

Differential Cradle

by Tom Endy 2021

Often I am asked about the construction of the differential rolling cradle seen in a number of technical articles. The differential cradle was built about 30 years ago and over the years a number of modifications have been made to it. When it was first built it was thought that it would often be transported to different locations. For that reason it was built in four sections so it can be taken apart and transported in the trunk of a modern car. The four sections are the front section, the U-shape section and the left and right sections. Each of the three larger sections bolt to the U-section with two hex bolts. The U-section is required so that a floor jack can be positioned directly under the banjo. The sections are made from two and a half inch black pipe obtained from a plumbing store. The U-section is constructed from angle iron. The various lengths were determined by the requirements of a complete Model a rear axle assembly, room underneath a car, and a sufficient height to allow it to be worked on while sitting on a stool.

Using the cradle a rear axle assembly can be removed from a car with or without the brake drums and backing plates attached. In order to accommodate either the area where the threaded axle shafts rest has to be able to adjust laterally.



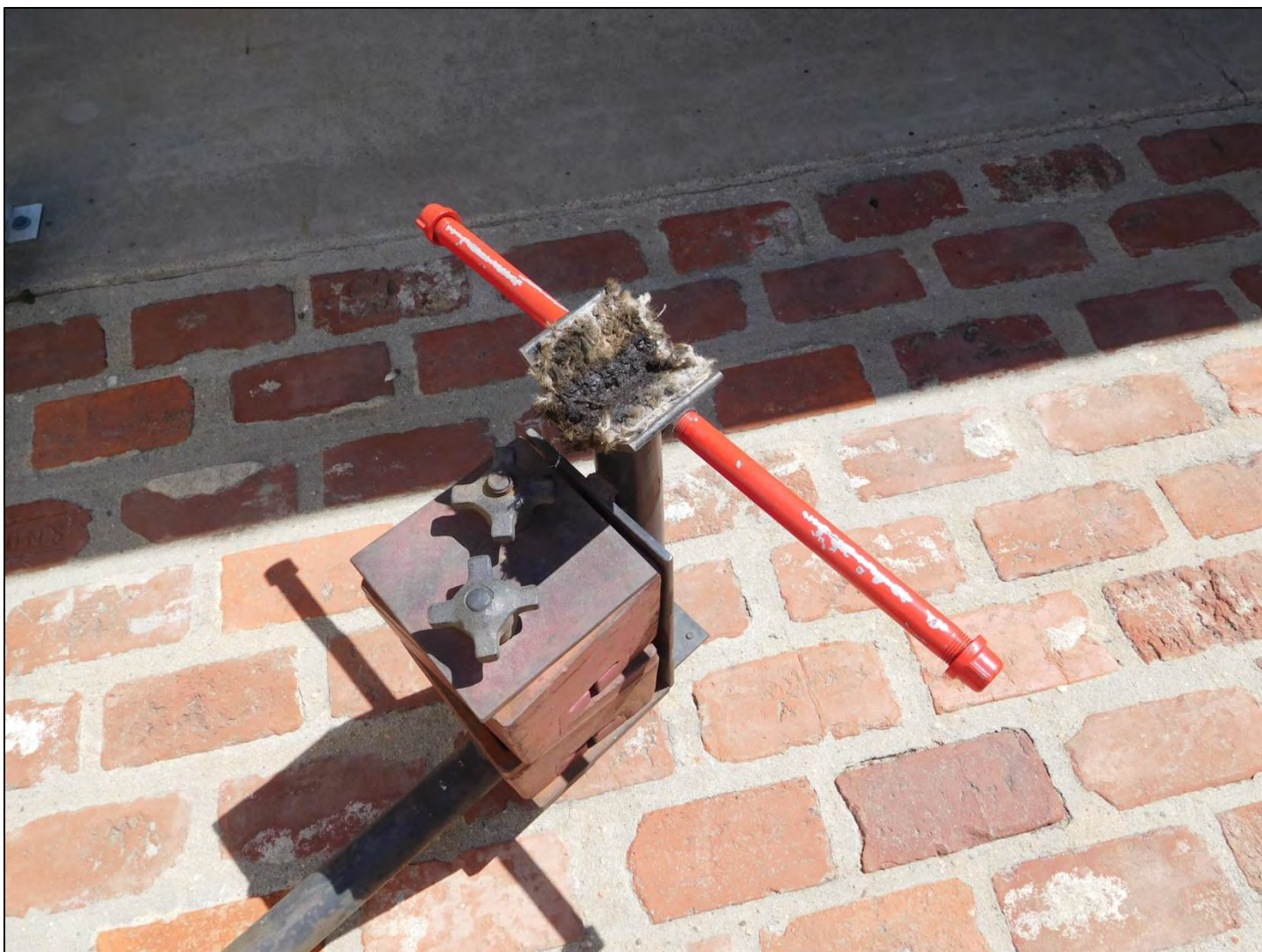
The first two modifications were made early on. The first was a means to secure the threaded axle shafts to the supports to prevent the rear axle assembly from jumping out of the cradle when rolled over a separation in a concrete floor. The second modification was the addition of counter weights at the front of the cradle to prevent the rear axle assembly from doing a somersault when the torque tube is lifted up. The two red blocks seen at the front weigh a total of 50 pounds and adequately counter balance the cradle.



Shown here is the device used to secure the threaded end of the axle to the support. Also shown is how the support can be moved laterally to accommodate a rear axle assembly with or without brake drums attached. The U-shape cap attached to one side pivots over the threaded end of the axle and is bolted on the other side.



These two devices were machined to screw over the threaded ends of the axle shafts to protect the threads. They also lock the axle housing in place and provide a means to pull an axle housing off one side without pulling the whole rear axle assembly out of the cradle. The cradle provides a platform to disassemble a complete rear axle assembly after it s removed from the car.



The two red horizontal struts were added to provide a resting place for the two radius rods when installing a Mitchell overdrive. During the installation the rear axle assembly remains in the cradle and only the torque tube and drive shaft are removed. The radius rods are then allowed to rest on the struts keeping them level and preventing oil from spilling out of the banjo.



Another modification is the device seen folded over at the front of the U-section. Its purpose is to provide a support for the Mitchell overdrive stub shaft after it is installed. This is used when the cradle is being used without the radius rods installed on the rear axle assembly.



The stub shaft support is shown in the upright position.

Measurements:

The measurements given here are nominal and not precise. When attempting to build a cradle it is suggested that a full up rear axle assembly be available to use as a guide.

The top of the two vertical rear supports are a nominal 17 inches from the ground including the height of the wheels. They were originally two inches taller, but were shortened for better mobility under the car.

The top of the front vertical support is a nominal 19 inches from the ground including the height of the wheels.

The distance from the center line of the front support to the center line of the rear supports is a nominal 40 inches.

The distance between the supports for the threaded ends of the two axles is a nominal 64 inches with a lateral adjustment on each side of about three quarters of an inch.

The dimensions of the U-section openings are a nominal 13 inches across and 11 inches deep.