Making Wagon Undercarriage in HO Scale
By Joe Kaspar and photos by same
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Making a wagon undercarriage in HO scale can probably end up being the most difficult phase of wagon building. The technique explained here represents one Ringling style undercarriage being built for trunk wagon #65.

Construction of the undercarriage becomes a separate project and is built after the wagon body is completed for several reasons. The first is that all my wagons are spray-painted, including the undercarriage. The second reason is that if at some later date I wish to change the style of wheels and undercarriage, it is easier to remove the assembly without damaging the body.

Most of the wood used in this project will be scale and dimensions given are scale measurements. Using scale lumber take the guess work out of determining sizes. A note before getting started, certain deviations to this approach will have to be made for drop frame wagons and wheels of different diameters used in the front and rear set.

To begin the project, the fifth wheel is constructed first. Using 0.015 inch styrene, compass two circles, three scale feet in diameter and cut out with scissors. If the fifth wheel is to be stationary, the circles are glued together. If the wheel is required to turn, some sort of fastener like an eyelet must be used. Pictured (photo 1) shows a small eyelet, like the type used in electronic circuit boards, used to fasten the two circles. Eyelets and tools to set them are available in electronic parts stores, craft stores, and on-line shopping.

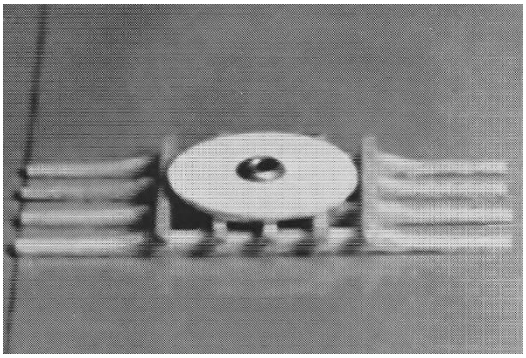

Photo 1: Assembling the fifth using an eyelet will provide a free turning assembly.

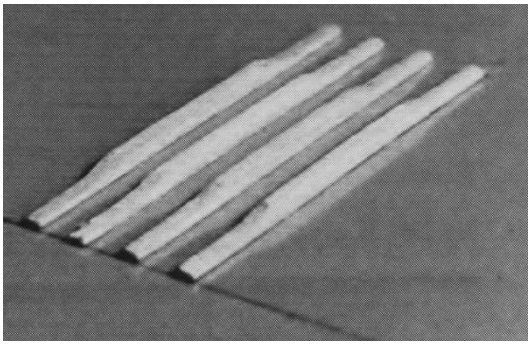

Photo 2: Four bolsters set to the styrene work surface with Elmer's white glue

Use a sheet of styrene at least 0.025 inches thick as a work surface. Draw a line on the work surface to represent the side of the wagon body. Measure the width of the wagon and cut four bolsters using 3” x 3” scale lumber. Measure the width of the wheel to be used and mark this dimension on both sides of bolsters. Taper the bolsters as shown in the photo and using Elmers white glue, secure to the styrene (photo 2) work surface.

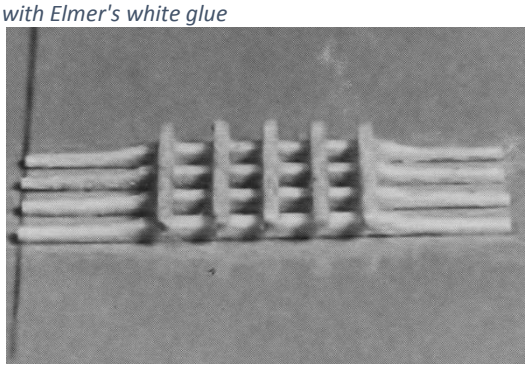

Photo 3: Braces overhang the front and rear by 3”

Cut five long braces 2” x 3” x 3’ 6” and glue over the bolsters. There should be a 3 scale inch overhang on the front and rear bolster. The two outside braces should have their ends slightly tapered. Now glue the braces on to the bolsters. The spread should not exceed three scale feet (photo 3).

Cement the fifth wheel in place using an adhesive type glue such as Walters Goo. Cut two lengths of 2” x 2” x 6’ long scale wood. Glue these two pieces into a “V” shape with an opening one foot wide. Cut two 1” x 6” x 1’ pieces of scale wood and glue at the opening of the “V” assembly to form the pole pocket. Drill a #75 hole each side of the pole pocket and insert a length 0.015” brass wire with adhesive glue to keep the wire from falling out at this time (photo 4).Cut four braces 2” x 2” x 3 ½‘ and taper each end of the brace. With adhesive glue, mount the braces on the fifth wheel, tapered edge toward the bolster (photo 5).

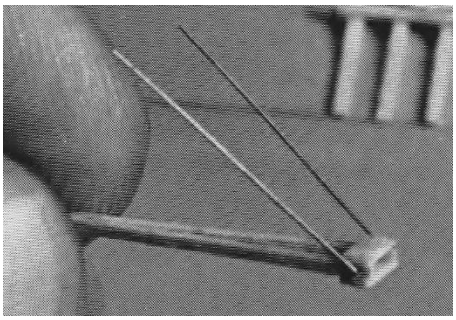

Photo 6: The pole pocket is formed by gluing 1 foot spacers between 6 foot boards at one end and securing the boards together at the other end forming a "V".

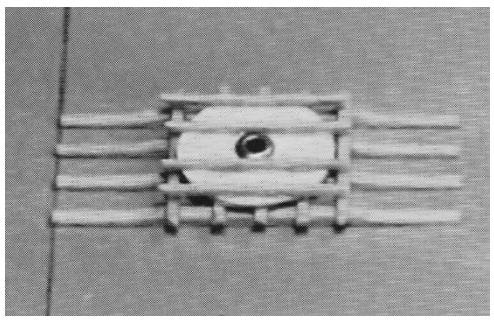

Photo 5: Mount 4 braces to the fifth wheel keeping the rounded edge of the outside supports toward the bolsters.

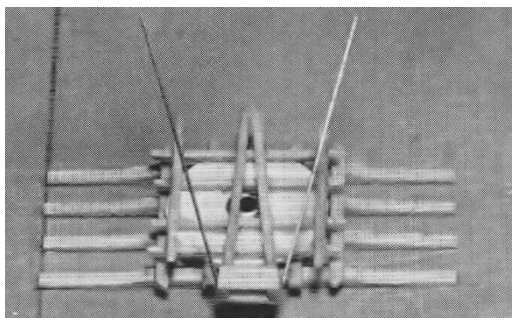

Photo 4: Pole pocket assembly trimmed and two supports added across the 4 braces.

Cut the rear of the pole pocket assembly off to a total length of five scale feet and glue in place. Cut two lengths of 2" x 2" x 3 ½ '. Round one corner on each end. Glue on both sides of the pole pocket with the rounded edge toward the bolsters (photo 6).

Cut two axle bearings out of 1/16" brass tubing. The length of the bearing should be just short of the wheel hub to allow free movement of the wheel. Cut the front axle base out of 1/16" x ¼" bass wood four scale feet long. Taper the axle base as shown in Figure 1. Using adhesive glue, attach the axle bearing to the axle base. Wheels are mounted by passing the axle trough the bearing and securing the axle to the wheels. After mounting the wheels, balance the wheel assembly over the fifth wheel assembly. Proper height of the axle should have the wheels just clearing the bolsters. The axle base must be adjusted to meet this requirement.

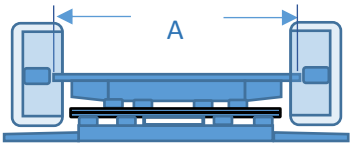

Figure 1: Axle bearing atop the axle base is balanced on the 5th wheel.

The U bolts are constructed from 0.010" styrene and 0.010" brass wire (photo 7). The holes should be the exact diameter of the axle assembly and should be drilled in the styrene before cutting to size. The U bolts are held in place by slightly spreading the brass wire and then gluing in place with a Cyanoacrylate ("Crazy Glue") type glue (photo 8). All caution must be observed when using this type of glue. Since this glue runs freely, a tissue is used to blot the surface. When the surface has dried, snip the long ends of wire as close to the axle as possible with scissors. Now glue the axle assembly to the undercarriage.
Bring the brass wire from the pole pocket back to the axle and glue in place with Cyanoacrylate. Two axle braces are cut from 3 x 5 index card stock and glued in place (photo 9). The front assembly in now complete. Slide a razor blade under the bolsters and the assembly will come right off the styrene. A little water on the finger will dissolve any excess glue from the bottom.

The rear assembly is started by gluing the bolsters to the styrene just as the front assembly. This model required two bolsters to have metal braces attached to the body. The axle assembly will not be attached to the rear and front bolster because they will be painted a different color. We are using these bolsters to determine proper axle height at this time (photo 10).

Cut four axle supports out of 1" x 6" wood and glue in place. The length of the axle supports should allow for a one foot overhang across the bolster nearest the wagon front (photo 11). Cut the rear axle assembly from the same stock and size as the front and glue the axle on top with adhesive glue. Balance the rear axle assembly on top and slide the front axle next to it to compare axle height. If the rear axle is not the same height, adjust the rear axle assembly accordingly.

Attach the U bolts to the rear axle assembly in the same manner as the front and glue the axle to the supports. Cut four axle braces from the same 3 x 5 index card stock and glue across the axle assembly to each support. Both the front and rear assembly can now be painted. If they are to be sprayed, it is best to give a brush coat first so that paint gets into the "hard to get at" places.

I hope much of this will be of some benefit to the model builder. It has been helpful to me; now I don't have to remember what I did last time!

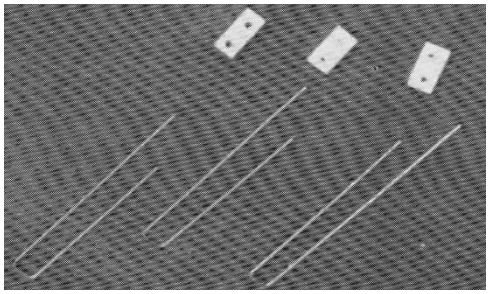

Photo 7: Drill holes into the strip before cutting to make the U bolts

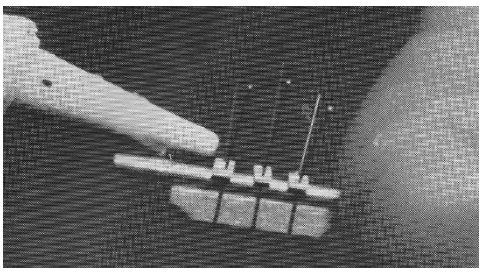

Photo 8: U bolts secure the axle bearing to the axle base.

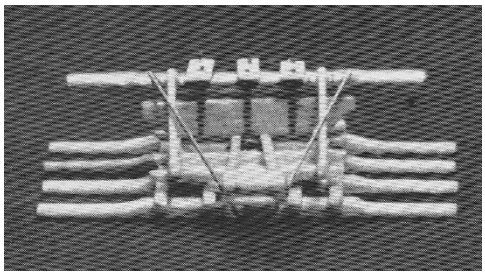

Photo 9: Axle assembly is mounted onto the 5th wheel braces with the brass wire and paper braces glued to the axle bearing.

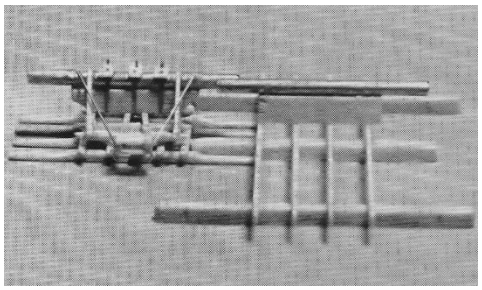

Photo 100: Use the 5th wheel assembly to gauge the height of the rear axle. Note that different wheel heights will require adjustment to this technique.

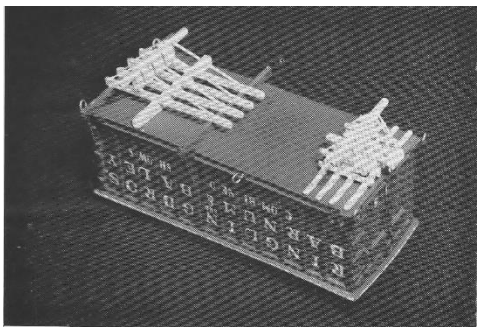

Photo 11: Axle supports perpendicular to the wagon bolster & overhangs the front most bolster by 1 foot.