Constructing an HO-Scale Animated Billboard

Article and photos by David Yadock, MMR®

I like to create structures or scenery items that catch the visitor's eye. It is always good to make a commercial scenery item more individualistic. One such item is the Walthers billboard structure kit. The kit is very easy to assemble and is quite nice looking. However, it lacks lighting for nighttime scenes and doesn't have that eye-grabbing "pizzazz" to make it a scenery standout. I had a spot in the foreground of my layout for one of these billboards, but it lacked detail to make it interesting to the layout visitor.

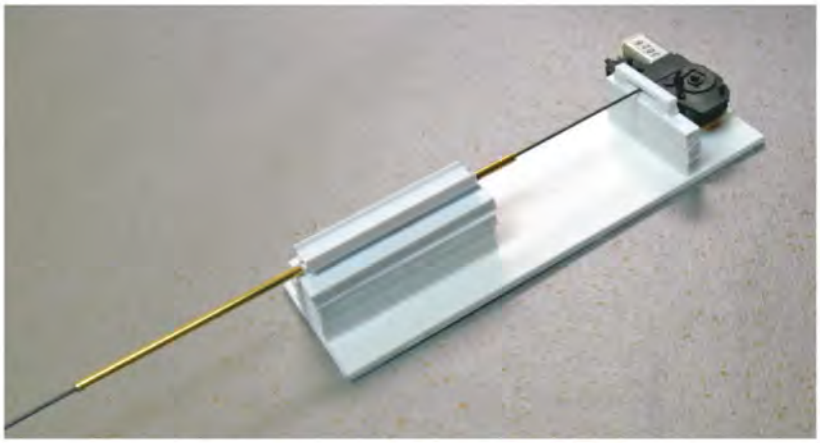
A simple way to create visual interest was to add some motion to the sign. Adding motion always gets people's attention. I chose to have a sign crew replacing the advertisement on the billboard with a new one, which involved a worker standing on the platform in front of the billboard and unrolling a portion of the new advertisement onto the sign. The interesting part is that I added movement to the worker.

The Walthers billboards come three per package, which is convenient if you feel the need to start over. Construct the billboard following the manufacturer's instructions; however, leave the simulated overhead lighting off the sign for now. I spray-painted the molded green plastic sign with a flat dark green paint to get rid of any glue marks.

Once the kit is assembled, and the paint is dry, map out how the advertisement will be placed on the sign. I color photocopied the billboard advertisements provided with the sign kit because the original cardstock advertisements will not curl very well. One of the advertisements will need to be cut into a few pieces. Standard copier paper curls nicely, which will make the portion of the ad the worker is attaching appear as if it is being unrolled and glued onto the billboard.

Here is the basic idea to obtain the motion for the sign. I added a long length

Stock Walthers billboard kit.



All this page: **The force behind the animation is this bullwheel and drive rod. The mechanism is simple and the force created is an up-and-down motion. The motor's rotation is transferred to a slow-motion wheel fitted with a drive rod, creating a motion not unlike that of a steam locomotive driver. The entire system is then packaged so the drive rod can be managed and its force directed.**

of piano wire channeled through a hole in the layout. Beneath the layout, a small motor makes the wire move up and down. This motion from the motor is transmitted up to the sign where the wire is flattened and gently pushes the curled advertisement up the sign. (It seems the worker's partner needs to add a little more glue to the back of the billboard since that section of the advertisement doesn't want to stay attached!) Making the motor assembly is quite easy but requires patience during construction. The motor I used was for my own convenience since it already had a reduction gear assembly attached as well as a bullwheel. Any simple motor with a reduction gear can be used for this project. Of course, one would need to build a small bullwheel attachment to the motor.

The sign location requires the area underneath the benchwork to be free of obstructions to accommodate the motor assembly. I built the motor assembly on 1/16-inch-thick styrene, which is thick enough for drilling holes to attach it to the underside of the layout and stable enough not to warp or wiggle when the motor is running. You only need enough styrene to hold the motor plus a 3- to 4-inch length of brass or aluminum tube attached (approximately a 2-inch by 4-inch piece will work). The tube acts as the guide to keep the piano wire straight when it penetrates the layout.

Attaching the piano wire to the motor bullwheel is accomplished by first drilling a

No. 70 hole in the middle of the cam that extends from the bullwheel on the motor. The hole only needs to be 1/8- to 3/32-inches deep. If you go too deep, your hole will extend through the bullwheel and get caught on the inside structure of the motor cam assembly. Next, obtain a 9- to 10-inch length of piano wire and carefully make a 90-degree bend at one end. The bend only needs to be 1/8-inches in length. Eventually, this will get placed in the hole drilled in the cam on the motor bullwheel.

Bill of Materials

Walthers
Billboard structure kit
Scenemaster pickup truck (modified)

Woodland Scenics
Misc. figures

Central Valley Model Works
Central Valley ladder kit (#1602)

Evergreen
Various styrene sheet and structural shapes

K&S Precision Metal
Brass tubing (#1143) and piano wire (#500)

Miscellaneous
Variable speed 3-5 volt DC motor with attached micro-reduction gearbox (easily found on eBay)

Left: **The process of aligning the rod mechanism with the physical billboard is crucial to smooth operation of the animation. To look good on your layout, the billboard should also sit true and level.**

scrap styrene, I fashioned a guide near the motor to keep the piano wire attached to the bullwheel cam. I made a slot the thickness of the wire, which is where the flexing wire will be contained while the bullwheel is in motion. Test the motor with the piano wire attached to the cam to ensure the slot is wide enough to accommodate the flex in the wire. Again, be careful to make sure everything lines up properly to avoid any binding. Applying power to the motor will ensure the wire shaft and guide tubing are lined up; it will also check for any shaft binding. When everything is tested, and all the glue is dry, you now have completed most of the motor assembly.

Drill a small 1/8-inch-diameter hole in the scenery. The piano wire with the brass tube shaft will protrude out of this hole and creates the final guide for placing the billboard. Make sure the face of the billboard is about 1/4- to 3/8-inches in front of the hole. Carefully mark the

I added some thin styrene motor mounts to the 1/16-inch-thick styrene base. Glue the motor to those mounts with Walthers Goo. Let the glue dry thoroughly. Solder some leads to the motor and test it to make sure it runs properly. I added some styrene scrap to the upper portion of the base. Using trial and error, I stacked several styrene scraps to build up the height, so the brass tube is level with the motor cam on the bullwheel. You can test the height by sliding the piano wire into the brass tube and fitting the 90-degree bend into the cam hole. From the side, you can see if the wire is parallel with the motor bullwheel cam. Once at the correct height, glue the brass tube to the stacked styrene using Walthers Goo. Leave some space between the motor and end of the brass tube so that the piano wire has room to "flex" when the bullwheel is rotated. If there is not enough flexing room, the piano wire will bind.

I then stabilized the brass tube by gluing some styrene channel to each side. Once that was dry, I glued a piece of styrene to the top of the channels. Using

Right: **A pair of bends are needed to align the rod through the billboard walkway and into the rolled artwork on the front of the billboard. I used some blocking to raise the billboard to the correct height.**

Top: **The billboard paper needs to have enough give to provide the distance the rod travels. A little experimentation may be needed to ensure enough material is rolled. Notice the rod and its "z" shape sticking up from the benchwork.**

locations for the billboard frame legs and trim as necessary to make it level. Remember to have the motor assembly parallel with the billboard face. You can now glue the billboard to the layout. Let this dry before proceeding. Make any adjustments before gluing the billboard to the layout.

Once dry, you can proceed with attaching the motor assembly underneath the layout. I chose to mount the assembly to a piece of aluminum metal angle for maximum adjustment capability. The

Above: **I used rubber cement to affix the paper billboard artwork to the plastic billboard. Notice the hole cut in the walkway below the rolled section of the billboard.**

assembly can also be removed quickly during display construction as detailed in the next paragraph. Apply some power to the motor to move the cam so that it is aligned to be closest to the layout surface (12 o'clock), which will be the high point of the worker with his brush applying the sign. Make a mark on the wire with a felt pen by the base of the billboard. Then apply some power to the motor until the cam is at the farthest point from the layout surface (6 o'clock). As before, make a mark on the piano wire by the base of the billboard. The distance between the two marks on the wire represents the travel distance the worker will be "pushing" his brush up and down. Measure this distance traveled and record it — you will need it later.

The first mark made on the wire represents the high point of travel. Make a 90-degree bend perpendicular to the face of the billboard at that mark. The next bend will be made where a No. 70 hole will be drilled into the platform of the billboard. I drilled the hole between the first and second board in the platform. (See the photo for the location.) You will need to remove the motor assembly from the layout to make this second bend in the wire. Once the wire is bent, thread it through the hole in the platform. Next, determine the height of the brush the worker will use and add the travel distance recorded earlier to this measurement. This sum is the approximate amount of wire needed. Add a little more length when doing this calculation so that a "T" bend can be made at the end of the wire; about an additional 3/16-inch will do.

I used one of the several advertisements provided with the Walthers kit. I then measured where I was going to position the worker hanging the new ad. The worker figure needs to be close to the hole where the piano wire comes through the platform. I figured each roll of advertise-

ment is around three to four feet long. A portion of the new ad is installed with the rest of the billboard looking like it is being prepped. The completed section of the advertisement is rubber-cemented to the billboard front. The prepped area is some weathered-looking photocopier paper, also rubber-cemented to the billboard front.

For the "active" portion of the ad, I first tightly curled the advertisement and put rubber cement about halfway up the curl. I then added rubber cement to the billboard front, where that portion of the curl would be attached. The rest of the curl will be free of any cement and be allowed to drape over the piano wire "arm" where the "T" bend is located.

When all the glue is dry, the power can be applied to the motor to allow the piano wire brush to push the curl up toward the top of the billboard. Once this is determined to work without any problems, glue the worker in front of the piano wire. When attaching the worker to the platform, make sure to have his raised arm located next to the piano wire. My Woodland Scenics worker has an outstretched arm to further provide for the illusion. Some light brown paint can be applied to the upper portion of the piano wire to represent the wooden implement the worker is using. I left the rest gray/black so that it would blend in and not be noticed.

I cut the rest of the advertisement into four-foot-long sections. I then tightly rolled them up and placed those rolls together with a scale bucket next to the worker. Those rolls represent the next portions of the advertisement to be attached to the billboard. I added a second worker on a ladder to look like he is smoothing the completed billboard section.

I then added some overhead lighting to the sign. Three HO-scale barn lights were attached to the top of the billboard. The wires to power them were slipped down the back of the billboard.

Strategically placed shrubs can hide the location of the piano wire. Another option is to add some scale lattice or horizontal strips to the front of the sign. Adding ground cover around the sign and the worker's small pickup truck or vehicle completes the eye-catching scene.