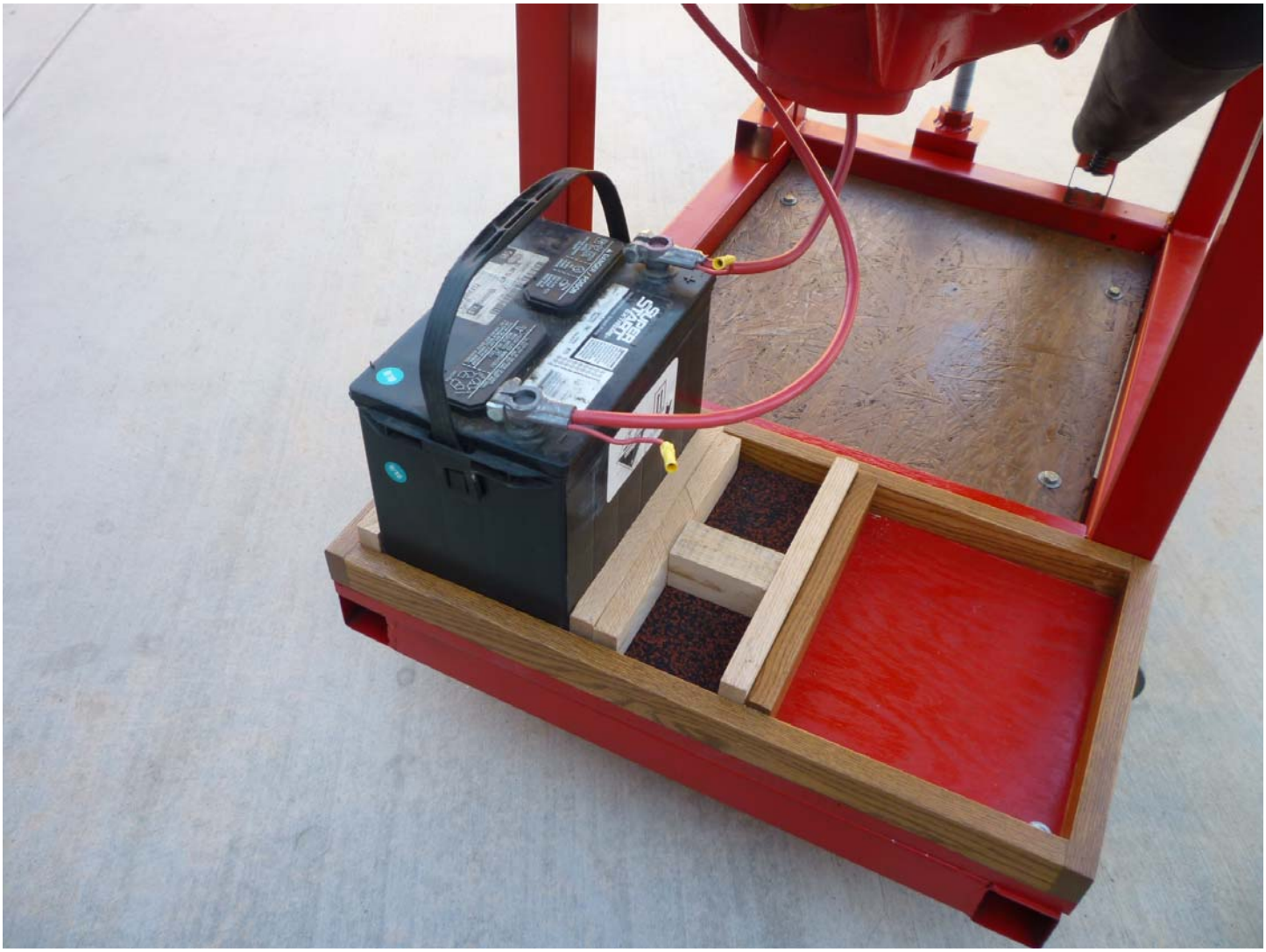
The modified Model A muffler is attached to the frame on spring loads and is left in place when the engine is removed from the test stand. The probe for the EGT gauge is located just below the muffler clamp. A threaded boss is welded to the header pipe for the probe to insert. When an engine is removed the probe stays in place with the muffler and is disconnected at the gauge.

A parking brake is installed to keep the engine stand from taking off down the road.

The input signal for the tachometer is taken off the low side of the coil. The gauge is set for a four-cylinder engine. The clip lead is the connection to the distributor cable.



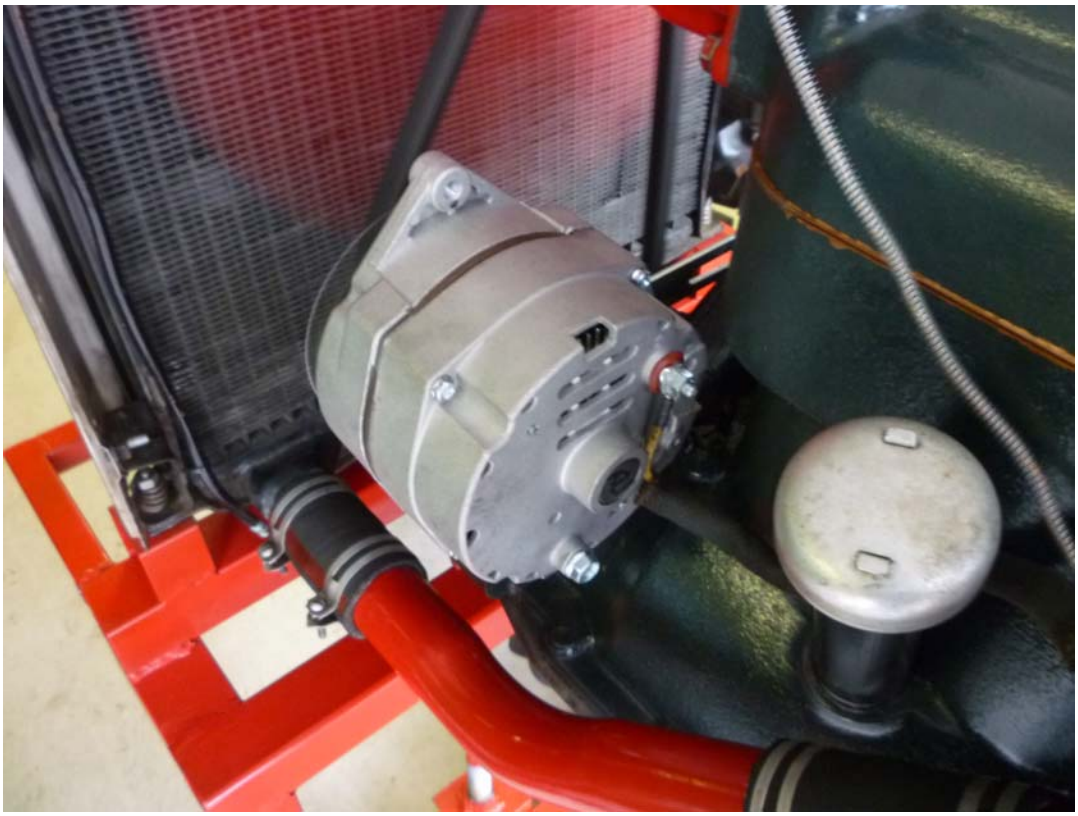
Wiring inside the control panel to the ignition and all the gauges. The hour meter is on the left; the tachometer is on the right. The backside of the gauge on the left side panel is the water temperature gauge. The EGT gauge is directly below it.



The engine test stand compartment will accept any size 12-volt battery. Blocks of wood are positioned to prevent the battery from walking around due to engine and stand vibration.

A front handle has been added.

A 1930 radiator shell and a radiator cap has been installed.



An ammeter was installed in the electrical system. It will show any discharge from a connected electrical load when running the engine with the idler pulley instead of an alternator or generator (top photo).

A 12-volt alternator is shown installed. The ammeter will show charge when the battery is being charged by the alternator. The installation of the alternator is optional. The engine under test can run just as well from the battery with the idler pulley installed in place of an alternator (bottom photo).

Observations learned from the EGT gauge: (Water temp at a nominal 160 F)

At 2000 RPM the readings are:
800 F with the GAV open one turn
900 F with the GAV closed

At 2500 RPM the readings are:
1,000 F with the GAV open one turn
1,100 F with the GAV closed.

The jets in the carburetor have been flow tested and resized to the suggested flow rates.

A rich fuel mixture provides a lower EGT temperature reading.
A lean fuel mixture provides a higher EGT temperature reading.

EGT temperatures can move up and down with little affect on the water temperature.