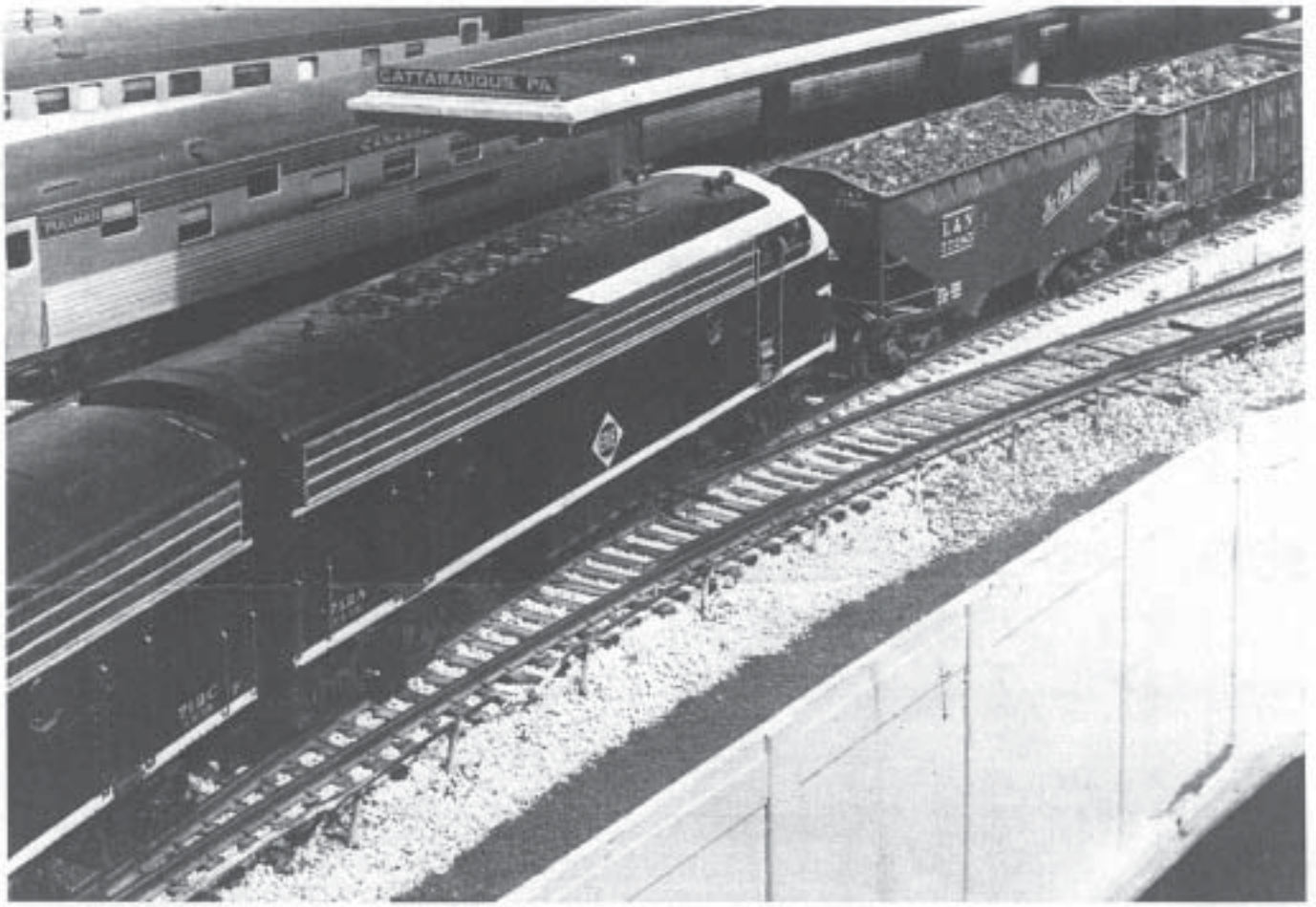


Erie E7's on a westbound coal drag pass through the Canandaigua Southern passenger station as they leave Cattaraugus, bound for Pittsburgh. Some quick modification to the Atlas truck-mounting arrangement allows them to exert full tractive force while at the same time keeping all wheels firmly on the rail as they maneuver the curves and 3.5 percent grades they face on the journey ahead.

Sure feet for the Atlas O scale F9

Changing couplers from truck- to body-mounted and a simple bolster lowering job greatly improves multiunit operation

BY JOHN ARMSTRONG

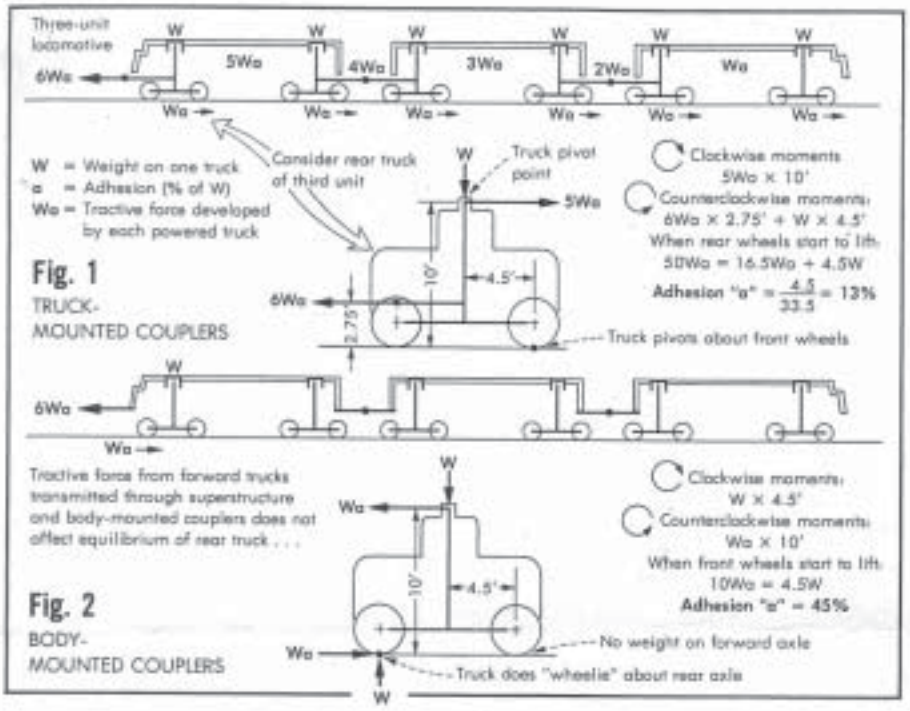
THE Atlas O scale EMD F9 diesel is an exceptionally smooth-running machine which will creep along at 2 or 3 scale m.p.h. equipped as it comes right out of the box. At its price, it's natural to have more than one and run them in multiple. With all units pulling with all eight wheels—they don't come nonpowered—difficulty with the truck-mounted couplers becomes apparent. When developing only a part of the tractive force of which the motor, drive, and engine weight should be capable, the trucks on the rear unit experience such a weight transfer as to lift one axle and invite derailment, a tipping action.

Fig. 1 shows how the path of the tipping force through the coupled units unbalances the fore and aft equilibrium of the top-pivoted trucks. Adding weight to each unit will increase the usable tractive force in proportion, but, as the equations show, the proportion of the engine weight that can be translated into tractive force will stay the same. For the three-unit lashup, it's only 13 percent of the weight on drivers when the tipping starts—while I find on my Canandaigua Southern (dirty steel rail) that 50 percent adhesion is quite normal between wheel and rail.

As fig. 2 shows, the multiple-unit problem is taken care of by mounting the couplers on the body (actually, of course, on the underframe) instead of on the trucks. Each truck then acts independently in contributing its force to the whole locomotive, and you can add units until the breaker pops or the railroad begins to look too short for such an assemblage of motive power. However, that high truck pivot point still limits adhesion to 45 percent at the point where all weight has left the front axles and each truck does a "wheelie." At this point, particularly on any sort of a curve, you're ripe for a derailment. Again, adding weight to the unit (which can be done to some extent without hazard to the husky 1.5-ampere motor in the Atlas F9) increases the tractive force but doesn't get rid of the tendency to tip. Since we seem to be constitutionally unable to avoid loading engines down to the limit from time to time, derailments of my Erie F7 A-B-A set* in pusher service on the CSRR were a problem for all but the most skillful enginemen. Even the most conscientious eagle-eye could find himself on the ground if the engine on the point should momentarily lose power.

After a typical period of contemplation with regard to doing something about the matter (about 2 years in this case), I undertook the project of lowering the effective kingpin location on

*They started out as C&O F9's, but were mildly kitbashed into fair representations of late-model F7's like Erie no. 712, delivered in 1952 with F9-style grille. No mechanical changes have been made in the stock units, nor has any weight been added.



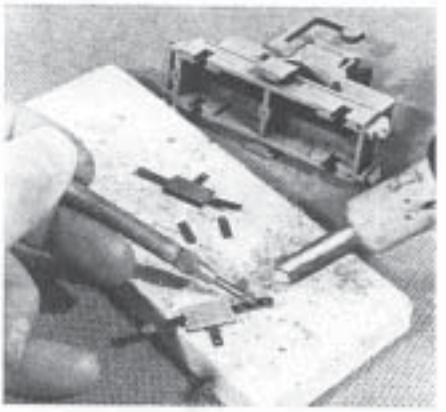


Fig. 3. Soldering wear pieces to the outer two thirds of the .003" spring-brass wipers keeps light contact pressure on the back face of the wheels and adds years to wiper life.

my F's. Since this turned out to be an easier job than anticipated, I'd like to share my experience.

The following step-by-step instructions and the accompanying photos pretty much tell the story. In the process, I heavied-up the wheel wipers: they're made of .003" stock and were showing wear. The bolster lowering job, which uses about 23 cents' worth of material per unit, was completely effective in converting the covered wagons into surefooted beasts that can now slip their wheels in helper service anywhere on the hill without lifting a flange over the railhead.

Perhaps some of the challenge has gone out of things for the engineer on the pusher, but the dispatcher really appreciates being able to allow a full 19 loads of coal for the A-B-A's contribution to moving tonnage from Cattaraugus to Aikenbach without worrying about a likely call for the rerailing crew.

Steps to follow

Detach the electrical leads from the chassis wiring. Unsnap the truck from the underframe arch and separate it from the chassis. Remove the truck—this will disconnect the drive shaft—and discard the eyelet at the truck pivot point.

Next, remove the bottom coverplate (four screws) and lift out the two wheelsets. Grease will usually hold the four journal-box springs in their holes in the main gearbox, but it's best to remove them and put them where they won't be lost. If you haven't already changed couplers from truck mounting to body (chassis) mounting, slide off the coupler pocket from its attachment to the truck and discard it.

Unsnap the sideframe assemblies from the truck transoms and slide them off their brackets on the gearbox.

Unsolder the lead wires from the wheel wipers. This will allow the plastic wiper retainers to slide out of their mounting on the gearbox. For heavy service, it's advisable to add wear pieces to the wipers, as shown in fig. 3. The ones shown were made by putting a dimple in a piece of .006" phosphor bronze weather strip material with a blunt center punch.

Next, unsnap the plastic C-shaped clamp above the worm shaft. Release the prongs holding the side coverplate to the gearbox by pressing toward the center of the truck, and remove the coverplate.

The three spur gears should be removed next. Do not disturb the worm shaft, however. It can remain in place throughout the operation.

Drill a .097" (no. 42) hole completely through the "septum" in the center of the truck, to enlarge the existing screw hole. Cut threads, using a 4-40 tap to a depth of about ¼" (fig. 4), or use a no. 4 self-tapping screw in reassembly (covered later).

Cut 3/16" x 3/8" oblong holes through the gearbox and side coverplate. The holes should be at the center line of the truck and tangent to the bottom flanges, as shown in fig. 5. Start by drilling two adjacent 3/16" holes; then carve the holes to shape with a pointed-end modeler's knife. Be careful of the L-shaped brackets on the gearbox which hold the wipers and sideframes—they are fragile when these parts are not in place.

Next, make the bolster in accordance with fig. 6.

Tap the existing holes in the under-

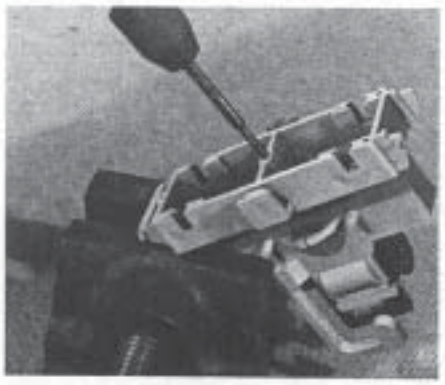


Fig. 4. Using a 4-40 tap, cut threads in the .097" hole in the center crossmember of the one-piece truck-frame/gearbox to a depth of ¼". The top portion of the hole becomes the new kingpin pivot point for the truck.

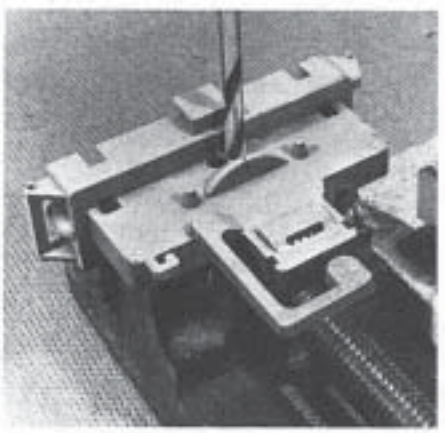


Fig. 5. Drill holes in the gearbox and matching side cover plate; then cut them to an oblong shape. These are for the new bolster.

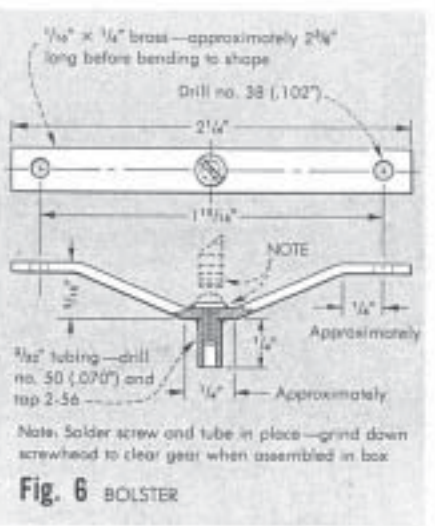


Fig. 6 BOLSTER

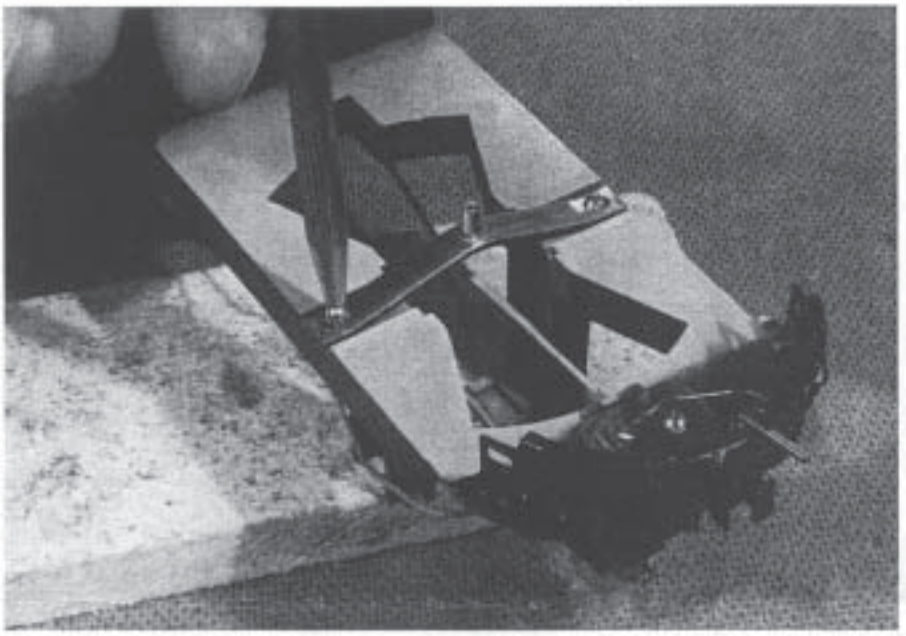


Fig. 7. For some unknown reason, the underframe already has a molded groove and screw holes that are exactly where they should be in order to mount the new brass bolster properly. It is a good idea to check the fit of the bolster before assembling it into the truck.

frame with a 2-56 tap to receive the bolster mounting screws. Check the fit of the bolster, and enlarge or elongate the holes in the bolster if necessary—a close fit is not important. See fig. 7.

Put a stack of washers totaling approximately .075" in thickness on the kingpin of the new bolster. Insert the bolster through the oblong hole in the gearbox, and insert the pin into the hole you drilled in the septum.

Reinstall the three spur gears on their stub shafts in the gearbox. Check that the bolster cannot interfere with the gears as it swings or pivots. Snap the side coverplate in place on the gearbox after impaling it on the free end of the bolster. The bolster is now captivated.

Next, reinstall the C clamp above the worm shaft, and reinstall the wiper assemblies by sliding their retainers under the gearbox brackets. Solder the wires onto their tabs; then snap them into the retaining notches in the gearbox, with a loop to clear the bolster, as shown in fig. 8. Bend the tabs outward to clear the bolster and avoid any possibility of shorting against it.

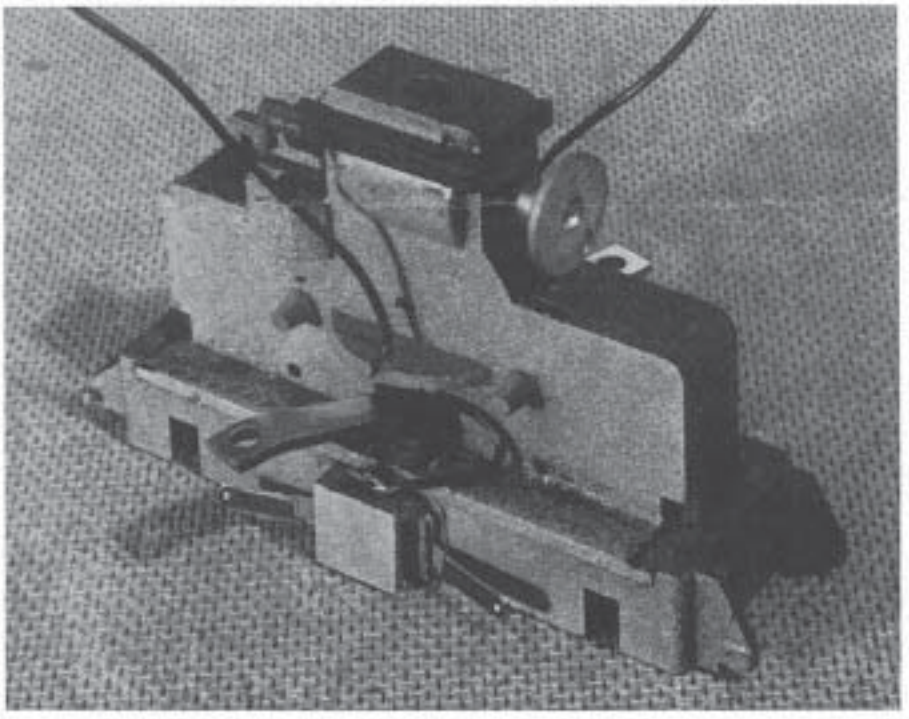


Fig. 8. The only possible short circuit in the system is between the bolster and the tab on the wheel wiper. There is plenty of clearance if you simply remember to bend the tab downward to keep the soldered connection well below the bolster as the truck rocks on the kingpin.

At this point, there is some difference in procedure in handling the two trucks of the locomotive unit. On one truck, which can arbitrarily be designated as the "R" truck (for "rear" or "rigid"), the pivot prong on the underframe arch above the truck (which engages the eyelet above the worm shaft in the original assembly) should be left in place to keep the body from rocking excessively. However, to let the truck pivot a bit in the fore and aft direction to accommodate itself to vertical curves in the track, carve the prong into an oval shape by slicing off material on the front and rear as shown in fig. 9. Use a sharp wood chisel or modeler's square-end knife blade.

On the other truck ("F" for "front" or "floppy"), completely cut off the prong and the integral plastic spring fingers on the truck. This allows for free rocking motion and creates a desirable three-point suspension of the locomotive unit as a whole, which lets it negotiate warped track and superelevated curves readily but avoids wobbling on level track.

Next, reinstall the truck into the underframe. Remember to have the driveshaft end pointing toward the motor. If you forget to insert the drive shaft into the universal joint in the process, you don't have to start over—the universals will readily snap apart to let you connect things up after the truck is fastened in place.

Screw the bolster in place on the underframe with 2-56 screws. Use washers if necessary to provide a little clearance between the underframe arch and the top of the truck gearbox—about 1/32" is right.

Slide and snap the sideframes into place. Reinsert the journal-box springs, and reinstall the wheelsets. Be sure that the wheel wipers are inside the wheels and that the wipers are bearing on the wheels properly.

Drill out the center hole in the bottom coverplate to clear a 4-40 (no. 31) screw and reinstall it with a short no. 4 screw instead of the original.

Finally, reconnect the wires to the motor leads and the other wiring in the unit as appropriate.

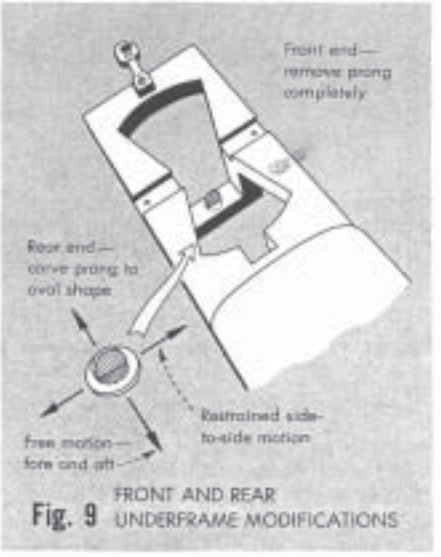


Fig. 9 FRONT AND REAR UNDERFRAME MODIFICATIONS