

## 0Instructions for the M.L.W. Services S Scale CNR Steel 8 Hatch Freight Refrigerator Car Series 2 - 6

Finally! Whew! This kit has been a long process. There are three versions being offered. The first is Series one. The second covers Series 2, 3 & 4. The last version is of Series 5 and 6. Each series is somewhat distinct from the other but shares similar construction techniques. We will refer to which details apply specifically to which Series throughout the course of the construction. A Series 1 kit has a potential for at least 6 versions and 4 versions of paint schemes depending on era.

First, I would like to thank the following people for helping in the creation of this kit. Stafford Swain/Ken Goslett for all the information in their RMC article, Jim Parker for use of his photos, Jim King for the initial pattern work, Bill Lane for his additional pattern work, Chris Creighton for his pattern work and casting, Al Ferguson for the decals, Darren Altbaum for use of the True Line Trains charcoal heater drawings, Ron Sebastian of Des Plaines Hobbies for the 8 rung ladders and for permission to use the PRS parts as patterns, Don Thompson of SHS for the trucks and couplers, Silver Fox Productions, Dan Waske for his compilation of research articles and my wife, Terry for her patience and support

And thanks most of all for the people who were patient in waiting to buy this kit.

After great thought and a false start, it was decided that this kit would be more flexible if it were a flat kit. That way more than one version could be represented. As a result many changes were made to the original pattern work. It is hoped that you find this kit pleasing and accurate enough to build to try more M.L.W. Services products.

Please note that the majority of measurements are in *Scale inches*. Usually we use the words *full size* to denote where the instructions deviate from this practice.

You can optionally make working roof hatches. This is up to the modeller. Please read that section before trying to accomplish this feature. It is time consuming and tedious. However, if you want to make the hatches work, be aware that they are not very robust.

Finally, you will note that some of the construction photos may show adjacent bits that appear to have been attached out of the sequence of instructions. That's because the photos were taken from a number of pilot models during their various stages of construction. Simply concentrate on the instructions and don't worry that you missed something.

Cheers,

Andy Malette, Owner, M.L.W. Services

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## Index

Introduction	Page 1
Index	Page 2
Contents	Page 3
Grandt Line Ajax Brake System Diagram	Page 4
The Underframe	Page 5
The Body	Page 21
The Roof	Page 29
The Body Continued	Page 30
Roof Hatches	Page 33
Grab Irons and Ladders	Page 38
The Running Boards - Wood	Page 44
The Running Boards – Steel	Page 47
The Ends	Page 50
The Underframe Part 2	Page 60
Last Details	Page 64
Painting Instructions	Page 67
Appendix One – Series Detail Information	Page 69

## Contents

In your kit you should find the following...

Instructions on CD

Resin Castings for the Body, Underframe and Various Details

S Helper Service Trucks

S Helper Service Couplers

Des Plaines Hobbies 8 Rung ladders

Black Cat Decals or CDS Dry Transfers

6 cast brass grab irons

2 cast brass end stirrup steps

8 Pewter Castings for the Hatch Latches

4 Pewter Castings for the Lateral Running Board Supports

One Grandt Line S Scale Ajax Brake Set

One piece each of 0.012", 0.014", 0.020" and 0.032" brass rod

Two pieces of 0.040" strip plastic

Piece of 0.030" x 0.030" strip plastic

One sheet of 0.008" etchings

T-Pin

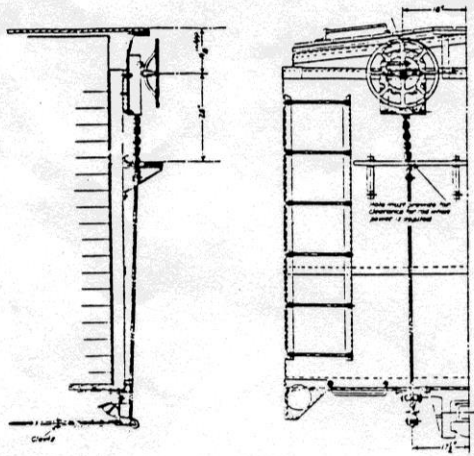
Etching Map

Grandt Line Westinghouse Ajax Brake Set Instructions (next page on CD)

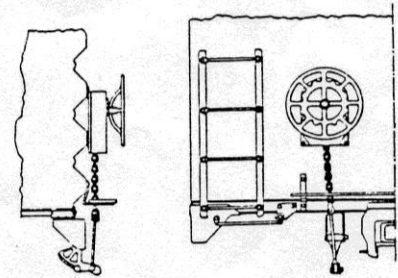
3 Tichy S Scale 18" straight grab irons

## Things you'll most likely need to build this kit.

- S Scale Ruler or even better a dial caliper in 1/64<sup>th</sup> of an inch.
- Pin vise.
- 0.032", 0.034", 0.020", 0.016", 0.012" drill bits
- Cyanoacrylate, sometimes called ACC or crazy glue
- Low temp melting solder
- CNR Red No11 Paint
- CNR Grey No11 Paint
- Straight edge razor blades
- XACTO® No. 11 Classic Fine Point blades
- XACTO® No. 17 Light Weight Chiseling Blade or Micro Mark 4mm Plastic Modeller's Chisel – Item 08093 is even better.
- Ultra-Fine Retractable Sharpie for marking
- Isopropyl Alcohol for removing the markings.
- Q-Tips
- Auto Body Glaze Putty or Squadron white/green putty
- Fine tipped soldering iron

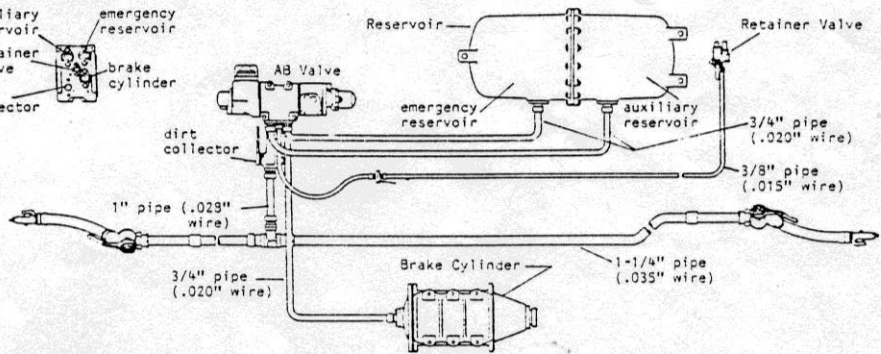
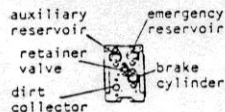


Typical Application c. 1935



Typical Application c. 1980

View of AB Valve  
Pipe Bracket



Piping Diagram

SCALE  
16  
3  
S

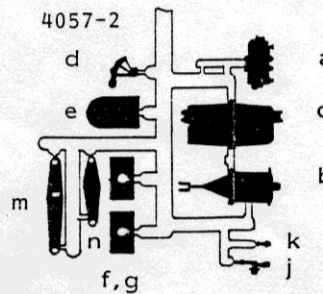
Westinghouse  
AB Brake Set

4057

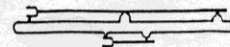


PARTS IDENTIFICATION

- 4057-1 Brake wheel
- 4057-2a AB Valve
- b Brake cylinder
- c Reservoir
- d Bell crank
- e Ajax brake gear housing
- f Cylinder mounting bracket
- g Reservoir mounting bracket
- h Brake lever
- j Retainer valve
- k Dirt collector
- m Brake lever
- 4057-3a Brake rod--long
- b Brake rod--short
- 4057-4 Chain



4057-3



4057-1

*Grandt Line*

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## The Underframe

### *The Brake Pipe*

1. Drill out the connections in the Air Reservoir, the Rear of the Brake Cylinder and the AB Valve using a 0.021" drill bit. Drill a 0.024" hole for the dirt collector in the upper left hole of the AB Valve.
2. Find the centre of the centre sill on the underframe casting and make a mark between the two main crossies. It should be about 41" from the edge of the crosstie. See Figure U1

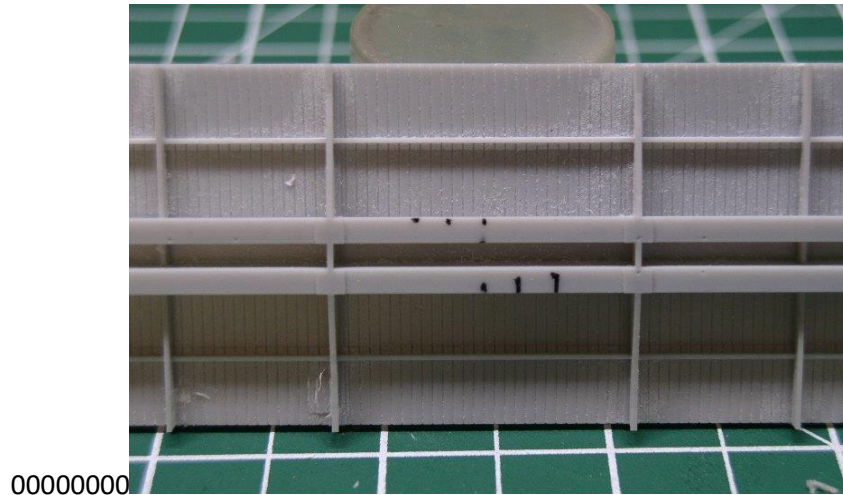


Figure U1

3. The slots for the brake pipe should start  $8 \frac{1}{4}$ " from the centre and are  $11 \frac{1}{2}$ " long  $7$ " from the floor. Looking at the right side of each side of the Centre sill, draw a line where these slots should go. See Figure U2.

0

Figure U2

Do either 4 or 4a.

4. Push the T-Pin into the Centre Sill along the lines you have made for the slots to make indents to help you drill. Use a 0.034" drill in a pin vise to drill out holes along those lines. Slow work with a hand held pin vice works for us. We twist the drill first to get the hole started in the right place. Carve out the remaining material between the holes with an XACTO® No. 11 Classic Fine Point blade to create the slots. See Figure U3.

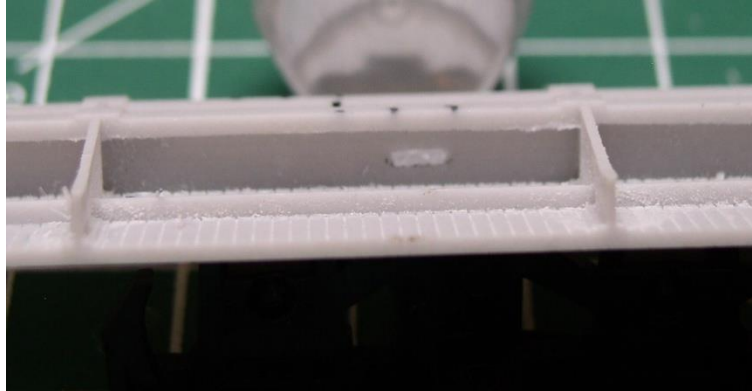


Figure U3

Measure and mark a spot on the top each cross beam and bolster 14" from the centre of the centre sill on the lower right and the upper left sides of the underframe. Now mark a spot 6  $\frac{3}{4}$ " from the floor in line with the 14" from centre spot you have just marked on those same cross beams and bolsters. Where marked, drill holes in the side of the cross beams and bolsters using a 0.34" drill. See Figure U-4-a. Use the same technique as above for starting the drill.

*OR*

4. (a) Measure and mark a spot on the top each cross beam and bolster 14" from the centre of the centre sill on the lower right and the upper left sides of the underframe. Now mark a spot 5  $\frac{3}{4}$ " from the floor in line with the 14" from centre spot you have just marked on those main cross beams and bolsters. Heat the tip of the T-Pin with either a soldering iron or handheld blowtorch and where marked, push through holes in the side of the main cross beams and bolsters. Clean out the holes using a 0.34" drill. See Figure U-4-a



Figure U-4-a

5. Bend the 0.032" brass rods about 5/8" from one end to a 25° angle. If all works as hoped, you should be able to carefully slide the brass rods into the holes in the crossbeams and the bolster and push the angled ends into the slots so they meet. Note that the rod goes over the smaller crossties. Leave about a full size 1/16" overlapping the underframe at the ends. If the holes or slots are not aligned enough you can carefully heat the brass rod 00 to the offending hole and adjust it as the resin softens. Don't overdo the heat or you will have a larger hole than you need. See Figure U5. See Figure U8a to see the whole Brake Pipe.

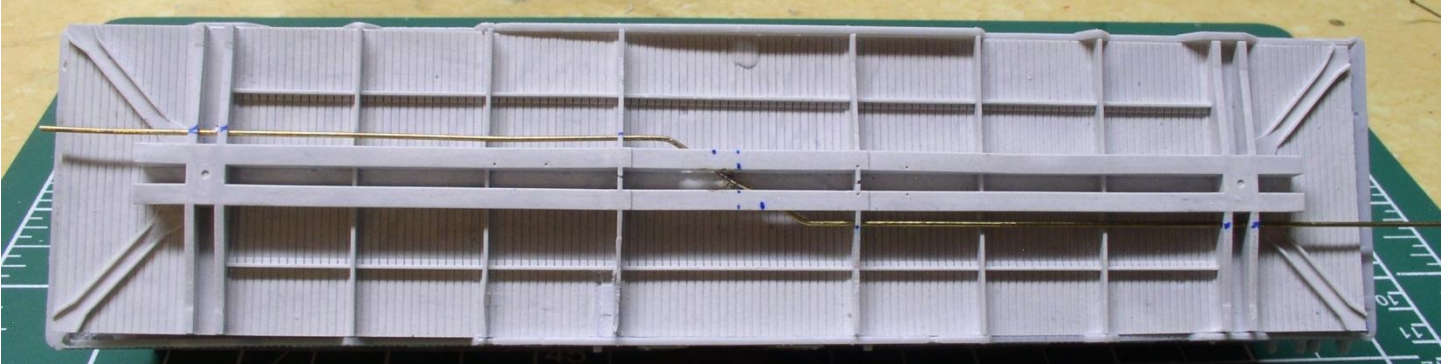


Figure U5

6. We use a fine tip soldering iron to solder the ends of the rods together in the middle of the centre sill. Alternately, you could try ACC to hold the line pieces in place.

#### *The Brake System*

7. Series 2 and up cars were built starting in 1941 had the brake system laid out similar to Series 13 and onward of the CNR steel 10' IH boxcars. The reservoir was set parallel to the centre sill across from the AB valve which is the typical setup. Make a mark 36" from the centre of the centre sill and 26" to the left of the left cross bearer on one side of the under frame. This will be where the centre of the Air Reservoir goes. Drill a 0.034" hole in the floor where the mark is. Glue the base of the reservoir centred over the hole. CNR did not really use this but it makes installation of the reservoir easier and stronger. See Figures U6 and U7.

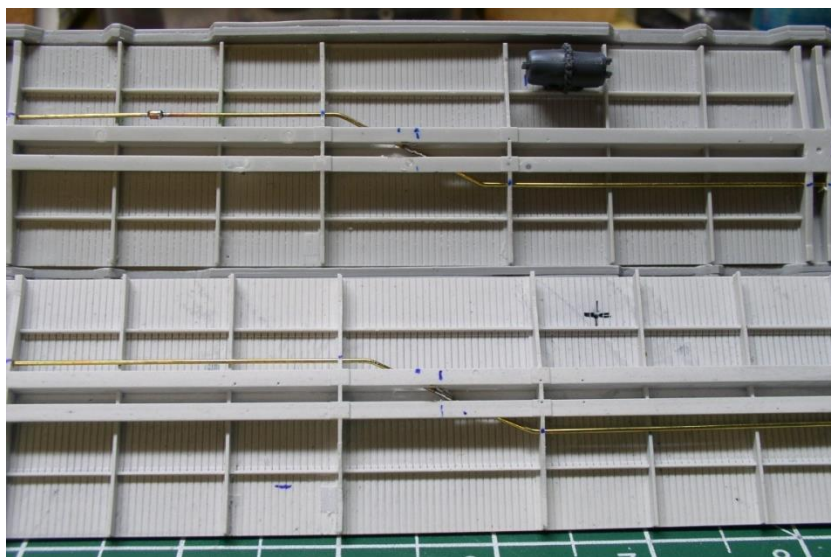


Figure U6



Figure U7

8. Attach the reservoir with the Emergency half towards the Centre Sill and the Auxiliary half towards the edge of the car. According to CNR plan 8H-20493-H, the Emergency has two lugs and the Auxiliary only one. The Grandt Line sheet has this reversed. See Figure U8

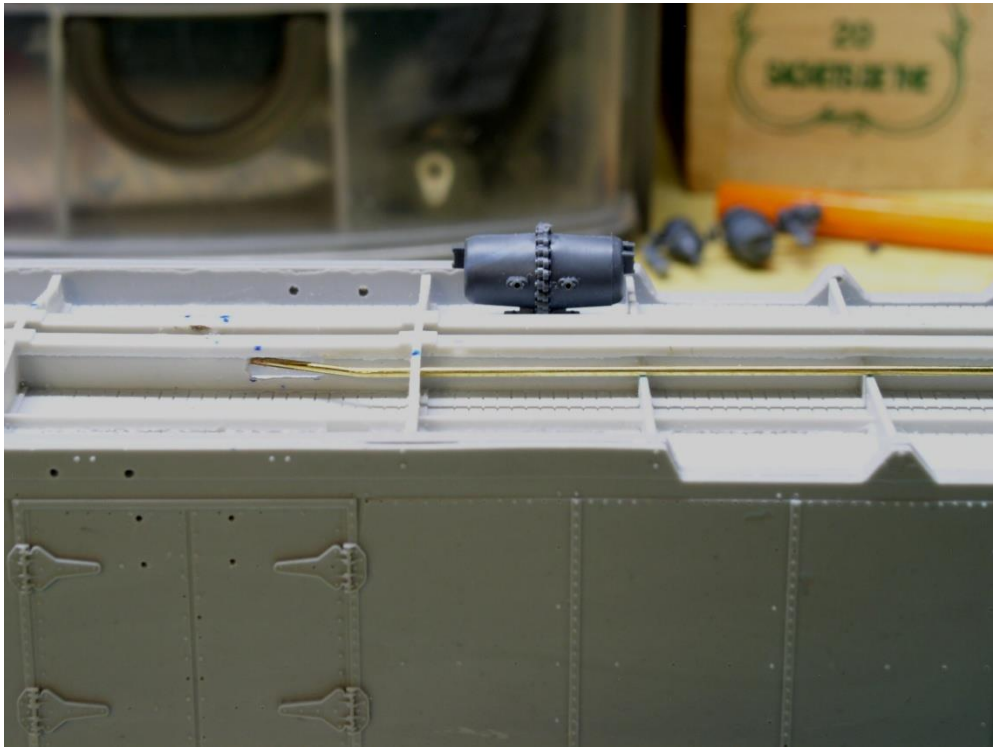


Figure U8

9. Refer to the Etching map and detach the shorter Brake Reservoir Front Bracket and the Brake Reservoir Rear Bracket from the Etch Fret. Using the two etch lines as guides, bend the Front Bracket legs into a 'V' shape. Bend the two little feet on the ends outward so that the etched bolt heads are facing up. Place the vortex over the single lug of the Auxiliary reservoir and glue in place. Bend the top of the Rear Bracket forward and the bottom backward to form a kind of straight 'Z' and attach to the underside of the lip of the centre sill and over the two lugs of the Emergency half. See Figure U9 and U9a.

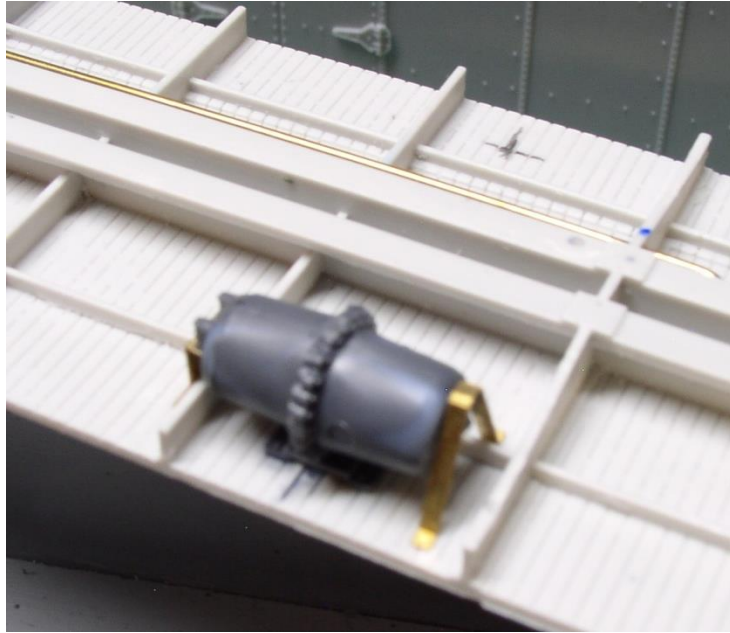


Figure U9

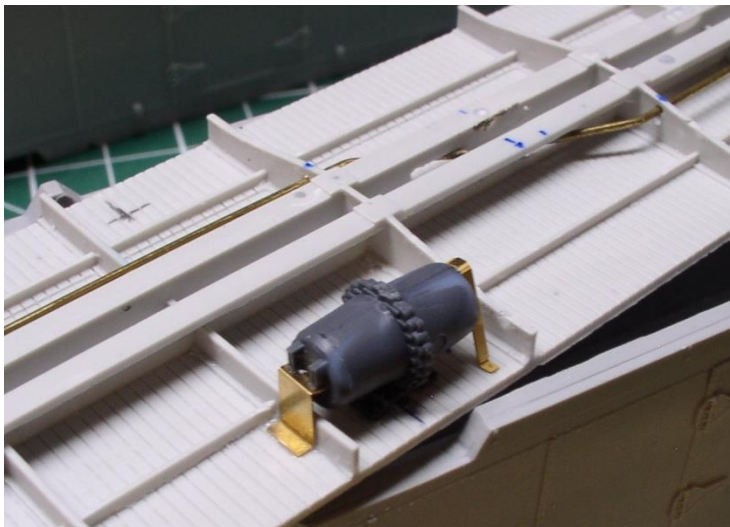


Figure U9a

10. Measure 2' 7 3/4" from the main cross bearer right across from the Brake Reservoir and mark. Then measure 3' 3 11/16" from the centre of the centre sill and make a mark. See Figure U10a. This is where the centre of AB valve bracket will go. You can use the shield if you are modelling after 1945. Cut out the Triple Valve Bracket from the Etch Fret. Cut off the short leg at the long end. On either side of the etched out section you will now have a long part and a short part. Bend the short part 90 where the etch line is to form the front leg. Bend the longer piece in the same direction but only about 30 degrees and form a bit of a leg. See Figure U10b for the formed bracket. If you are adding the shield, do it now. See Figure 10c for the formed bracket with the shield. The reefers in these series were not built with the shield. It was added later. Glue the bracket in place centred on the mark you made. See Figure U10d. Glue the AB valve to the bracket with the connections pointing toward the Centre Sill. See Figure U10e.

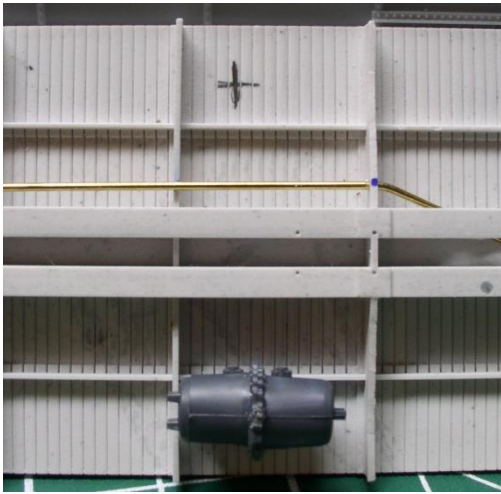


Figure 10a

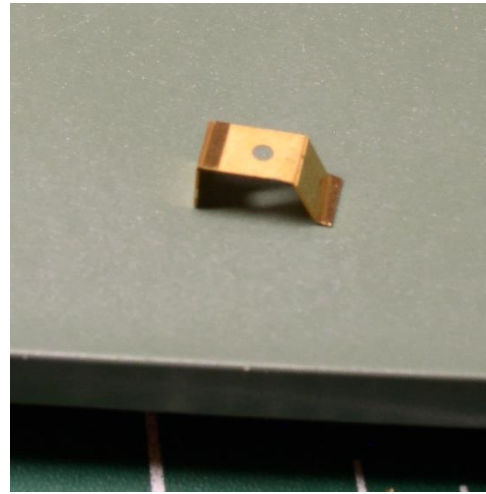


Figure 10b

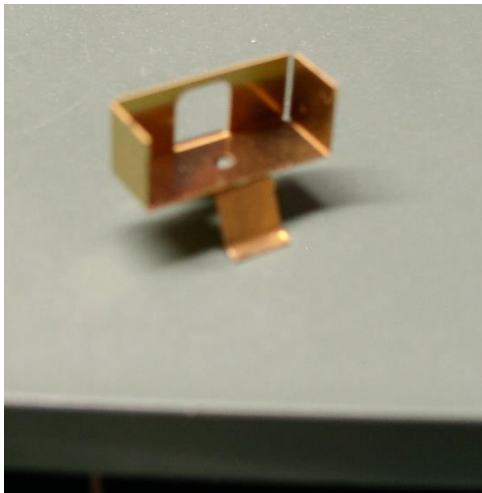


Figure 10c

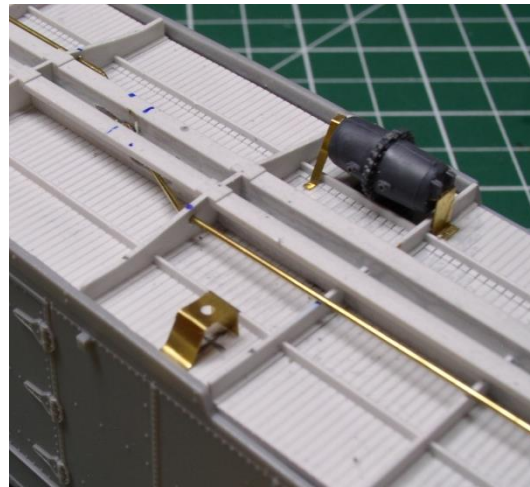


Figure 10d

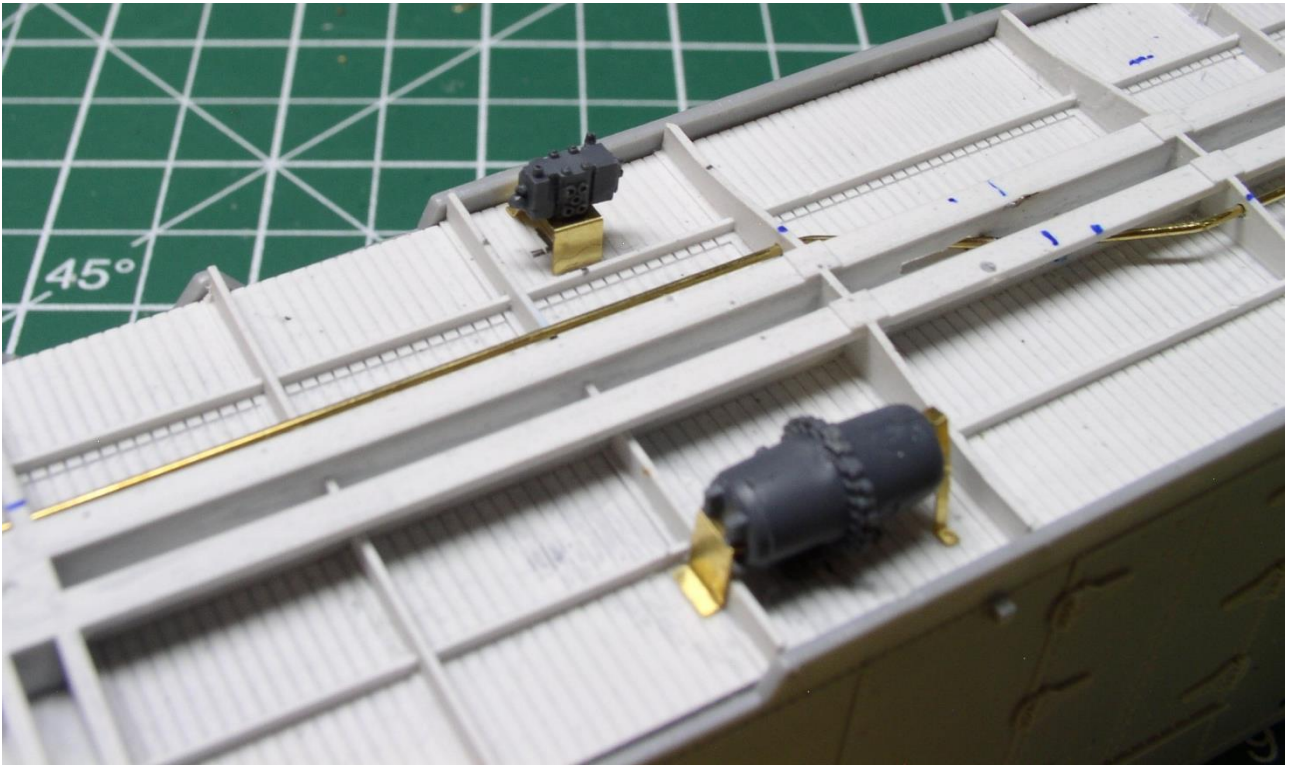


Figure U10e

11. Glue the Bottom Cover Plates of the two Cross Bearers on the Cross Bearers. Please look at the underframe. There are two sets of dimples for the Brake Lever hangers on the top of the Centre Sill found outside of the two central Cross Beams. Please ignore these. *(You may find that some do match though.)* They don't work for Series 1. Instead, mark two spots on both sides of the Bottom Cover Plates that are 24" inches from each other. Note there is only one pair across from the AB Valve. See Figure U11.

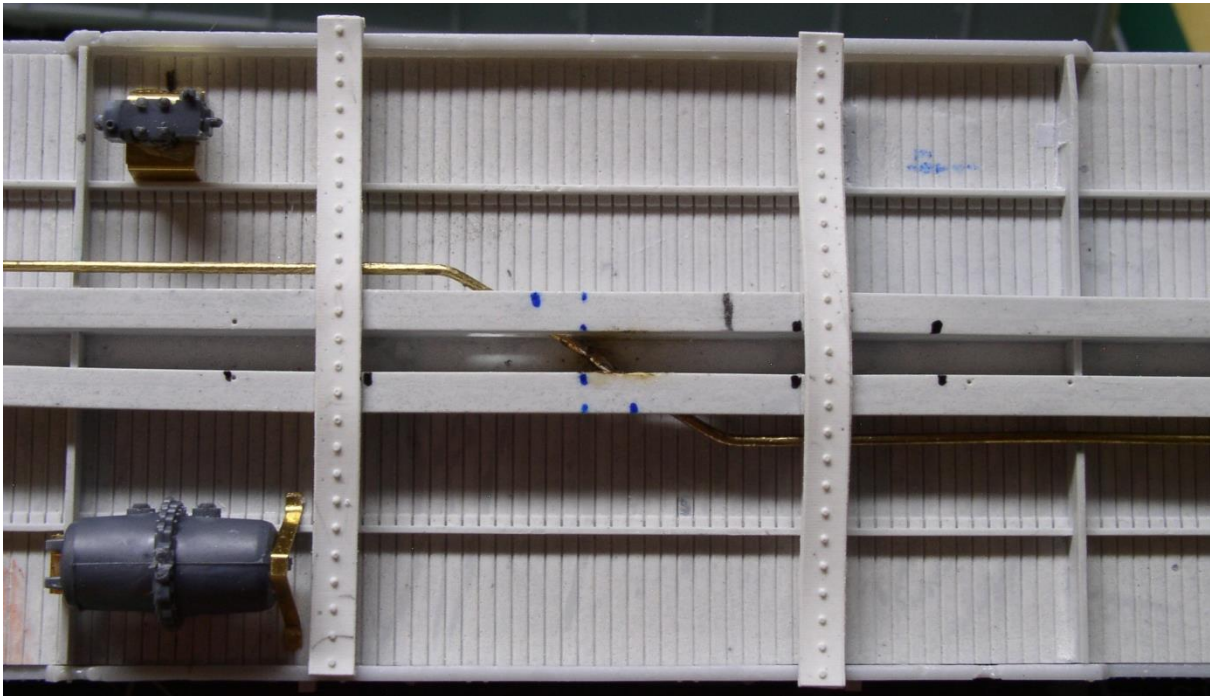


Figure U11

12. Measure 23 ½" from the centre, left of the Brake Reservoir and mark. This is where the brake cylinder will go. Fold the brake cylinder bracket 90° and glue the short folded part under the lip of the centre sill with the hole lined up with the mark. See Figure U12 and Figure U12a.

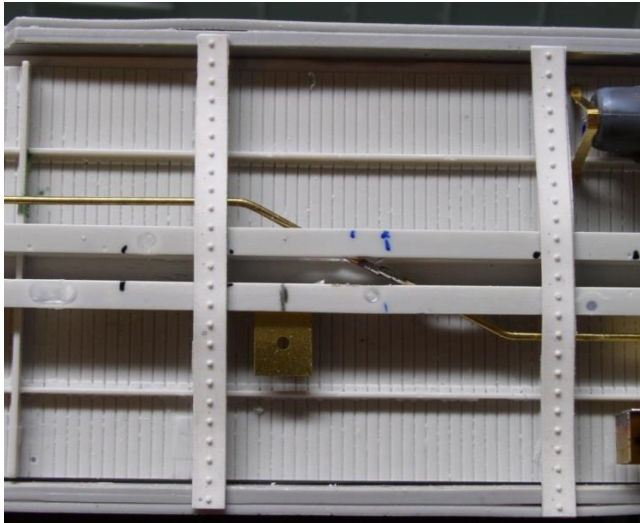


Figure 12

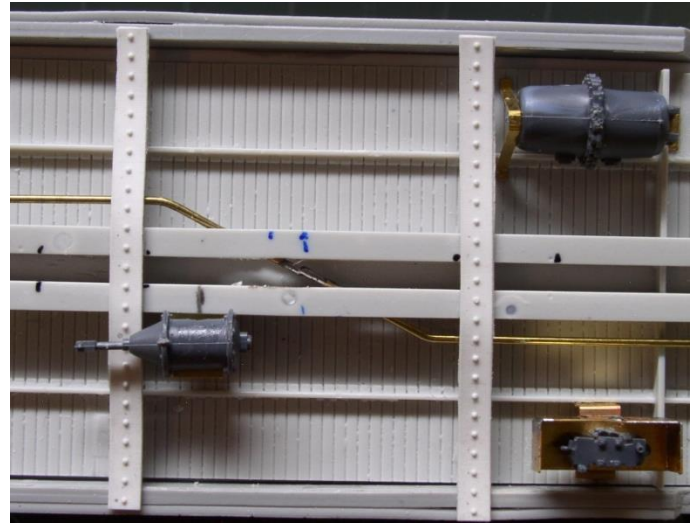


Figure 12a

13. Carefully drill 0.020" holes in the top of the Centre Sill where you have marked to allow installation of the Brake Lever Hangers on the double set. Form the Hangers from 0.020" wire. The legs of the hangers should have about a 20° sideways bend, if you desire. If angled, install with the angle away from the Sill otherwise have them sit between 8 and 9 " proud of the top of the Sill. See Figure U13.

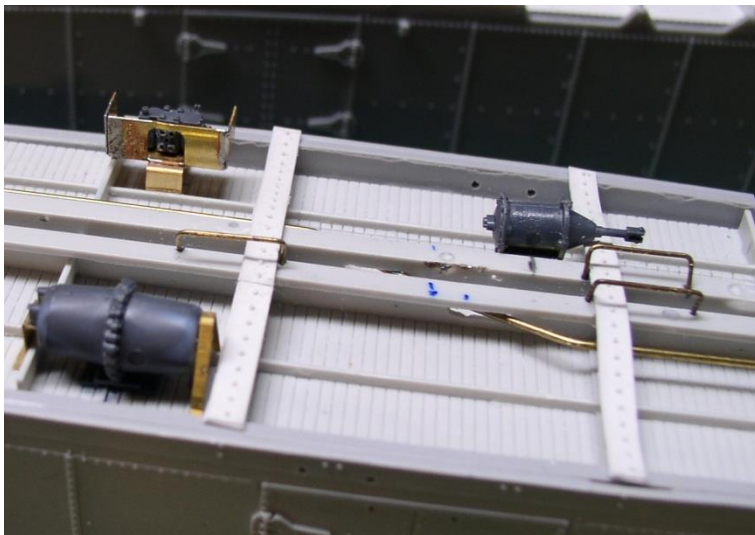


Figure U13

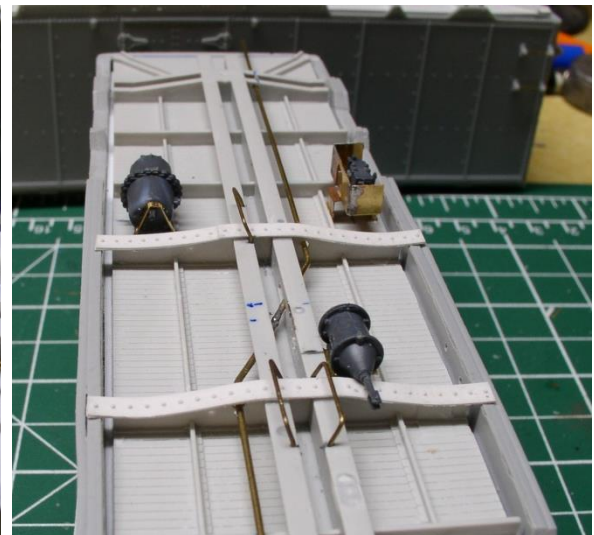


Figure U13a

14. Use 0.020" rod to make the pipe connections between the AB Valve and the Reservoir, the Brake Cylinder and the Brake Pipe. See the Grandt Line Westinghouse Ajax Brake description sheet to help identify what goes where. Keep in mind that the AB Valve is shown with the part closest to the floor at the top. See Figures U14 and U14a for placement of the pipes to the Brake Reservoir.

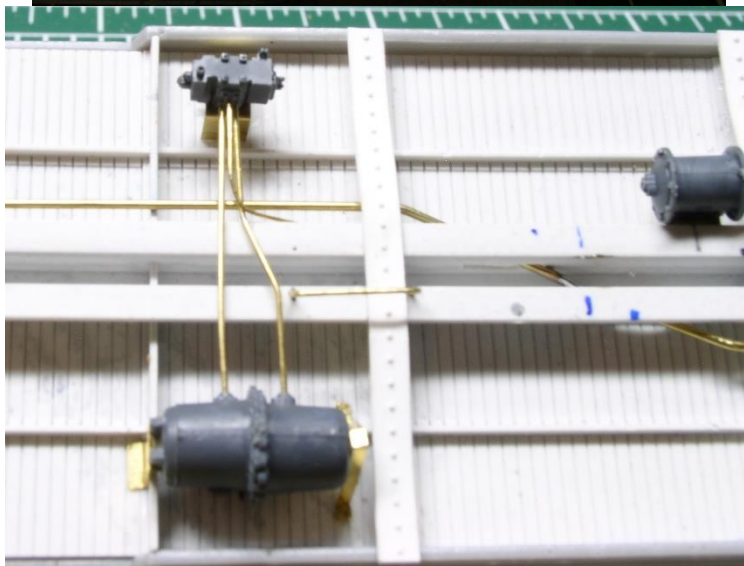
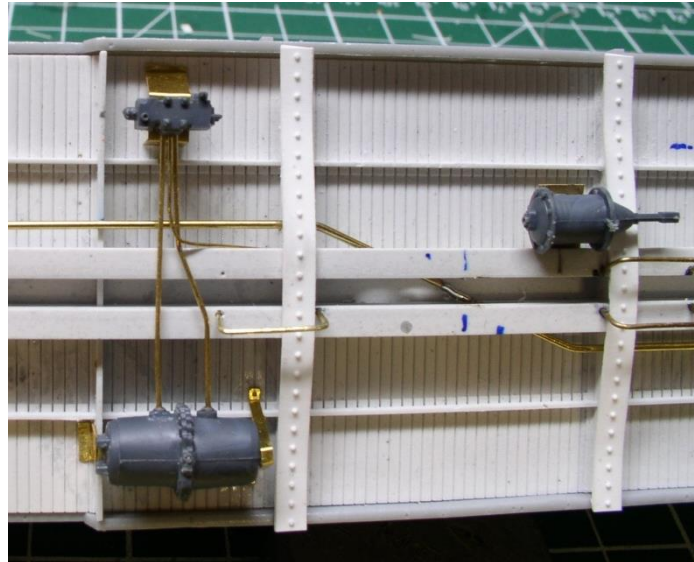


Figure U14

Figure U14a

See Figures 14b, 14c, 14d and 14e for placement of the Retainer line. Use a heated T-Pin to press holes into the cross beams and bolster for the retainer line. Use the piece of 0.014" rod to form the Retainer Line. Make a 20 degree bend in the 0.014" rod about 1 1/4" from one end. Fish the straight end over the Air Reservoir Lines and through the holes starting with the cross bearer closest to the AB Valve. The 20 degree bend is to get over the two lines from the Air Reservoir. Make a right angle bend in the line and glue into middle hole of AB Valve and to some of the Cross Beams. Figure U14a shows the Retainer line in the AB Valve. See Figures 14b and 14c. Angle and clip the end as shown in Figure U14d. Save rest of the rod for later.

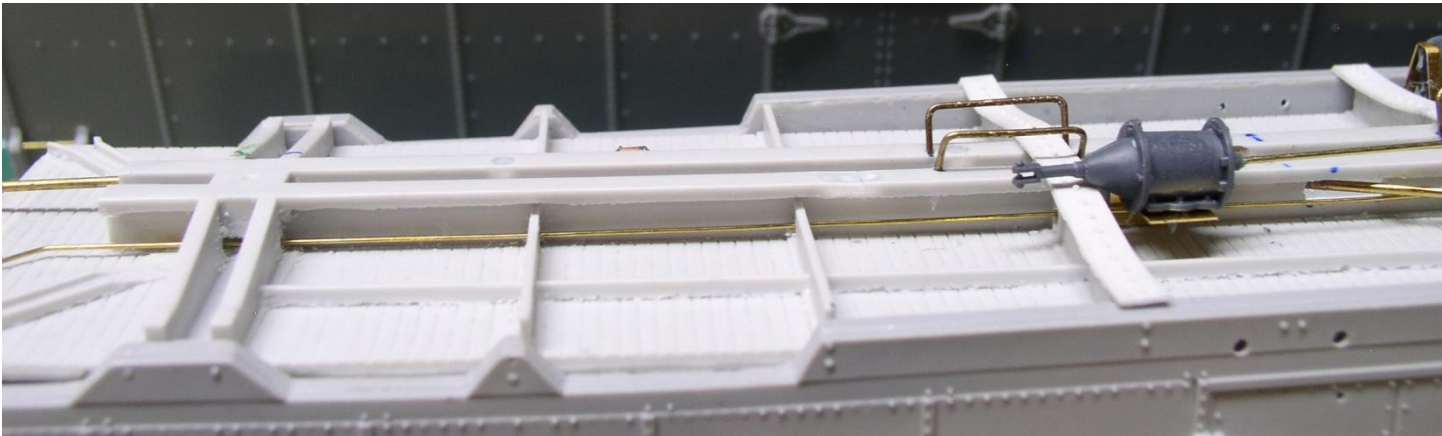


Figure U14b

Figure U14c

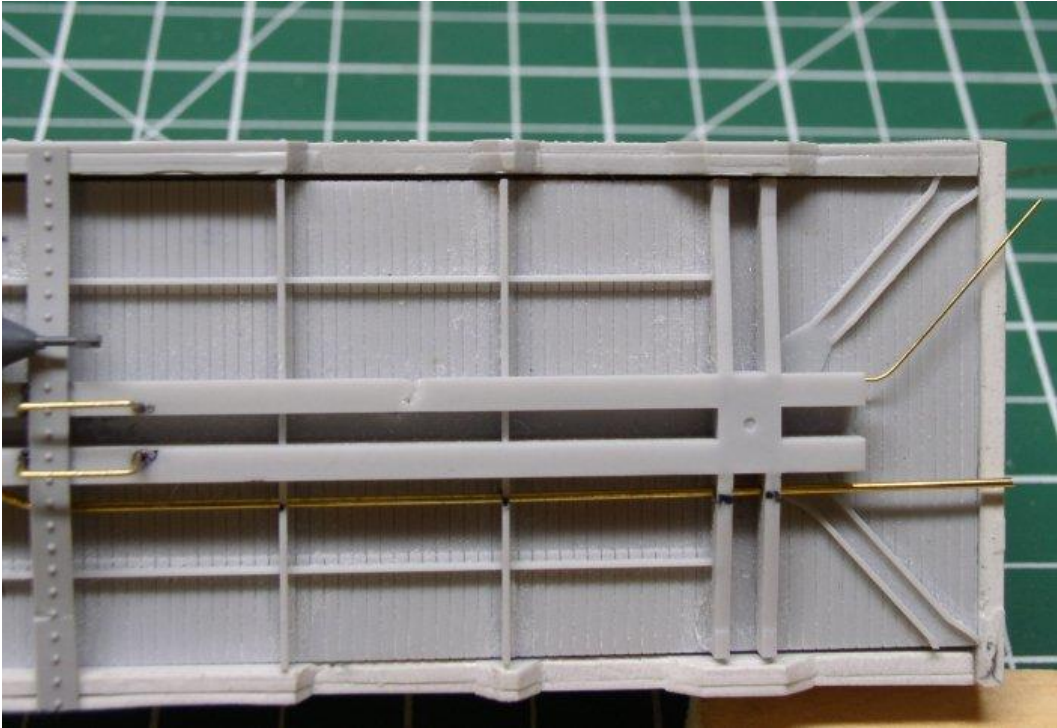


Figure U14d

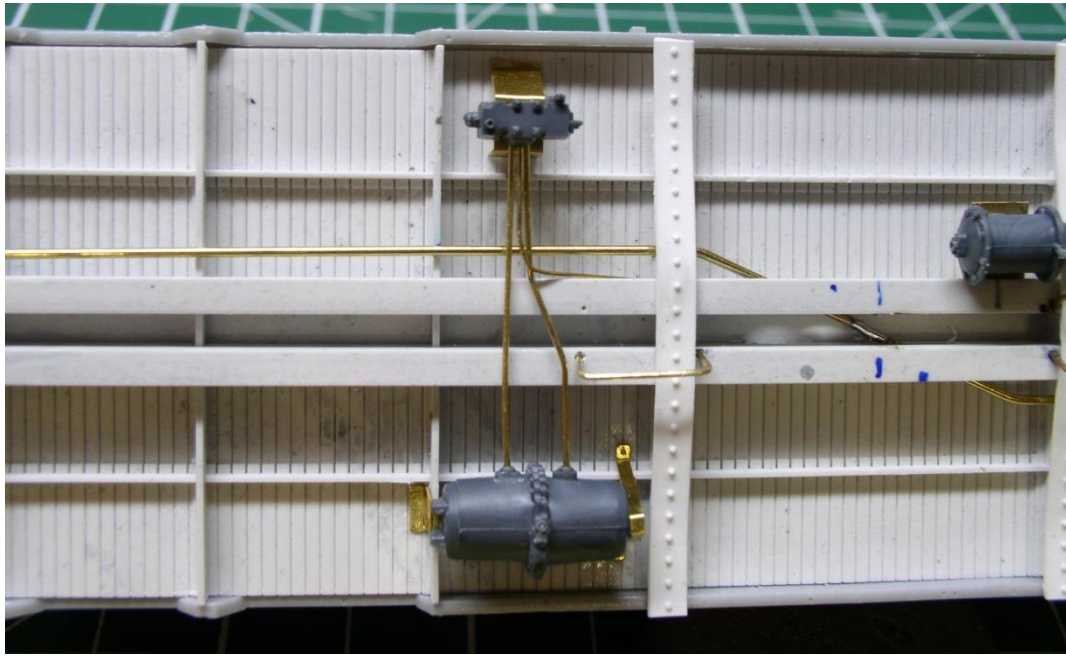


Figure U14e

15. Form the pipe that goes into the Brake Cylinder. Shape it as you see in Figure U14f. Attach to the Brake Cylinder and the Upper Right hole in the AB Valve.

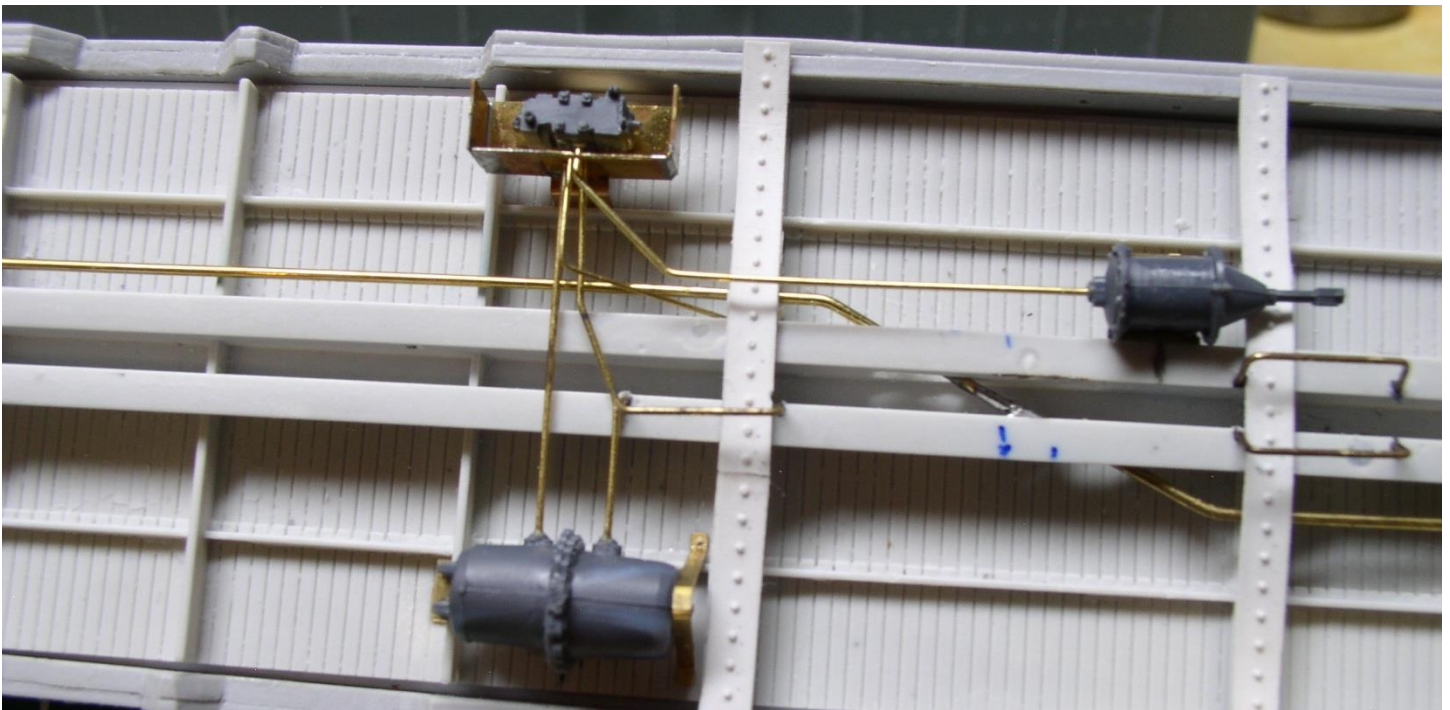


Figure U14f Showing the Pipes in the AB Valve So Far

16. The Grandt Line Instructions exchanged the labels for the Dirt Collector and the Retainer Valve. The Dirt Collector is actually J not K. First while still on the sprue, drill out the end of the Dirt Collector with a 0.020" bit. Carefully cut the Dirt Collector from the sprue leaving as much of the tab on as possible. Attach the Dirt Collector to the Upper Left hole in the AB Valve. Form the pipe using 0.020" rod. The pipe will go in between the pipes to the Air Reservoir. Attach to the Dirt Collector using ACC. Solder the rod to the Brake Pipe. See Figure U14g and U14h.



Figure U14g

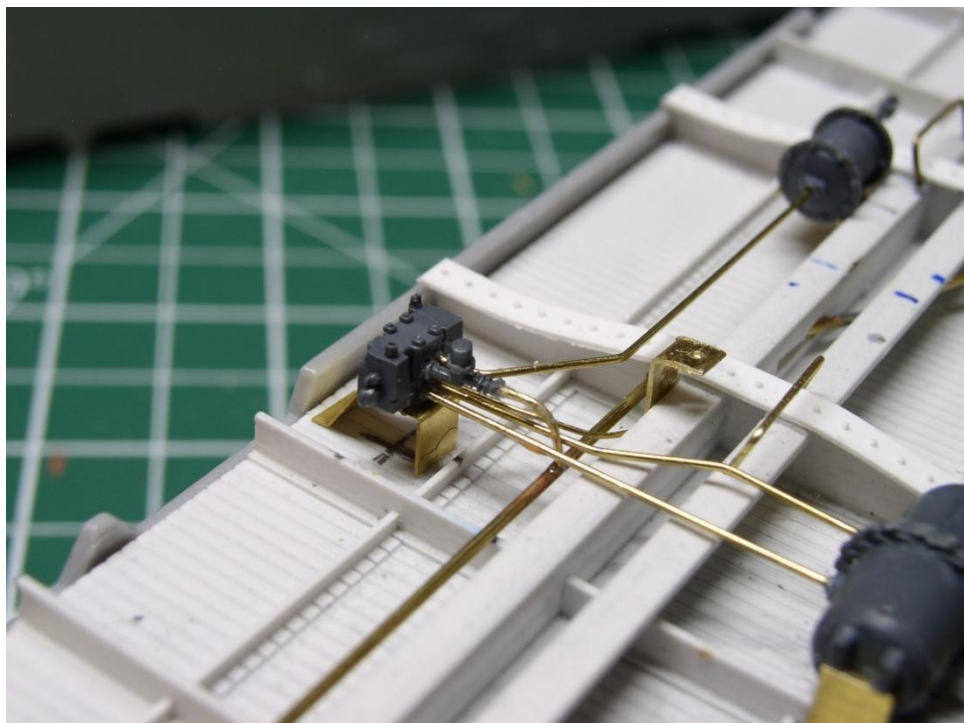


Figure U14h

- Using the dimples as guides, drill holes in the Bolster Caps using a  $7/32$ " drill bit. This will allow the lips of the SHS trucks to sit inside the hole and let the truck sit flat on the Bolster. See Figure U15



Figure U15

- Using the dimples as guides, drill holes in the Bolsters on the underframe using a  $1/16$ " drill bit. This will allow the self-tapping screw to make threads. Try one of the truck screws in each hole. See Figure U16

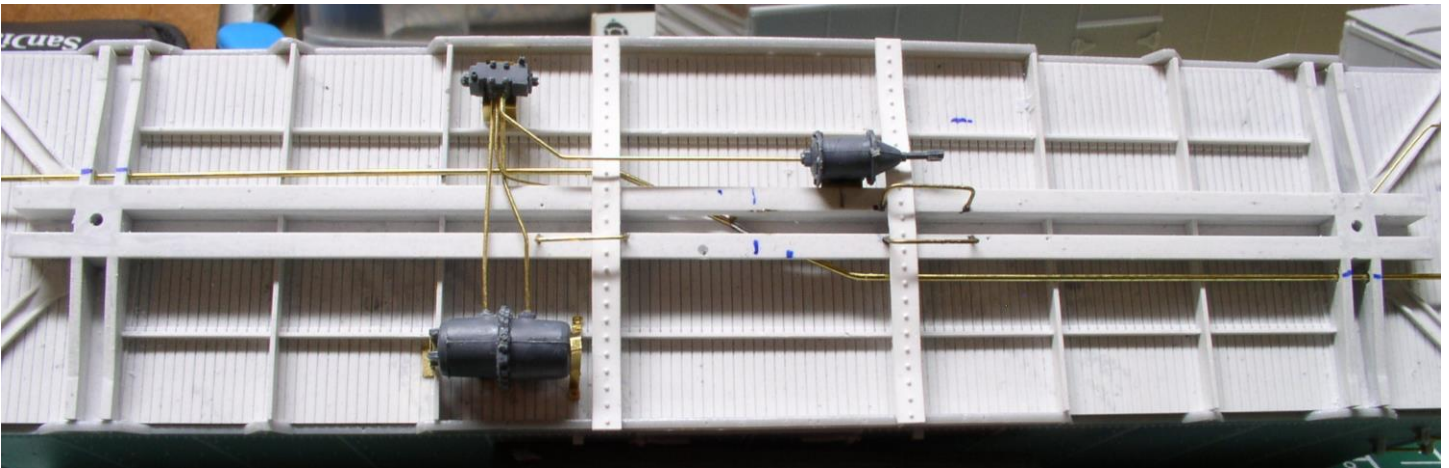


Figure U16

- Glue the Bolster caps on the Bolsters making sure that the holes are lined up. See Figure U17. . Attach trucks to check if you desire.

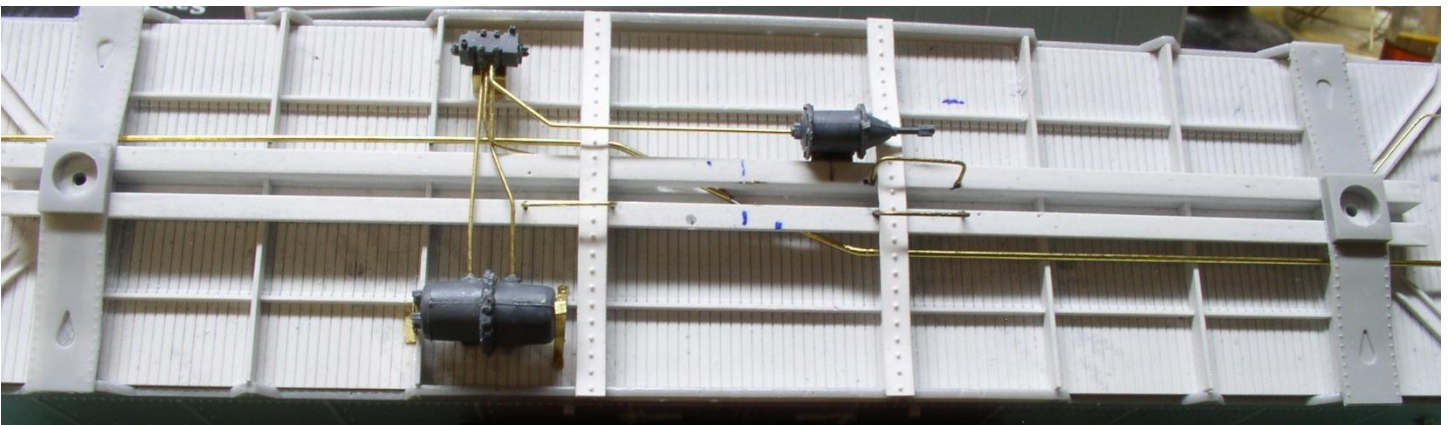


Figure U17

20. Form the Brake Lever Bracket into a 'U' . Glue in place right beside the Bottom Cover Plate closest to the AB Valve. See Figure U18a and U18b.

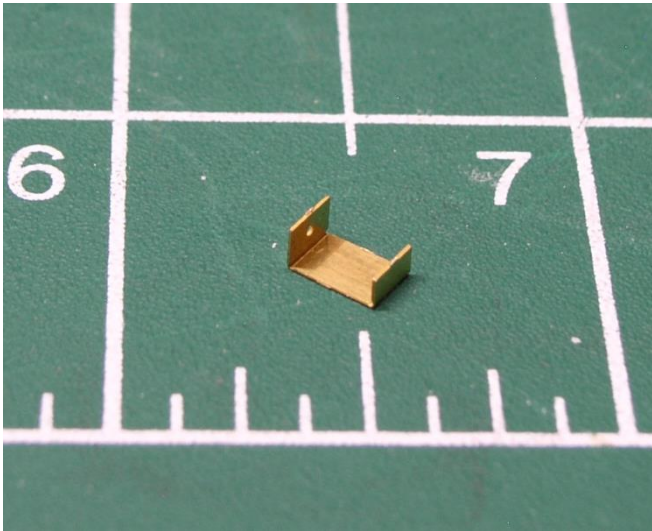


Figure U18a

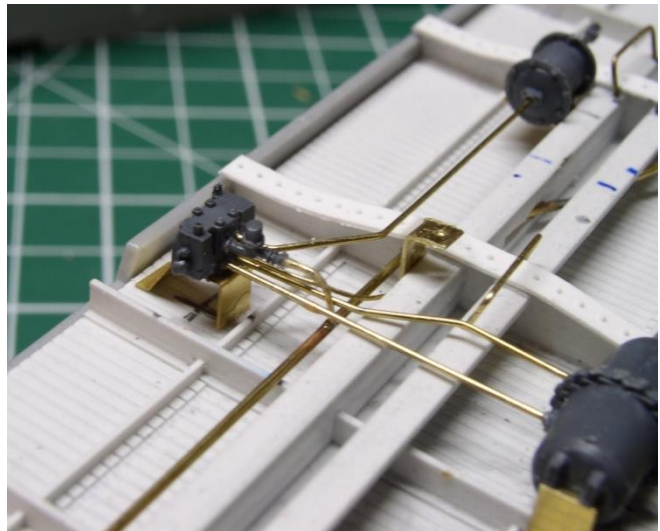


Figure U18b

21. Drill out the holes in the Short and Long Brake Levers with a 0.020" drill bit. Glue the Shorter end of the Shorter Brake Lever to the Brake Lever Bracket and under the hanger across from the AB Valve. It should be pointing 2" slightly to the left. Put the Longer end of the Longer Brake Lever into the clevis of the Brake cylinder with the shorter end going under the pair of Hangers to the left of the Brake Cylinder. See Figure U19.



Figure U19

22. The rod that goes between the two brake levers is supposed to be 8' 10" long, however you may find that you need a little more or less. Bend the ends of a piece of the 0.012" to form this rod and glue in place. Next measure and cut two pieces of this rod to go from the levers to the bolster. Bend the ends and glue in place. See Figure U20.

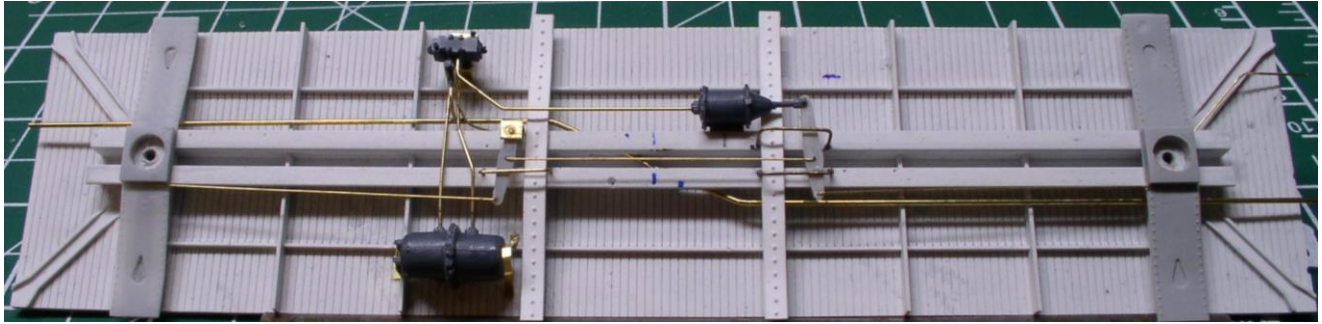


Figure U20

23. Drill out the holes in the sides of the charcoal heater using a 0.034" drill. Glue short pieces of 0.032" rod in these holes. See Figure U21.

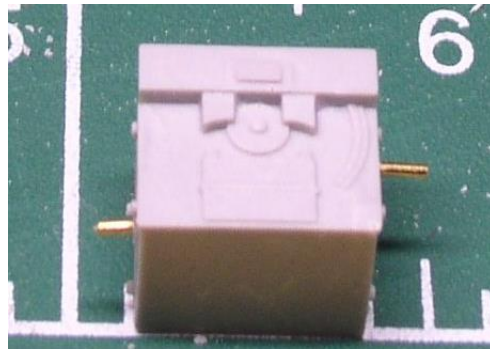


Figure U21

24. Shorten the pipe with the longer leg by 6" off the top. It should be about 32" long. Shorten the pipe with the shorter leg to 21". Drill out holes in the ends of the insulated pipes that go into the charcoal heater using a 0.032" drill. Glue short pieces of 0.032" rod into the top of the pipes. Typically the pipe with the insulation that extends farther down goes on the left lower side. The other goes on the right. Glue in place. See Figure U22.

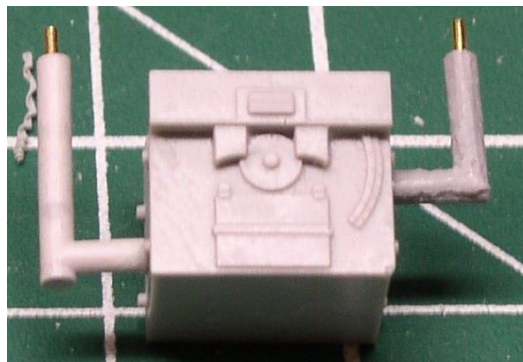


Figure U22

25. Mark the centre of the car on the side sill. Drill two holes in the floor to accept the rods in the top of the pipes 6" forward of the lateral stringer. See Figure U23.

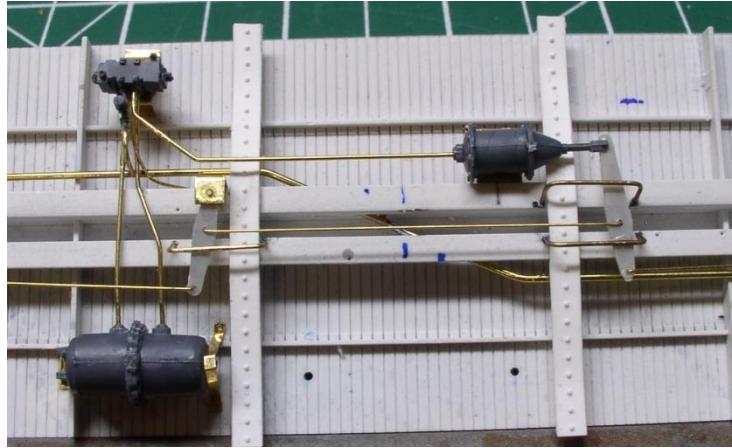


Figure U23

26. Insert the rods that protrude from the pipes into the floor and glue in place. The etched braces are a bit too short because this heater is a replacement for the original one which was oversize and are really for Series 1. Instead, use the two supplied 0.010" x 0.040" plastic strip to form the braces. Make a mark in the centre of the strip. Measure 15.5" on either side. The rear strip should have the legs 31" long and the front one should have legs about 33" long. Use pliers to make a permanent bends. Do the same with the legs and attach to the top of the heater and the cross bearers. See Figure U24.

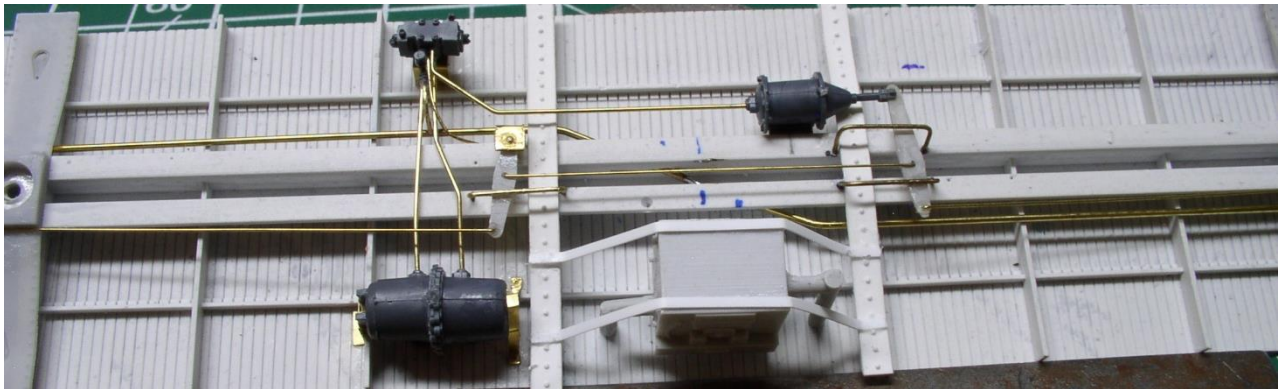


Figure U24

27. Attach about 28" of chain to 0.020" brass rod. Attach the chain to the Brake Cylinder/Long Brake Lever combination. Attach the free end of the brass rod to the bolster. See Figure U25.



Completed Underframe Figure U25

## The Body

### *The Sides*

1. Before you start on the Sides, decide whether you want to use the early or the later patch that was used over the doorway. This was done if it was deemed necessary when the car was shopped. Not all cars got this feature. Some were scrapped with the original top door frame intact. Series one was rebuilt 1946, the second and third were in 1949. They seemed to all use the early style. The fourth was in 1952 and it used the later style. There is no data on the later Series but they most likely used the later style. If you wish to add the early patch, go to Step 2. If you wish to use the later patch, go to Step 2a. See Figures B1, B1a and B1b for the differences in sides.

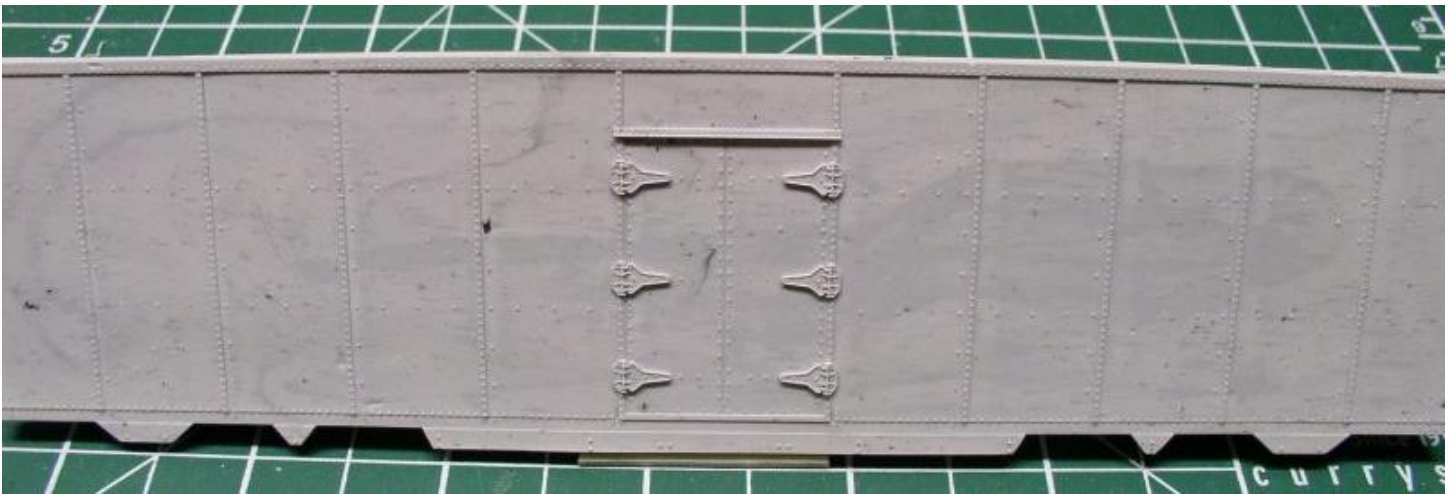


Figure B1 - Original Upper Door Frame

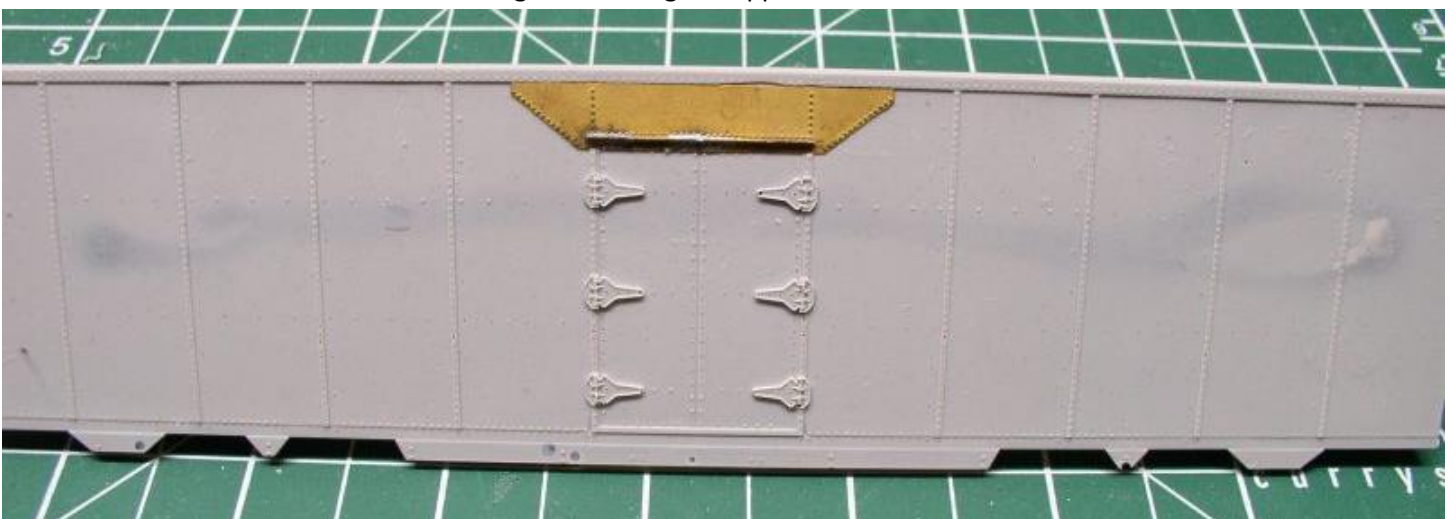


Figure B1a - Early Style of Patch Over Door



Figure B1b - Later Style of Patch Over Door

2. *Early Repair Patch Instructions* – Use masking tape to tape down the car side making sure you cover the top rivet strip. Run a second piece of tape just underneath the drip strip. This will cover the areas to protect the details as shown in Figure B2.

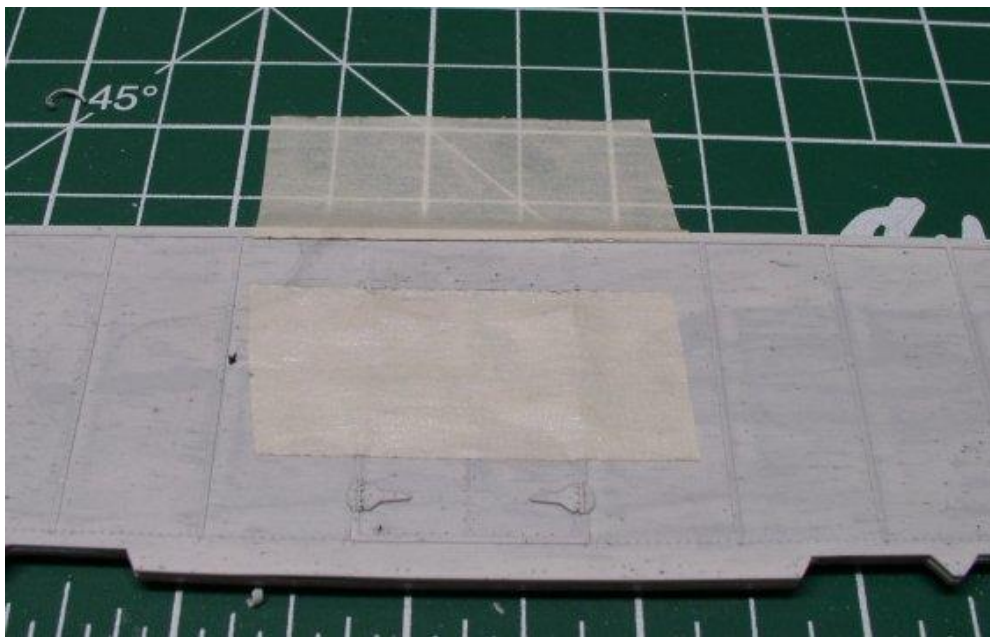


Figure B2

3. Use the XACTO® No. 17 Light Weight Chiseling Blade or Micro Mark 4mm Plastic Modeller's Chisel to carefully remove the details around area above the door including the original drip strip. Slow and easy works well. See Figure B3.

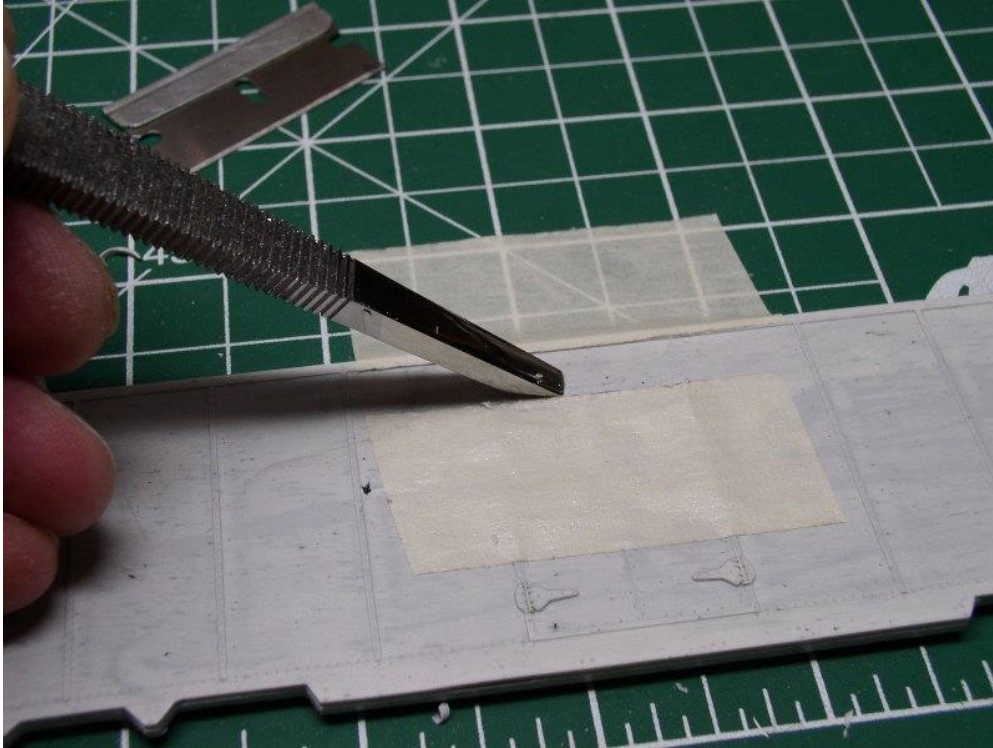


Figure B3

4. Cut out the Early Repair Patches and the Drip Strips. Depending on which version of etchings you have, solder the Drip Strips into the slots of the Early Repair Patches. See Figure B4.

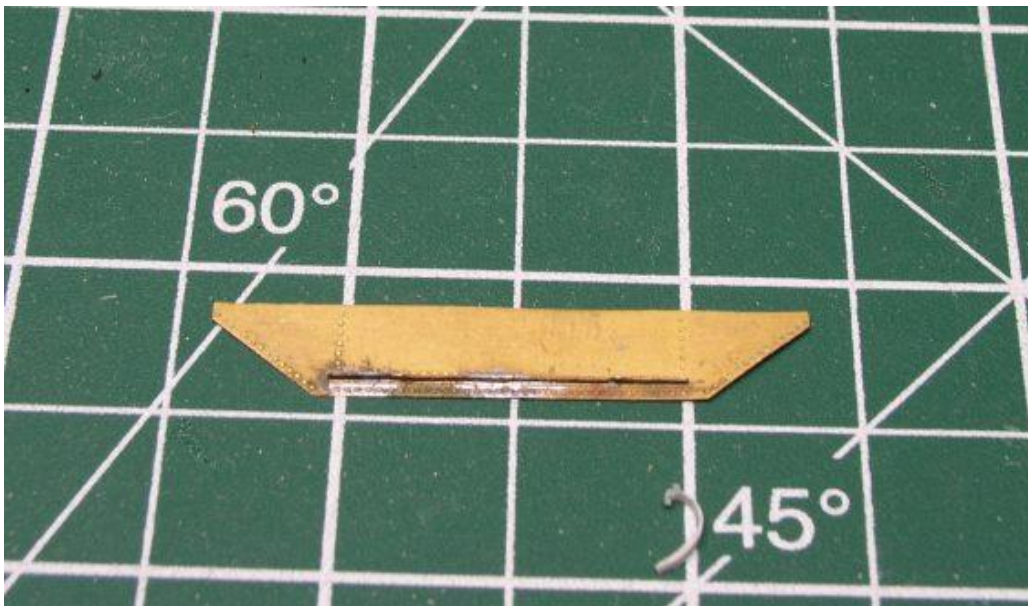


Figure B4

5. Line up the Rivet Lines on the Early Repair Patch with the remaining rivet strips on both sides of the door and glue in place. See Figure B5. Repeat steps 2 thru 5 for the other side.

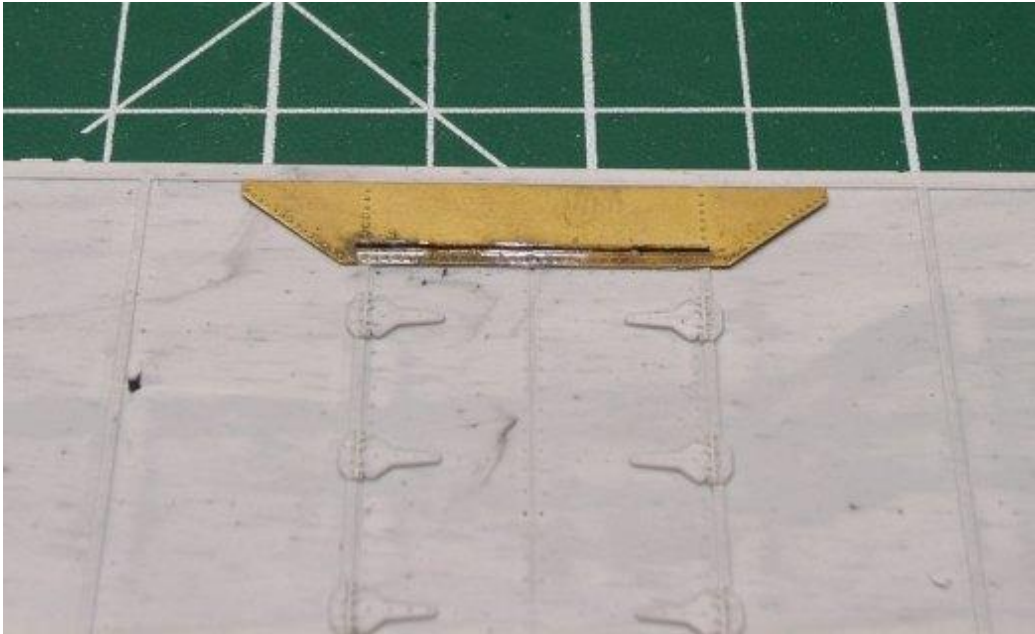


Figure B5

6. *Later Repair Patch Instructions* – Use masking tape to tape down the car side making sure you cover the top rivet strip. Run a second piece of tape to cover the tops up the uppermost hinges. This will cover the areas to protect the details as shown in Figure B6.

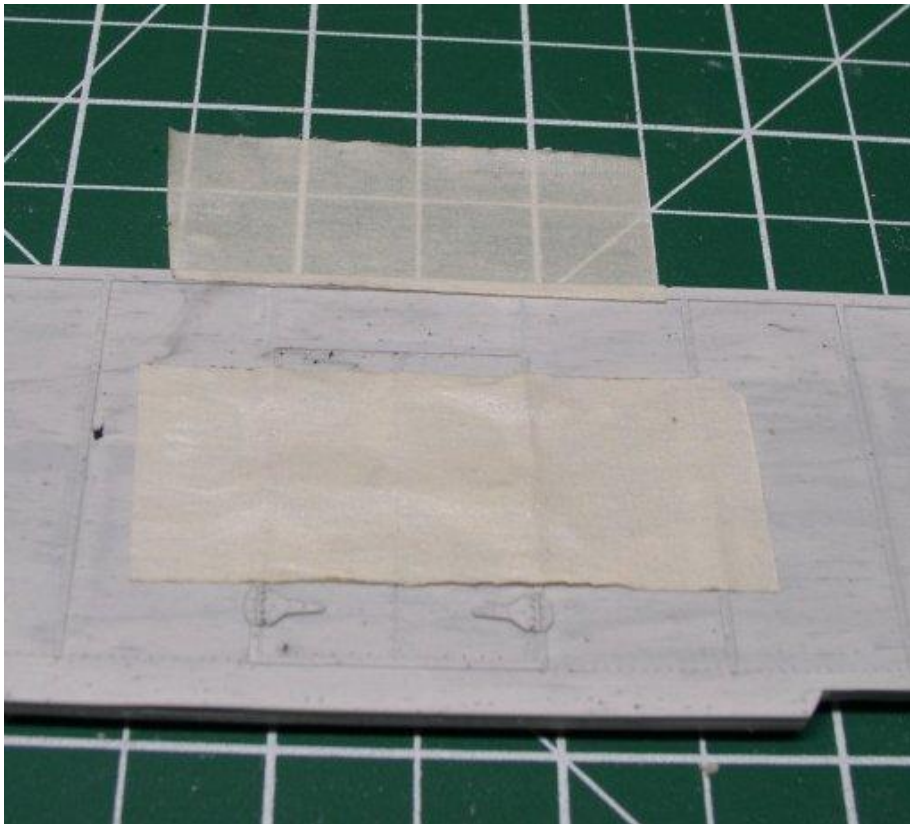


Figure B6

7. Use the XACTO® No. 17 Light Weight Chiseling Blade or Micro Mark 4mm Plastic Modeller's Chisel to carefully remove the details around area above the door including the original drip strip. Slow and easy works well. See Figure B7.

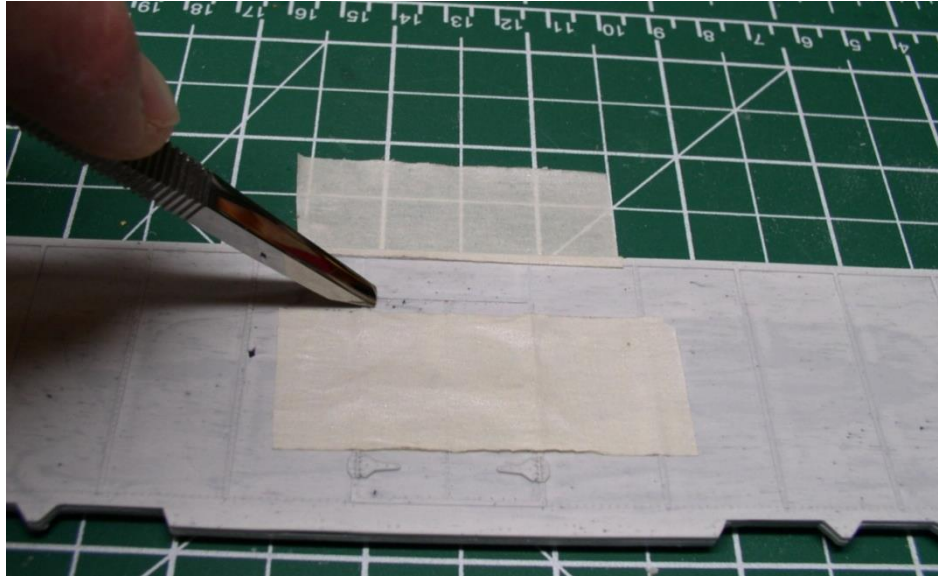


Figure B7

8. Cut out the Late Repair Patches and the Drip Strips. Depending on which version of etchings you have, solder the Drip Strips into the slots of the Late Repair Patches. See Figure B8.

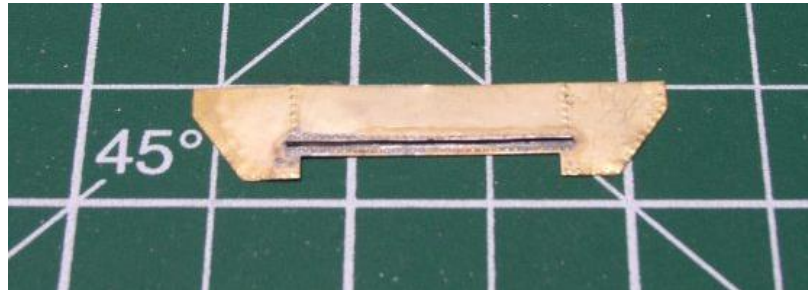


Figure B8

9. Line up the Rivet Lines on the Late Repair Patch with the remaining rivet strips on both sides of the door and glue in place. See Figure B8. Repeat steps 6 thru 9 for the other side.

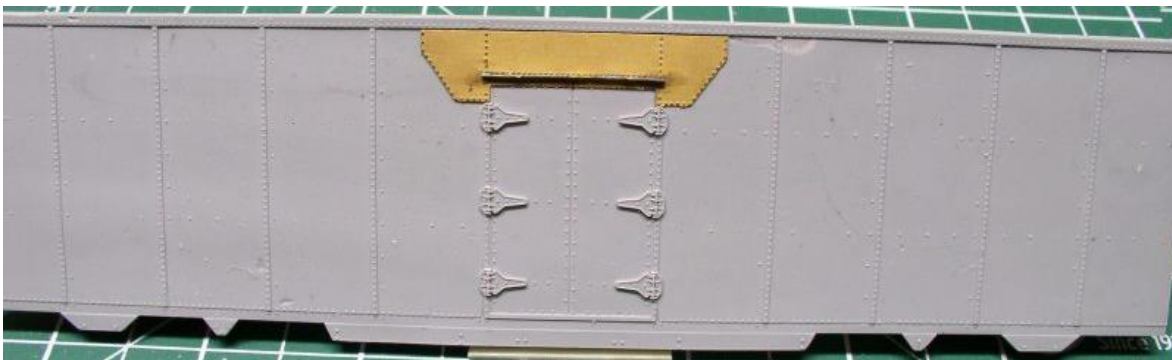


Figure B9

10. Mark a line on the inside of the side 2.5 scale inches away from the undercuts of the bottom of each side. Glue plastic strips along the lines marked. This will set the underframe the correct height. See Figure B10.

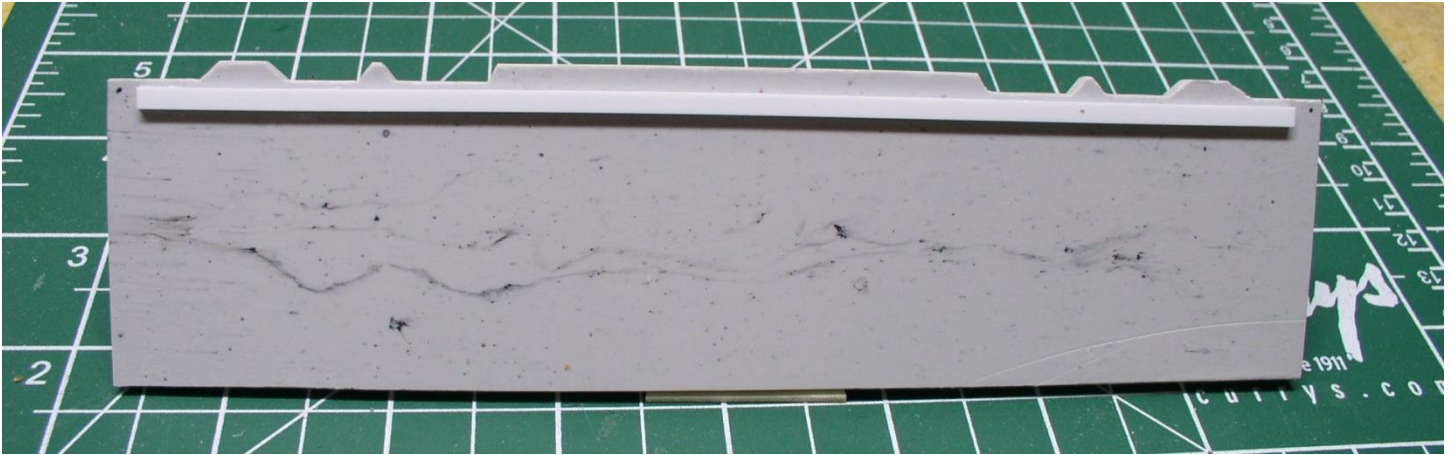


Figure B10

11. On each side, make 2 marks 8" from the centre of the doors in line with the bottom hinges. Make 2 marks 9" directly below these. Use a 0.017" drill to drill these out. Make handles out of 0.012" or 0.014" rod to fit in these holes and glue in. See Figure B12.

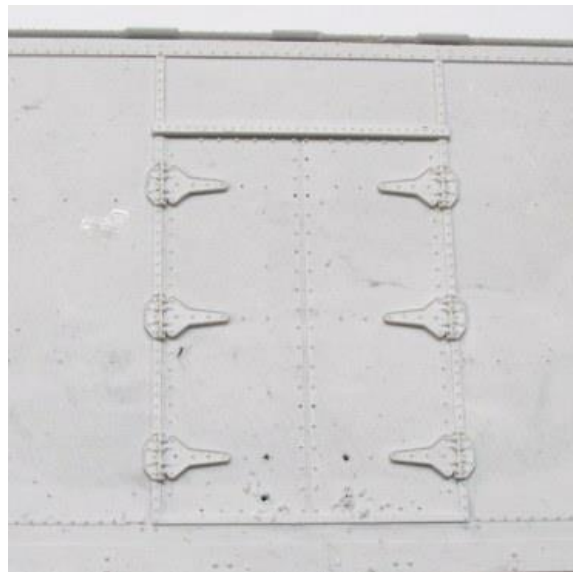
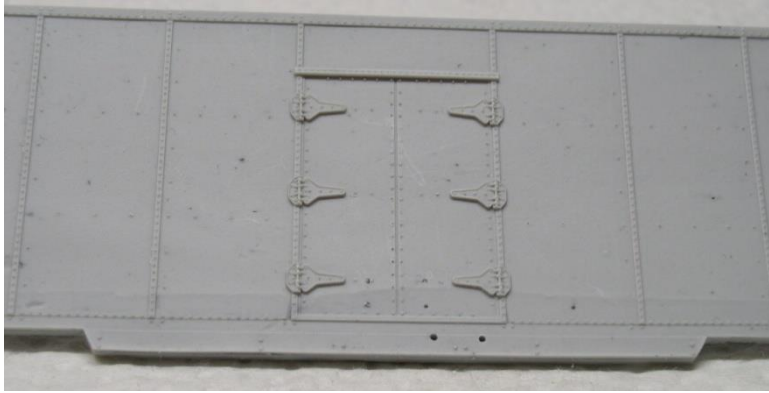


Figure B12

12. On each side, make 2 marks. The first is 10" from the centre of the door just at the top of the skirting. Make a second mark 15" to the right of the first mark. Drill a 0.025" hole at each mark. This is for the stirrup step to the right of the door. Wait until later to install the steps when the underframe can be attached. See Figure B13.



13. If you are using the original plate above the doors, grind enough of the drip strip to allow the top of the door latch bar to fit flush 4" to the right of the centre of the doors. See Figure B14.

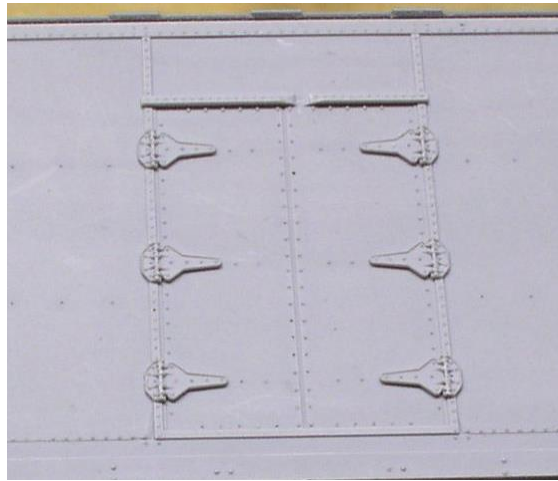


Figure B14

14. Add the door latch bar. The centre should be 4" from the middle where the two doors meet. Removing these latches can be a challenge. Cut away from the corners to meet another cut from another corner and you should be successful. See Figure B15.



Figure B15

15. Make some door stops from the 0.040" plastic strip. They should be 3.5" tall. Add the door stops on either side of the door. Series 1 and 2 had them about 17" to the side of the door frame. The rest of the Series had the door stops centred between the door frame and the next vertical seam. See Figures B16.

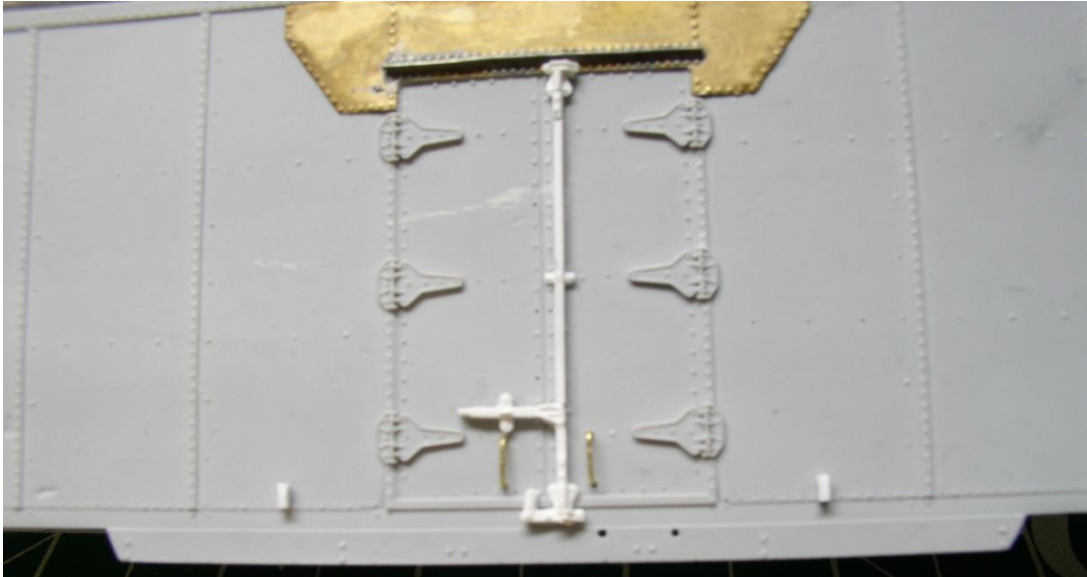
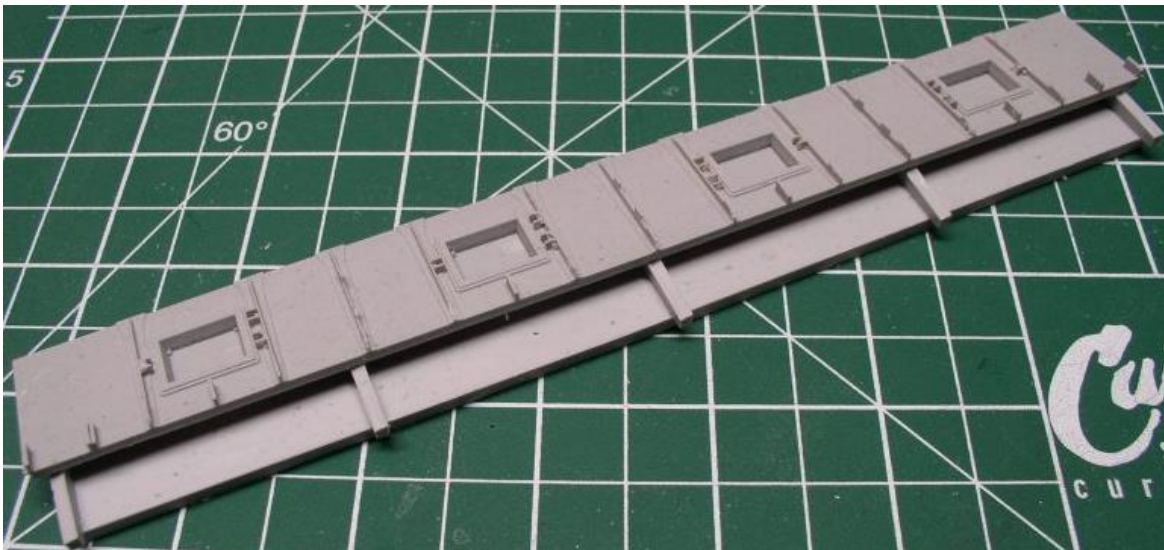


Figure B16

#### *The Roof*

**\*\* NB If you elect to have operating roof hatches, refer to instructions beginning on page 34/35, Operating Roof Hatches before proceeding to join roof halves.**

1. Carefully line up one of the roof pieces to the centre marks on inner roof frame and glue in place. See Figure R1.



2. Line up the other roof half and glue in place. See Figure R2.

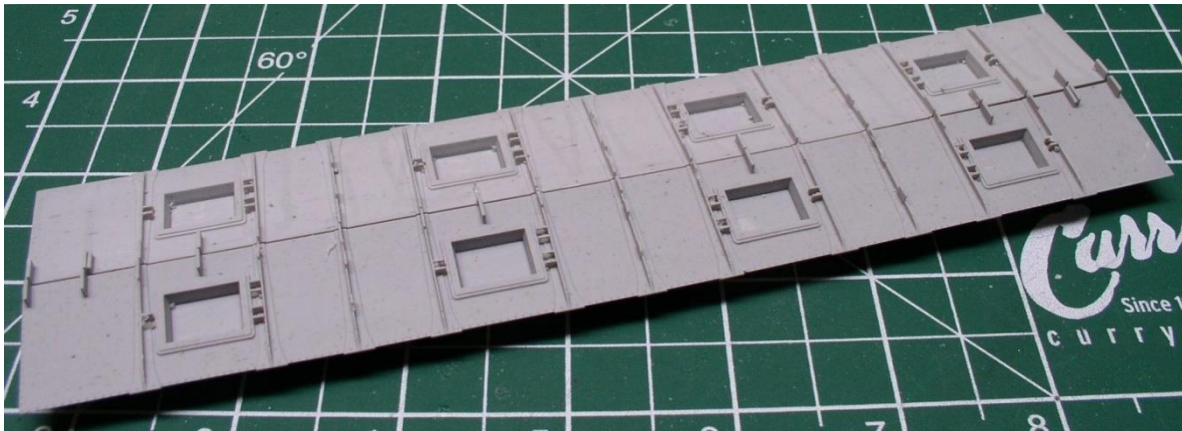


Figure R2

## ***The Body Continued***

1. Take one of the ends. Line it up with the roof and glue in place. See Figure BD1.

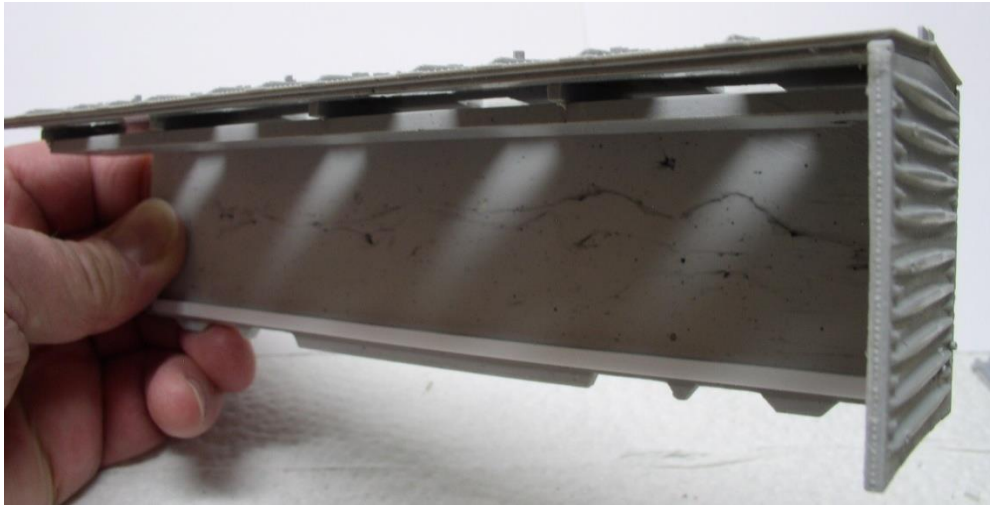


Figure BD1

2. Take one of the sides. Line it up with the roof and end and tack glue in place. See Figure BD1 again.
3. Take the other side. Line it up with the roof and end and tack glue in place. See Figure BD2.

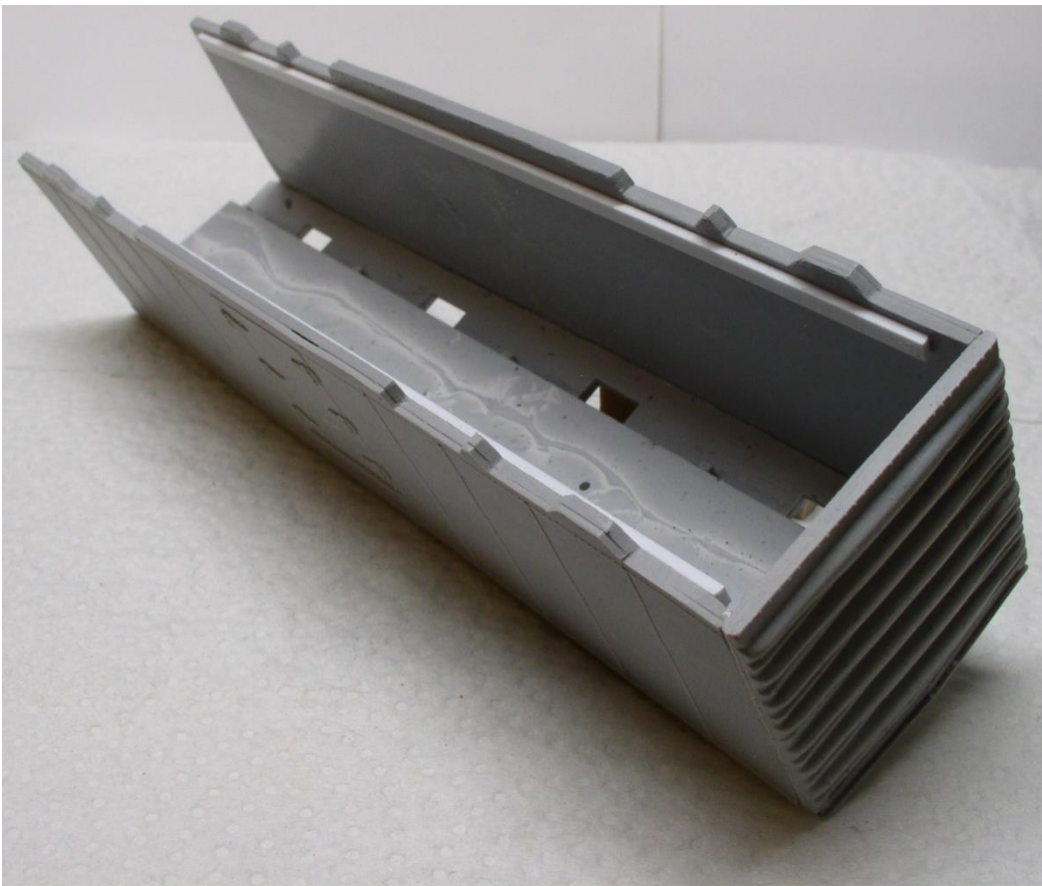


Figure BD2

4. Glue the other end on to form the main body. See Figure BD3.

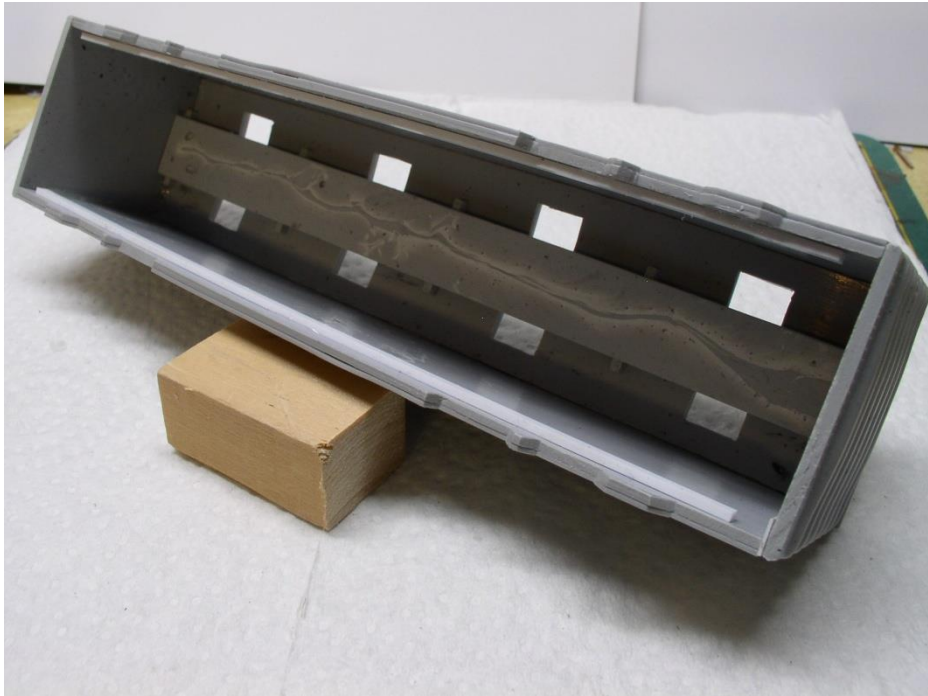


Figure BD3

5. Use Squadron Putty or 3M Body Putty to fill in the crease where the ends meet the roof. Sand using progressing finer degrees of sandpaper from 320 to 800. This will make the upper end seamless. See Figure BD5



Figure BD5

- Find the upper corner brackets and fold them so that the rivets line up with the vertical rivet line on the sides of the ends. There are two sizes so you can fit which ever fits better. Glue them in place. See Figures BD5 and Figure BD6.

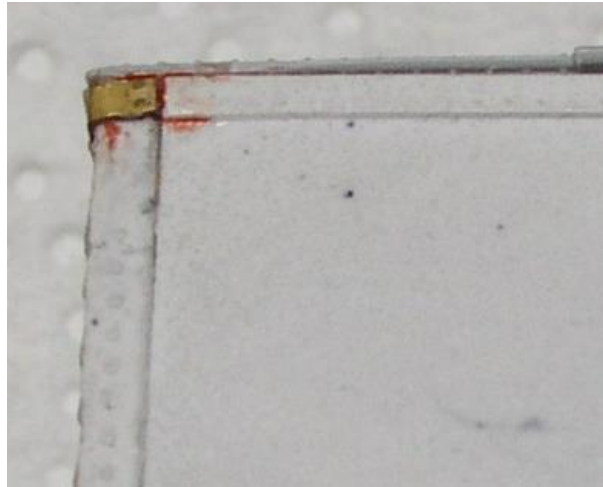


Figure BD6

- Test fit the underframe to the body. You may have to trim about 1/32" off each end to fit. Tack glue it in place using dots of ACC. You will want to remove the underframe later. See Figure BD7 and BD7a.

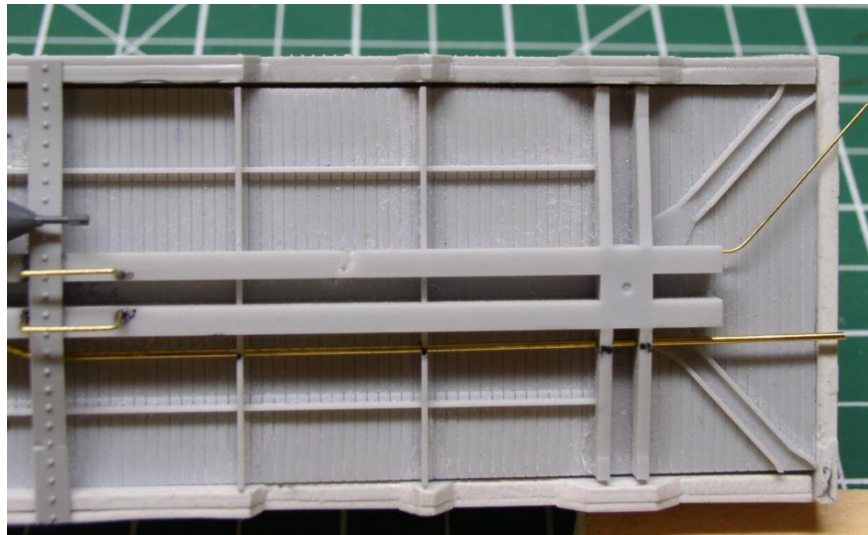


Figure BD7

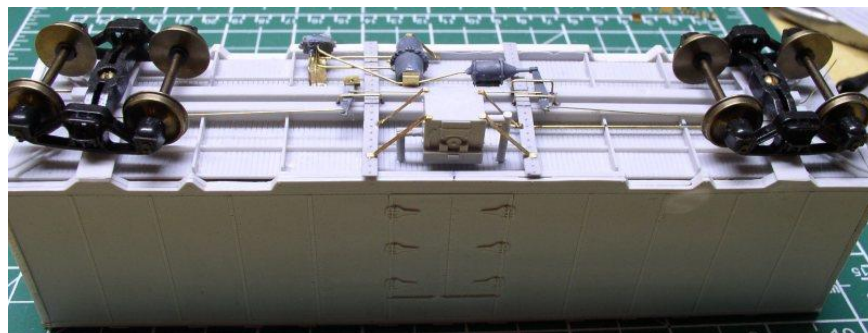


Figure BD7a

## Roof Hatches

There are two different types of roof hatch. One is for the left side of the car and one for the right side of the car when viewed straight on. Each hatch has its handle close to the running boards. Drill 0.016" holes next to the bolt heads where the handle would go. Bend pieces of 0.014" rod to form the handles for the roof hatches and glue in place. We use 1/8" square brass rod as a form. If the ends of the handles have flash, twist them in a pliers. To see completed and installed roof hatches, see Figure H1. (Note these are non-operating.)

**\*\*\*If you want operating hatches and go slightly off the deep end, skip this section and do the next one.\*\*\***

## Non- operating Roof Hatches

1. If you are not having operating roof hatches, glue the completed roof hatches and pewter latches in as shown in Figure H1.



Figure H1

## Operating Roof Hatches

**\*\*\*If you want operating hatches and go slightly off the deep end, do this section. If not, do the previous one. Please be forewarned that the operating hinges are not that robust and can break. Read this carefully before you start.\*\*\***

2. Chop plastic strip into pieces 4 1/2" x 3 1/2" to fit under the hinges of the hatches. See Figure OH1.



Figure OH1

3. Glue the underside pieces of the hatches to the bottom of the hatches. Check to make sure that the hatch still fits on the hatch opening on the roof. See Figures OH2.

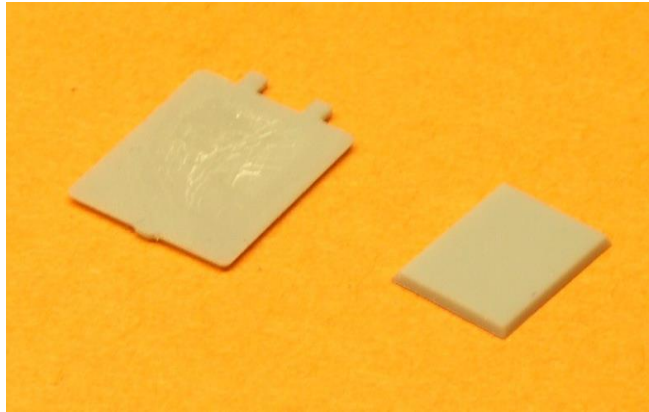


Figure OH2

4. Glue the 4 ½" x 3 ½" to under the hinges of the hatches. See figure OH3.

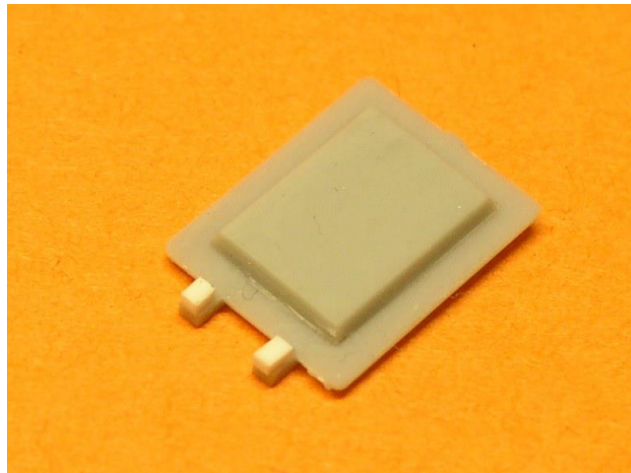


Figure OH3

5. File a slight radius on the bottom of the plastic pieces. See Figure OH4.

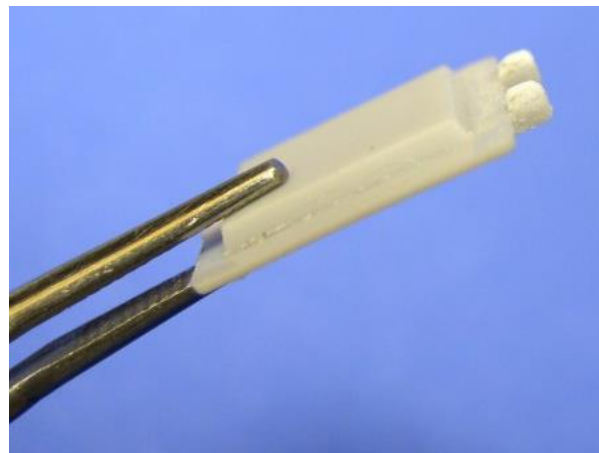


Figure OH4

6. Cur out the rectangular holes in the bottom of the roof hatch openings. See Figure OH5



Figure OH5

7. Place a hatch over the appropriate hatch opening and carefully drill out a hole through the hatch brackets and through the plastic pieces under the hinges using a 78 drill bit. *Please note that it is way easier to do this **BEFORE** the roof halves have been installed on the inner roof, the body and running board are assembled. We didn't realize this when we built the first pilot model. Impatience is not a virtue.* See Figure OH6.



Figure OH6

- Use a piece of 0.014" rod to test how well the hatch opens and closes. You may need to remove a bit of material to get it to open. Caution, only allow it to open about 45°, no more. The hinge will most likely break. See Figure OH7.

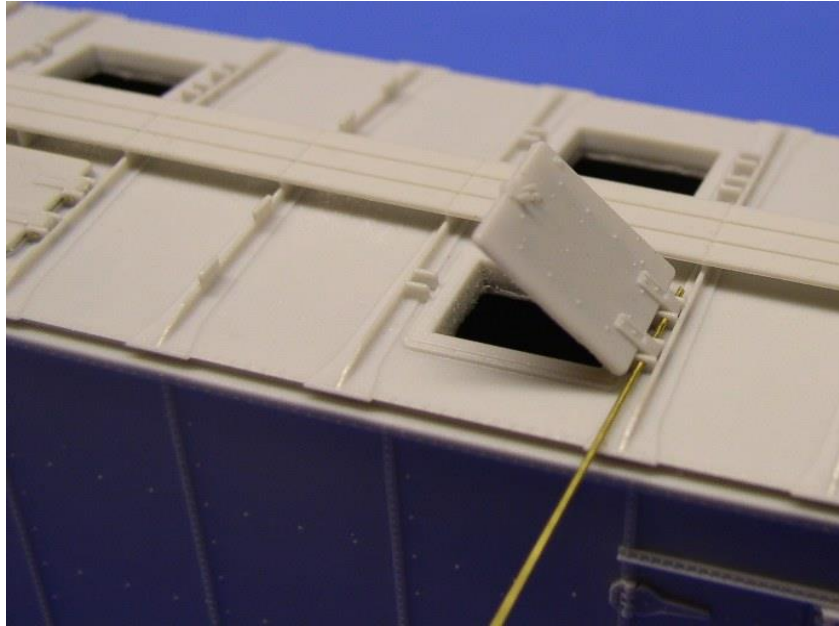


Figure OH7

- Cut pieces of 0.014" rod 8 inches long and slide into the holes in the hinge brackets and the hinges. Test to see if the hatch opens freely enough. Don't force it. More material may need to be removed from the radius of the piece of plastic. If all is well, glue the pieces of rod in place on the outside of the hinge brackets. See figure OH8.

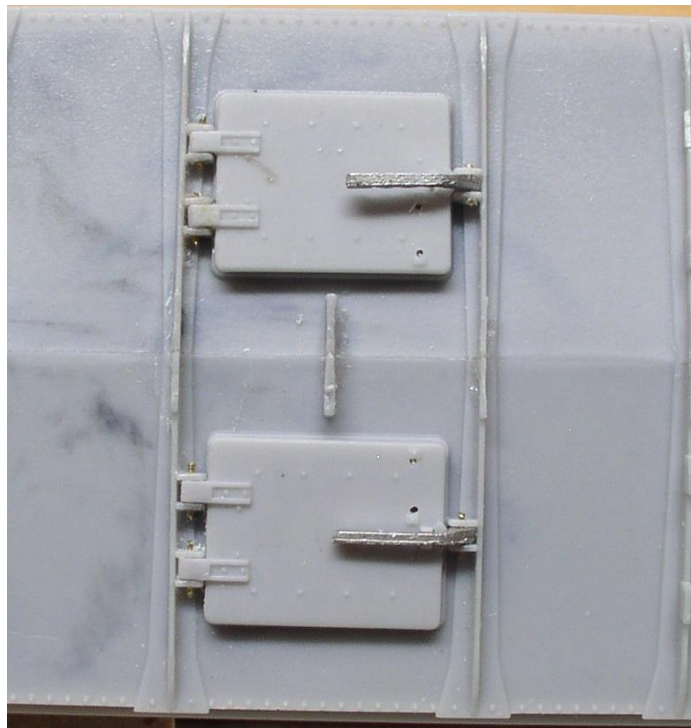


Figure OH8

10. Place one of the pewter hatch latches in the latch bracket in its down position. Drill a hole through the hatch latch brackets and the hatch latch using a 78 drill bit. Place an 8 inch piece of 0.014" brass rod through holes the hatch latch brackets and the hatch latch. Check mobility and if all is well, glue the 0.014" rod in place in place. See Figure OH9.

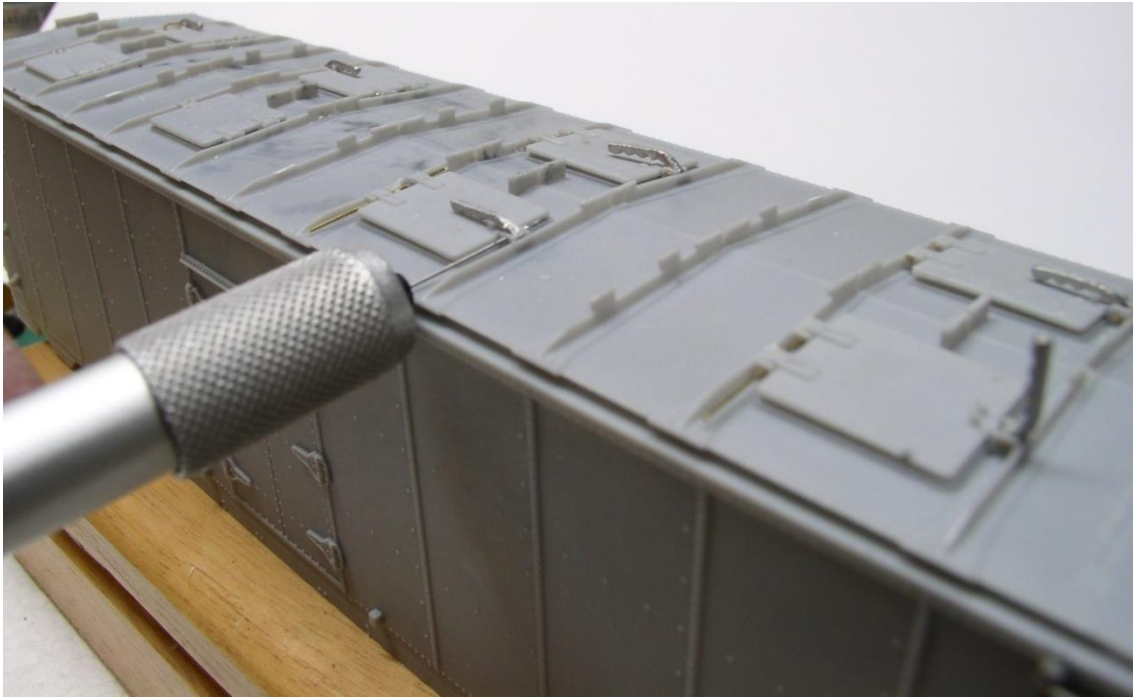


Figure OH9

11. Detail the roof hatches as in Step 1 in this section. See Figure OH10.

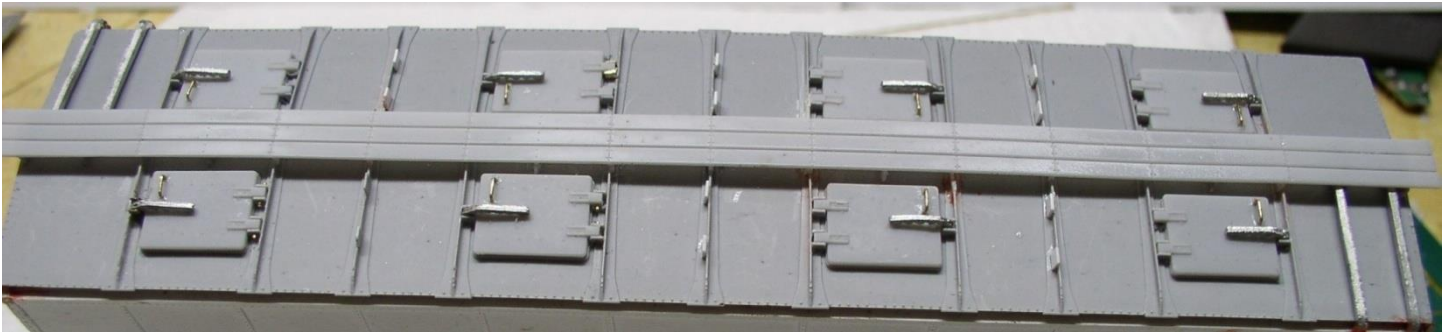


Figure OH10

## Grab Irons Stirrups and Ladders

8. You may need to straighten the brass grab irons after you cut them CAREFULLY from the sprue using a cut off wheel. DO NOT try to clip them off using rail nippers or side cutters. Use a fine pair of pliers to hold the end that you have to clean up. The grab irons on the left ends of the car should be centred as follows. Lower one should be  $21 \frac{3}{8}$ " from bottom and the upper should be  $2' \frac{7}{16}$ " inches from the lower one. To do this you may have to approximate but we use the following. Make marks 19" and 44" above the bottom of the edge left side of the end. Drill 0.020" holes at those marks. Position the grab irons in the holes and mark where the other holes must be. Drill 0.020" holes in those marks. If all fits well, glue the grab irons in place. See Figure BD8.

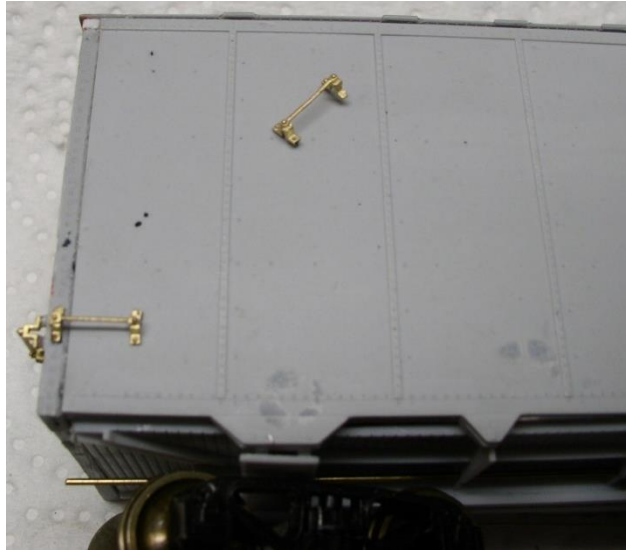


Figure BD8

9. Remove the stirrup steps from the sprue only using a cut off disk. DO NOT try to clip them off using rail nippers or side cutters because the steps will twist to the point where they break. Drill a 0.020" hole directly under the corner post of one of the left sides for one of the tabs on the stirrup step. Test fit one stirrup step and mark where the other tab would go. Drill a 0.020" hole where that mark is. Test fit the stirrup step and glue in place. Do the same for the other side. See Figure B9.

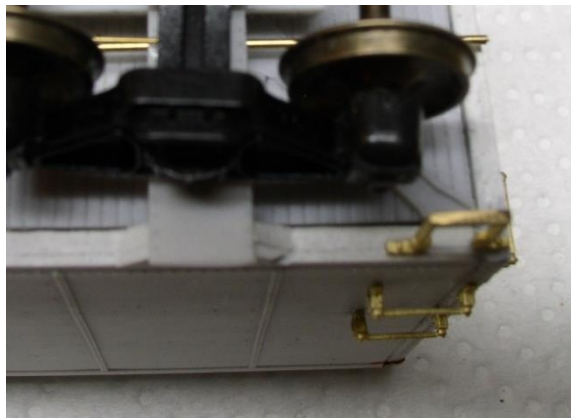


Figure BD9

10. There are holes to locate where the end grab irons should go. You may have to file/grind out the underside of the brackets of the grab iron. If necessary, drill a 0.020" holes where the tabs will go. Test fit and glue end grab irons in place. See Figure B10.

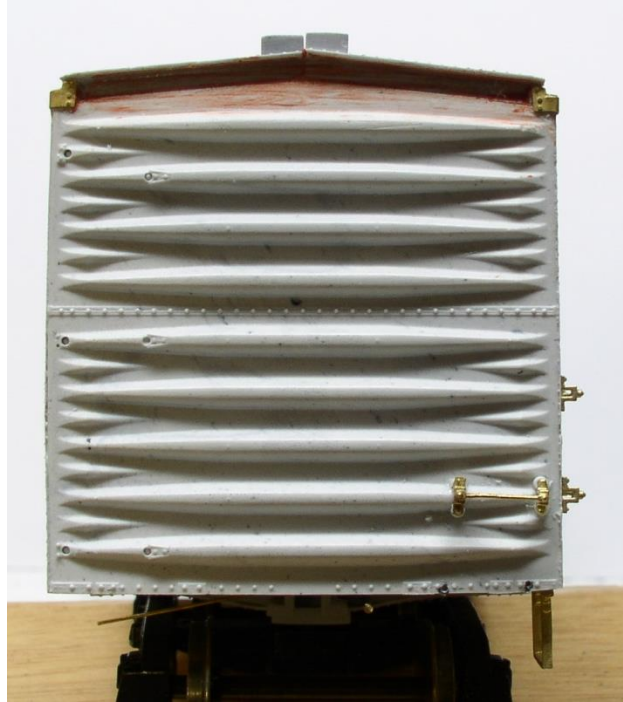


Figure BD10

11. On the lower right bottom of each end, mark 7" from the edge and then 18" from that mark towards the centre. Drill a 0.016" hole in each mark. Check to see if the Tichy Straight 18" Grab Irons fit into the holes. Next bend the Grab Irons 90° so that they hang down 4 inches from the holes. We use 3/32" square tubing as a form. See Figure BD11.

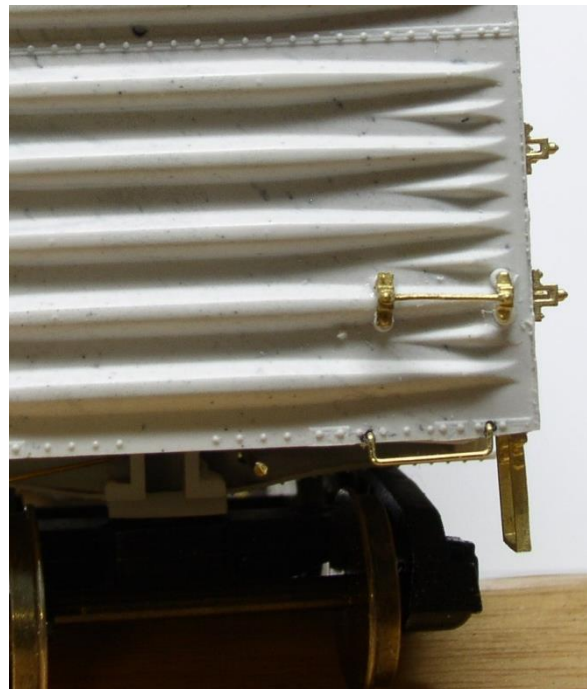


Figure BD11

***For Series 1, 2, and 3 with Dreadnaught Ends.***

12. Locate where the end ladders go and mark where the tabs would go. Drill 0.022" holes where the tabs will be inserted. If necessary, mount the etched ladder brackets over the tabs and glue the end ladders in place. See Figure BD12a.



Figure BD12a

***For Series 5 and 6 with IDE Ends***

13. Drill a 0.023" hole in the top rib 4" in from the side below the horizontal centre of the rib. Do the same on the bottom rib. Test fit the ladder and mark where the other tabs will make contact with the ribs toward the centre of the end and drill holes for those tabs. See Figure BD12b.



Figure BD12b

***For Series 4 with Dreadnaught Ends and Series 5 and 6 with IDE Ends***

14. Cut the end ladders just below the two mounting pins. Make sure that you allow for the large tab on the outer stile so that both stiles are equal in length. Save the step. See Figure BD12c



Figure BD12c

15. Drill a hole 3" in from the left side above the rivet line using a 0.016" bit. Drill another hole 18" to the right of the first hole. This is for the Tichy 18" drop step. Glue the ladders and the drop step in place. See Figure BD12d or BD12e.

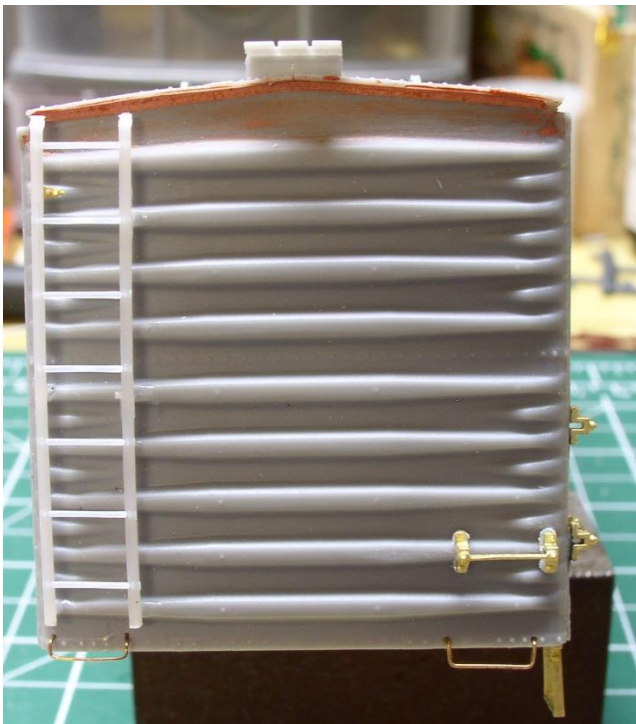


Figure BD12d Series 4

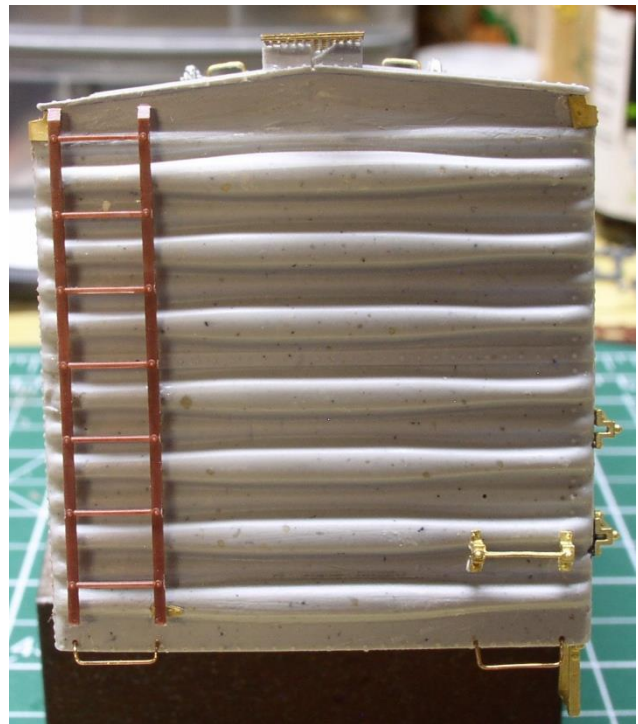


Figure BD12e Series 5 & 6

16. Cut the step from the piece of ladder just below the rung. Glue a short piece of 0.020" brass rod to the inside of the remaining stiles. See Figure BD12f.



Figure BD12f

17. Drill a 0.020" hole in the bottom of the left corner post. Drill a second hole 16" to the right of that hole. Glue the rods protruding from the steps into the holes. See Figure BD12g and Figure BD12h. Series 6 shown but it's the same general layout for Series 4.

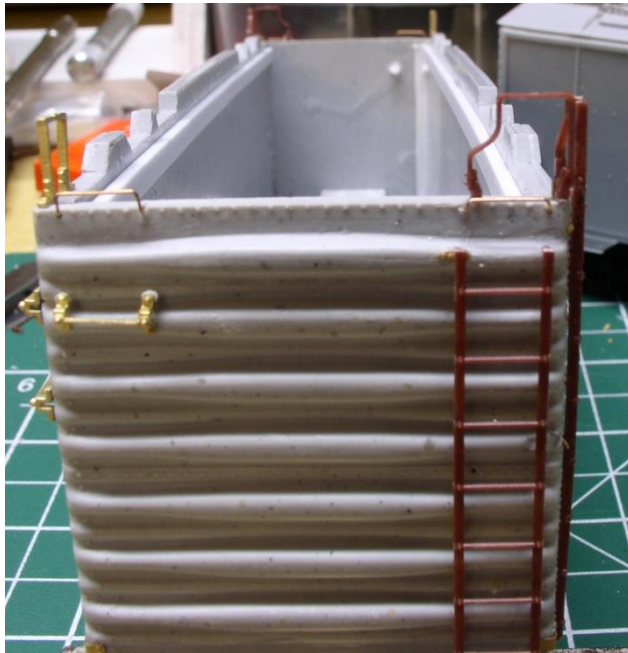


Figure BD12g

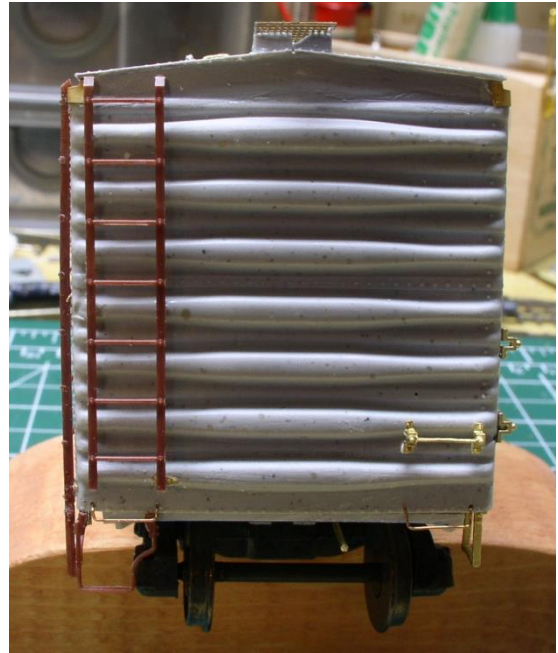


Figure BD12h

### ***Ladders on the Sides***

18. Mount the etched ladder brackets over the lower tabs and glue in place. There are no tabs on the bottom but glue brackets just above the lower rung. The top tabs do not need brackets. Clip and file the brackets that are on the side of the straight stirrup step until they are flush with the ladder stile. See Figure BD13.



Figure BD13

19. Make a mark about 58.5" up from the lower edge of the side about 1 scale inch in from the end. Directly to the left 19" make another mark. These marks will locate where the holes will go for the tabs on the ladder which are midway up. Drill out these marks using a 0.20" drill bit. Test fit the ladder and mark where the top tabs will go. If the ladder is not totally true with the end then you can enlarge the holes a bit. See Figure BD14.



Figure BD14

20. Drill the top holes and mount the side ladder. Cut the tops of the ladder stiles flush with the top of the side. Make sure the ends are square with the top of the side. See Figure BD15.



Figure BD15

21. The lateral running board supports may be too thick. They should represent an extension of the ladder stiles and should be the same thickness. Rub the lateral running board supports against a mill file to mill the sides down until they are the same thickness as the ladder stiles. See figure BD16.



Figure BD16

22. The pewter lateral running board supports should be an extension of the side ladder stiles and attach to the top of the peak of the roof. You may have to trim a bit of the curved ends of lateral running board support fit properly on top of the ends of the ladder stiles. The underside of the curve should just clear the top edge of the roof. See Figures BD 17 and BD17a.

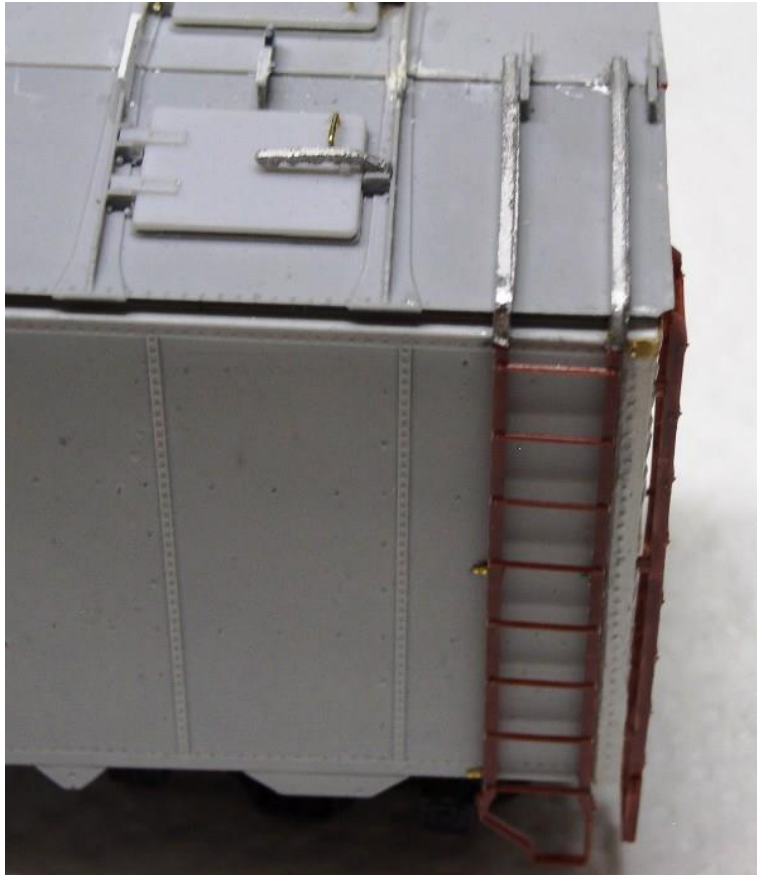


Figure BD17



Figure BD17a

23. Use Squadron Putty or 3M Body Putty to fill in the gaps where the end lateral running board supports meet the tops of the ladder stiles. Sand using progressing finer degrees of sandpaper from 320 to 800. This will make the joint . See Figure BD18.

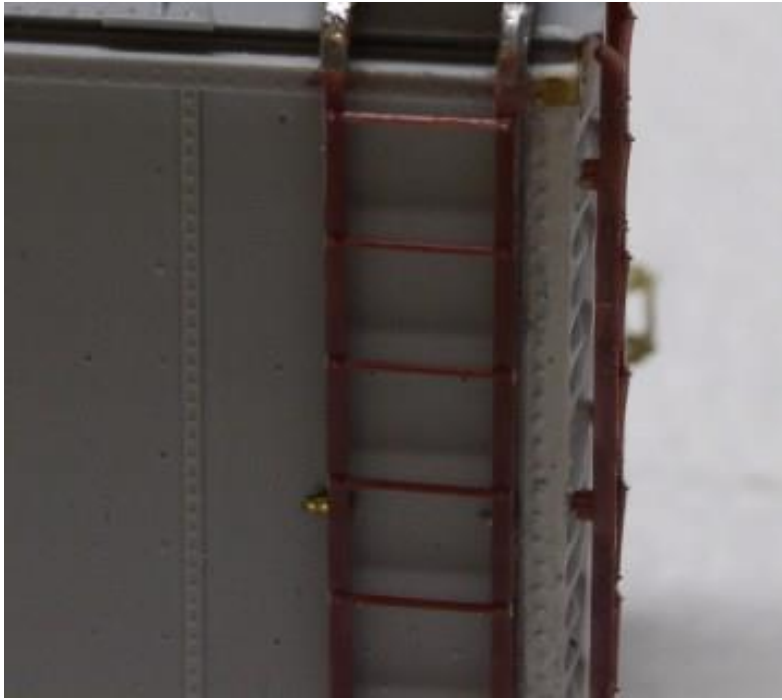


Figure BD18

24. Repeat steps 13 to 18 for the other side.

## The Running Boards

**\*\*\*Two types of running boards are included in this kit, a wooden one and steel mesh. As built these refrigerator cars had wooden running boards. But during at least two major shoppings, some but not all had their wooden roofs replaced by steel mesh. Series 6 and beyond were all built with steel mesh running boards. It is up to you which style to choose for the earlier series.\*\*\***

Wood Running Boards – Series 1 to 5 as built.

1. Check to see if all the running board supports are level. File, sand or shim where necessary. Centre the wood running board on the centre support and glue in place. See Figure WRB1.



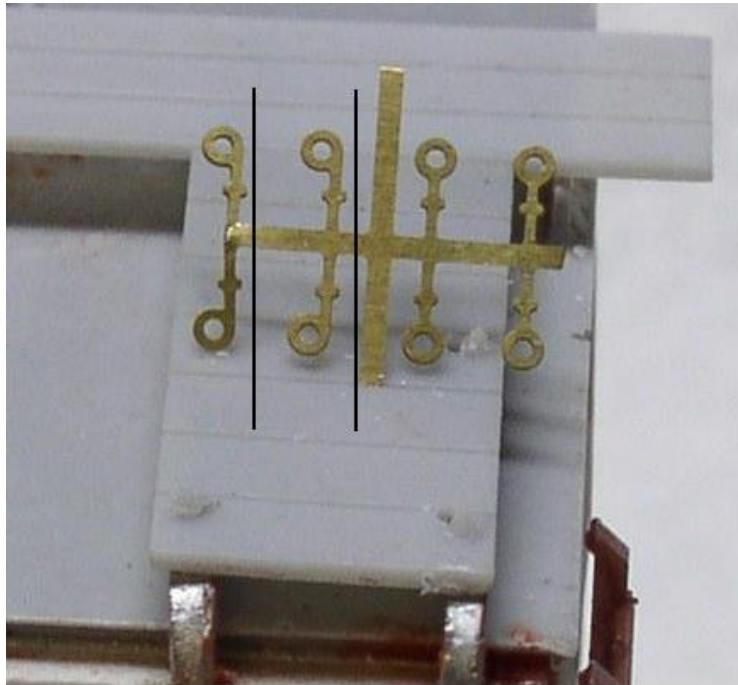
Figure WRB1

2. Line up and glue the wood lateral running boards on the lateral running board supports. The nail holes should line up with the centre of the lateral supports. See Figure WRB2.



Figure WRB2

3. The etched eyelets which are across from each other are paired and meant to be folded to form a 0.016" eyelet out of the 0.008" brass. Cut vertically two sets of the angled eyelets. Carefully fold each pair over to form a 0.016" eyelet. Use one pair of pliers to hold the eyelet and another to squeeze the end so that the fold is closed. See Figure WRB3 and SR2 in the Steel Running Board Section.



Cut Vertically As Shown By Lines

Figure WRB3

4. Find the dimples in by the bolt heads on the lateral running boards. Drill 0.020" holes in these dimples. To get a better idea where these holes are to go, please see Figure WRB5. Glue the angled eyelets into the holes which are closest to the lower right bolt heads. See Figure WRB4.



Figure WRB4

5. Use 0.014" rod to form the "L" shaped grab irons that will thread through the angled eyelet and into the holes that are drilled next to the two outer bolt heads. The grab irons should be approximately 3 ½" above the surface of the lateral running boards. See Figure WRB5 and Figure WRB5a



Figure WRB5

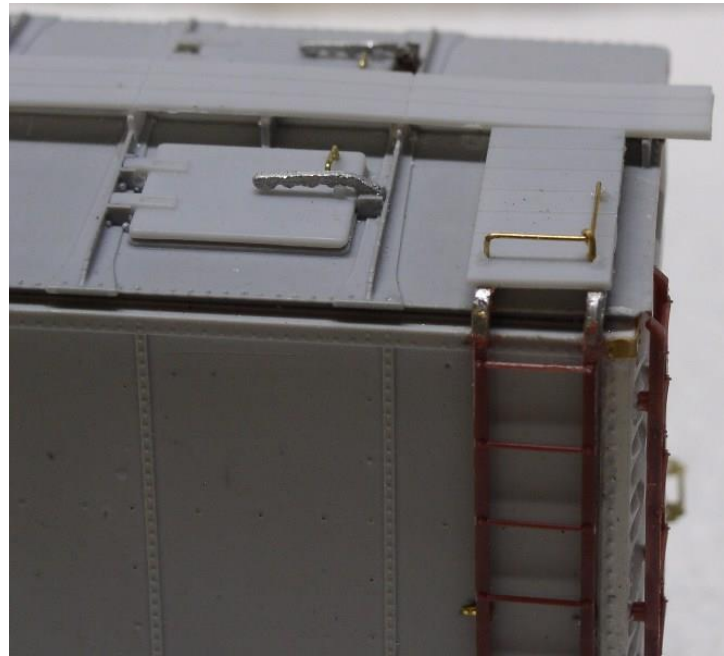


Figure WRB5a

***Steel Running Boards Series 6 and beyond or an upgrade to Series 1 to 5.***

1. The steel running boards are in two pieces joined that must be folded to create 0.016" (1 scale inch) running boards. See Figures SRB1a and SRB1b.

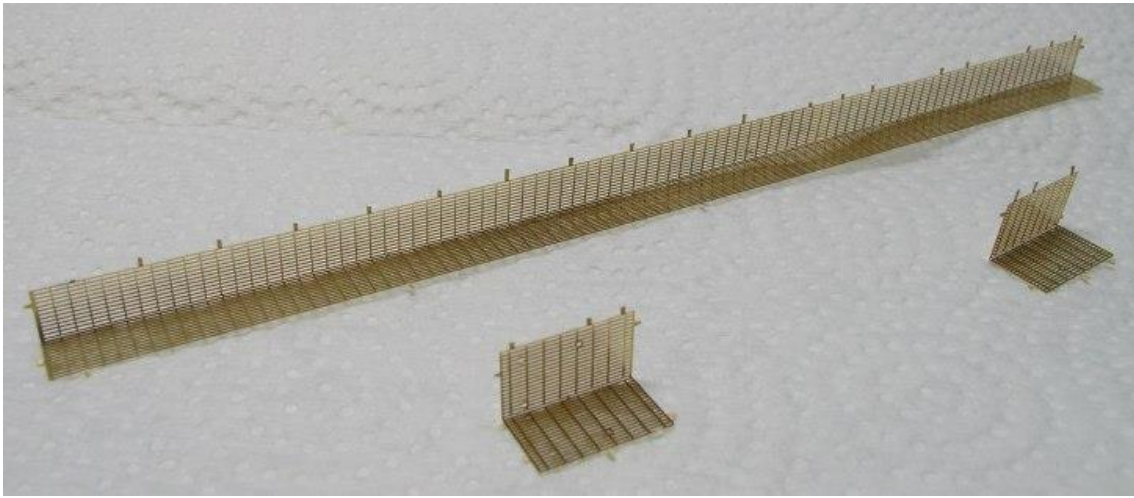


Figure SRB1a

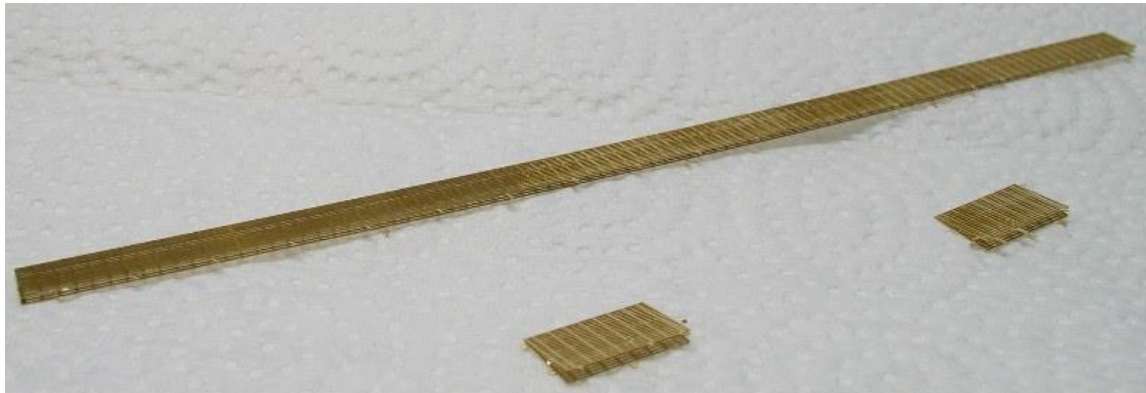


Figure SR1Bb

2. Run a light bead of solder along the edges of the running boards. Use a rotary tool with a cut-off disc to remove any tabs that are remaining. File the edges. See Figure SRB2

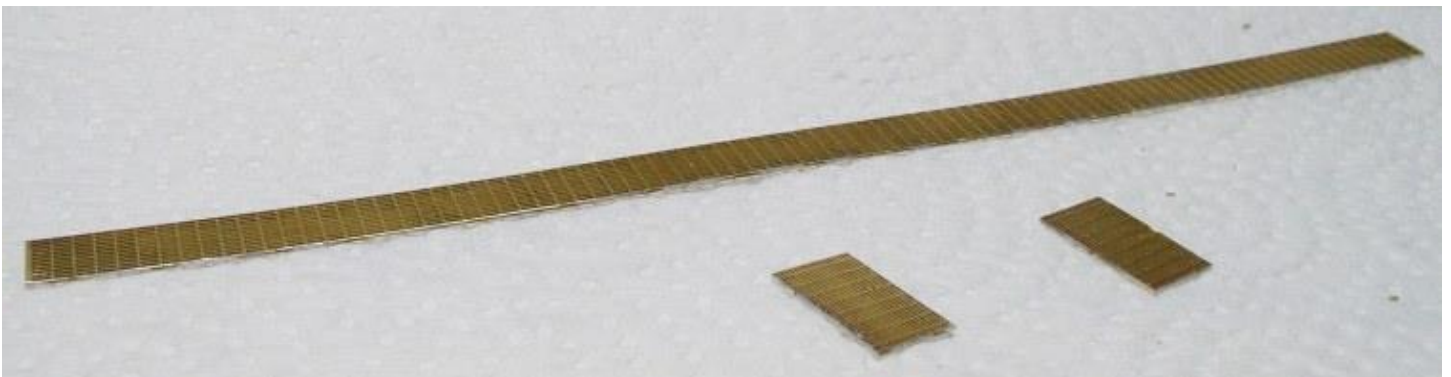


Figure SRB2

3. Attach the running board to the risers and the lateral running boards to the lateral stiles. See Figure SRB3.



Figure SRB3

4. The etched eyelets which are across from each other are paired and meant to be folded to form a 0.016" eyelet out of the 0.008" brass. Cut vertically two sets of the angled eyelets. Carefully fold each pair over to form a 0.016" eyelet. Use one pair of pliers to hold the eyelet and another to squeeze the end so that the fold is closed. See Figure SRB4 below and WRB3 in the Wood Running Board Section.



Figure SRB4.

5. Glue the angled eyelets in the hole in the lower right corner of the lateral running boards. Do not try to solder these in. The pewter lateral running board stiles are low melting and will be ruined. See Figure SRB5.

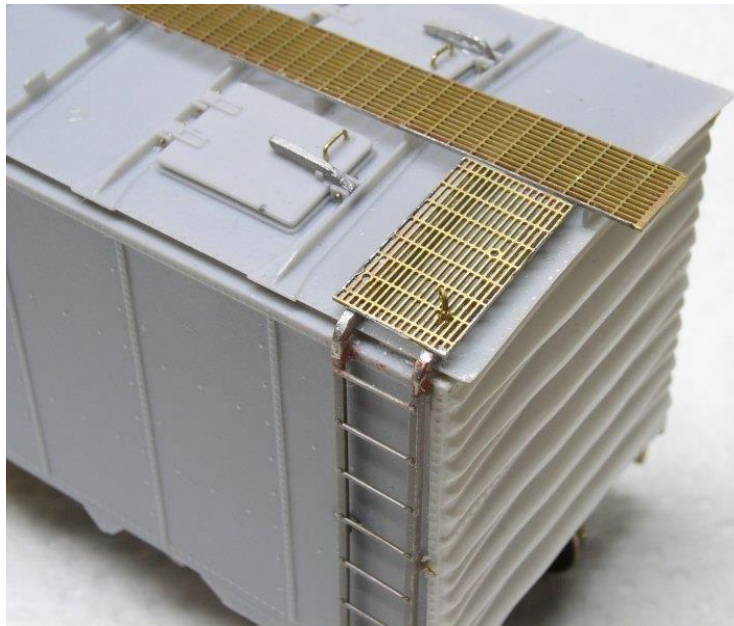


Figure SRB5

6. Use 0.014" rod to form the "L" shaped grab irons that will thread through the angled eyelet and into the holes that are drilled next to the two outer bolt heads. The grab irons should be approximately 3 1/2" from the surface of the lateral running boards. See Figure SRB6a and Figure SRB6b

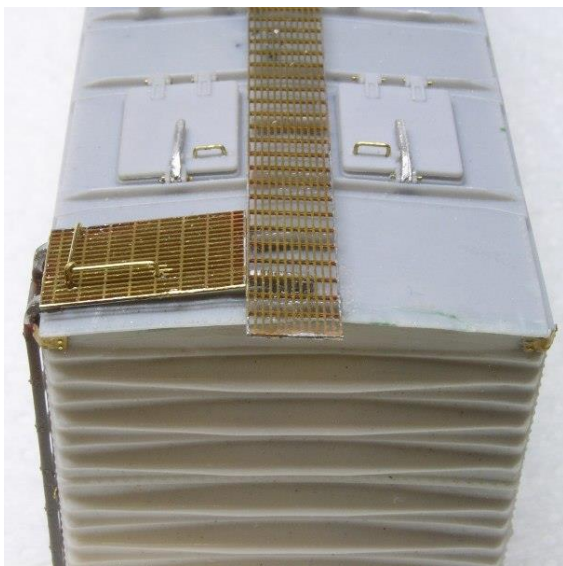


Figure SRB6a

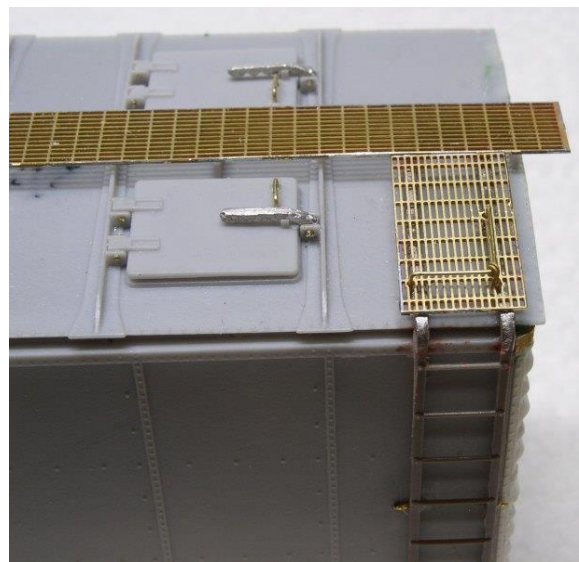
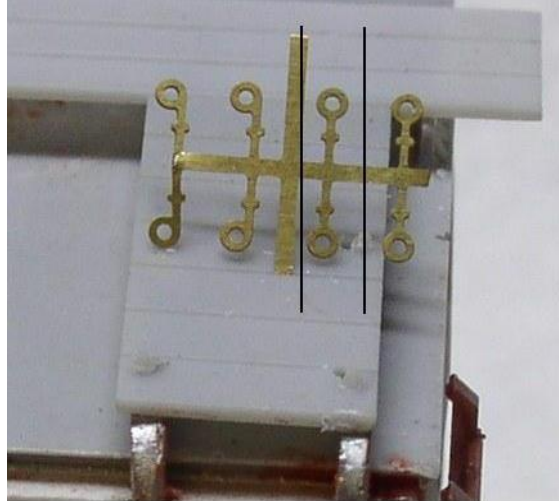


Figure SRB6b

## The Ends

*\*\*\*Please note that a Series One End is shown for the following steps but the details are the same for all the series.\*\*\**

1. The etched eyelets which are across from each other are paired and meant to be folded to form a 0.016" eyelet out of the 0.008" brass. Cut vertically three sets of the straight eyelets. Carefully fold each pair over to form a 0.016" eyelet. Use one pair of pliers to hold the eyelet and another to squeeze the end so that the fold is closed. See Figure E1.



Cut Vertically As Shown By Lines

2. In the B end (Brake Wheel End) drill 0.020" holes in the bottom rib, the rib just below the rivet seam and in the rib second from the top 2" away from the right ladder stile. Hold the eyelets in a pair of pliers and grind off the protrusion that allows the eyelet to stand away from a surface. You need to make the eye sit flush with the surface of the rib. When done, glue the eyelets in place. This will form the brackets for the Brake Retainer valve line. As an aside early CNR 40' 10' IH boxcars and reefers had straight retainer lines. The US roads had them angled. See Figure E2

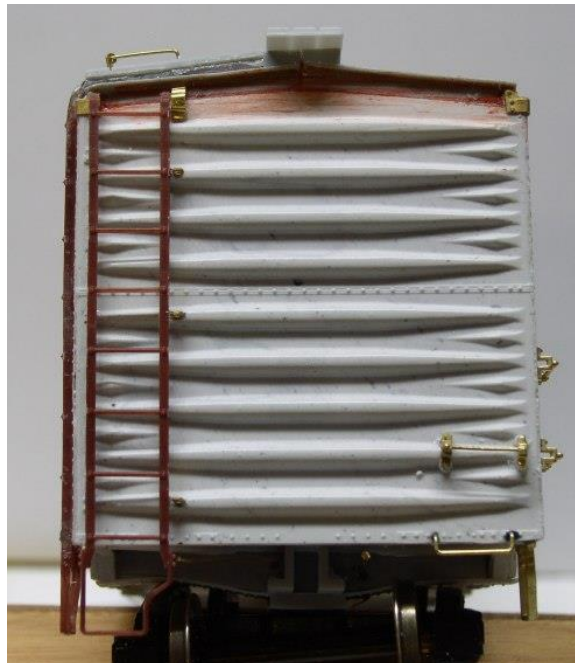


Figure E2

3. Use a scrap piece of brass to form a small 'U' 3" x 5" x and about 2" tall so that it sits level with the ribs. (You can also use a scrap piece of plastic.) Glue it in place right in line with the eyelets for the retainer valve. See the top right side of the ladder in Figure E2.
4. The Grandt Line Brake Instructions describe part k as the dirt collector when in fact it is the retainer valve. Remove the retainer valve from the sprue and use a 78 or 79 drill bit to drill out the hole in the bottom about 2 scale inches. Glue the retainer valve to a piece of 0.014" rod. Cut the rod leaving enough to form the end to meet up with the retainer line under the end of the car. Slide the rod into the eyelets and glue the retainer valve and rod in place. Bend the end of the rod to meet up with the retainer line. Trim if necessary. See Figures E3 and E9.



Figure E3

5. Locate the cut lever brackets, and the running board supports. On the backs of these parts are dimples. These dimples are guide for making rivets. Use the blunt end of a 78 or 79 drill bit clamped in a pin vice to emboss rivets from the back of these parts. You can safely do this on a cutting mat or a piece of leather.
6. Fold the end cut lever brackets as shown in figure E4.



7. Measure about 2" from the centre bottom of the car and attach the end cut lever bracket there. See Figure E4



Figure E4

8. Form the cut lever from 0.014" rod using the following dimensions shown. Please be aware that there may be some variance in dimensions. We have found when using Sergent couplers that the cut lever does get in the way of the magnet so we make the tongue 2" shorter. See Figure E5.

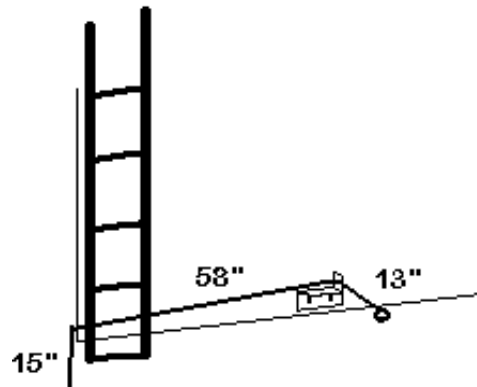


Figure E5

9. Thread the cut lever through the end bracket and under the ladder. Slide the side bracket over the cut lever handle and glue it to the side of the ladder for Series 1 - 3. In the later Series, glue to the grab iron which is the bottom step. See Figures E6 and E.

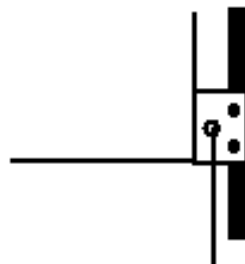


Figure E6

10. Repeat Steps 5 to 9 for the A end.

11. On the B end, fold the Gear Housing bracket and test fit. The lip may be too long to form a vertical fit. If necessary file off enough material to get it to form a good vertical fit. Position it so that it is horizontally 19" from the centre of the car and that the two legs are centred on the rib second from the top. The placard is mounted 11" from the side on the two ribs above the rivet seam. Glue both in place. See Figure E7.

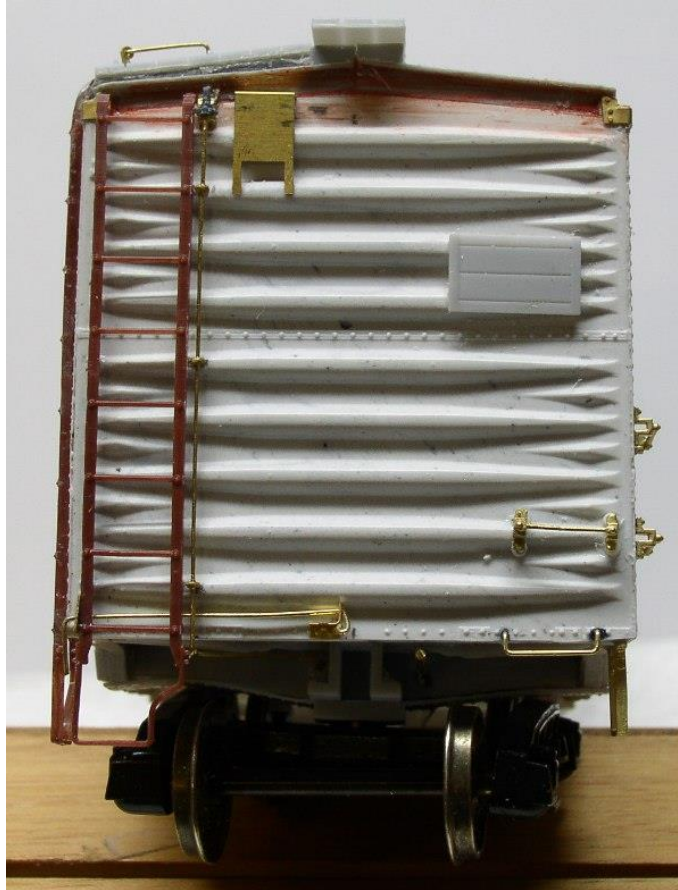


Figure E7

12. About 2" off centre to the right, chisel out a groove on the back of the Gear Housing. This is to fit the chain. Glue the chain in the groove. See Figure E8.



Figure E8

13. Turn over the car. On the bottom of the end, measure 17" to the right of centre. Drill a hole using a number 69 bit. Remove the Bell Crank from the Brake Sprue and glue it in place. See Figure E9.

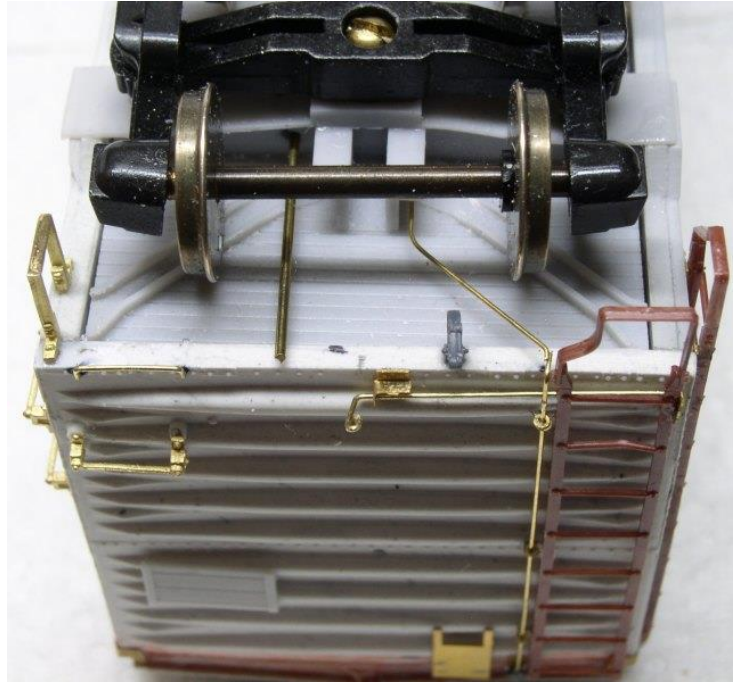


Figure E9

14. Cut the chain that is glued to the brake housing so that it is about 21" long. For Series 1, 2, 5 and 6, glue the Ajax brake wheel to the brake housing. Use the etched Universal brake wheel for Series 3 and 4 only. If you don't use it, that is a bonus for some other car. Glue the brake housing to the brake housing bracket. The centre of the brake wheel should be about  $16 \frac{3}{4}$ " down from the running board. See Figure E10.



Figure E10

15. The Grandt Line Long Rod and Clevis is not long enough. Fold the etched clevis into a 'U' and attach to the end of 0.020" rod. Check the fit on the Bell Crank and check to see how long the rod should be to attach to the chain hanging from the Gear Housing. We found it to be 6.5 scale feet. Attach the rod to the chain. Then attach the clevis to the Bell Crank. See Figure E11.

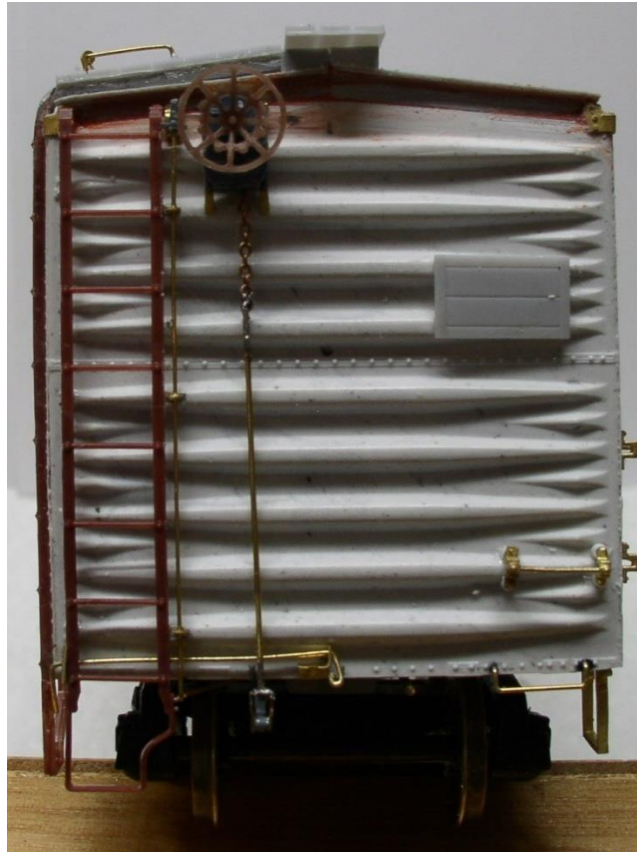


Figure E11

16. There are dimples in the rear of the Brake Platform Brackets. Use the blunt end of a #78 drill to emboss rivets on top of a cutting mat or a piece of leather. Bend the Brackets for the Brake Platform as shown in Figure E12.



Figure E12

17. Test fit the Brake Platform Brackets to make certain that when installed, they will provide a level surface for the Brake Platform. Attach the bracket closest to the centre 6.25" from the centre. Attach the bracket closest to ladder 21" to the left of the other bracket. See Figure E13.

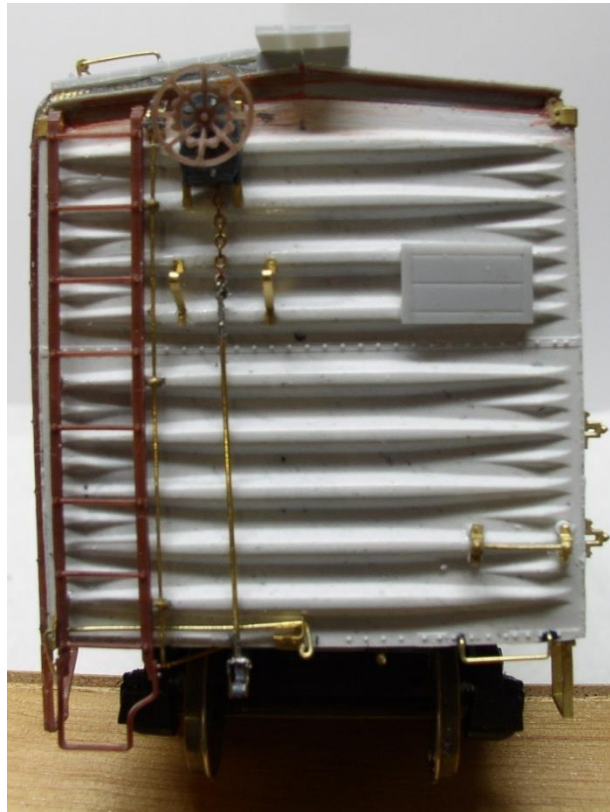


Figure E13

18. Fold the Brake Platform as shown in Figures BP 1 and BP2.

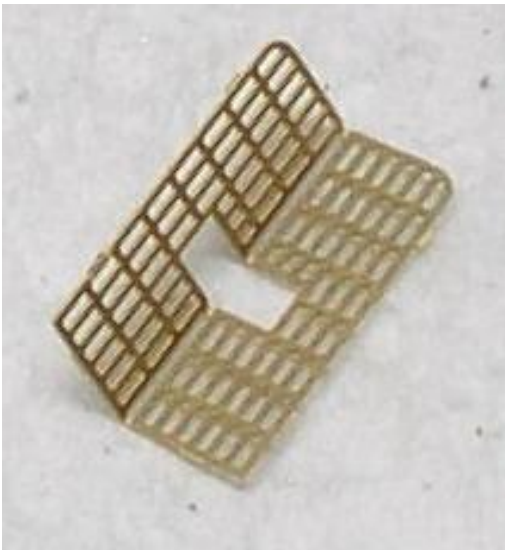


Figure BP1

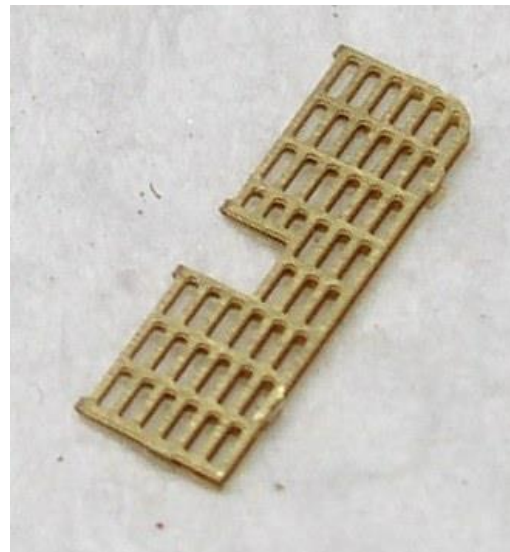


Figure BP2

19. Attach the Brake Platform to the top of the Brake Platform Brackets. See Figure E14.



Figure E14

20. Use the dimples at the underside of the Running Board End Support to emboss rivets. Fold the top of the Running Board End Support 90°. See Figure E15.

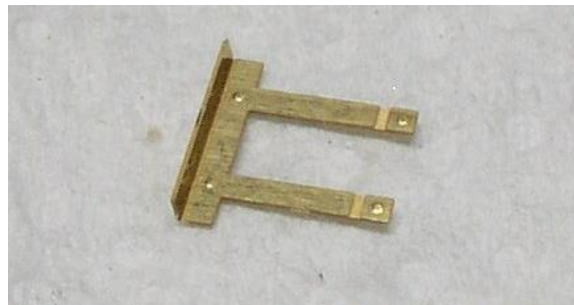


Figure E15

21. Bend the legs of the of the Running Board End Support backward and fold the feet forward. Install on the end of the running board. Do the same for the other end. See Figure E16.

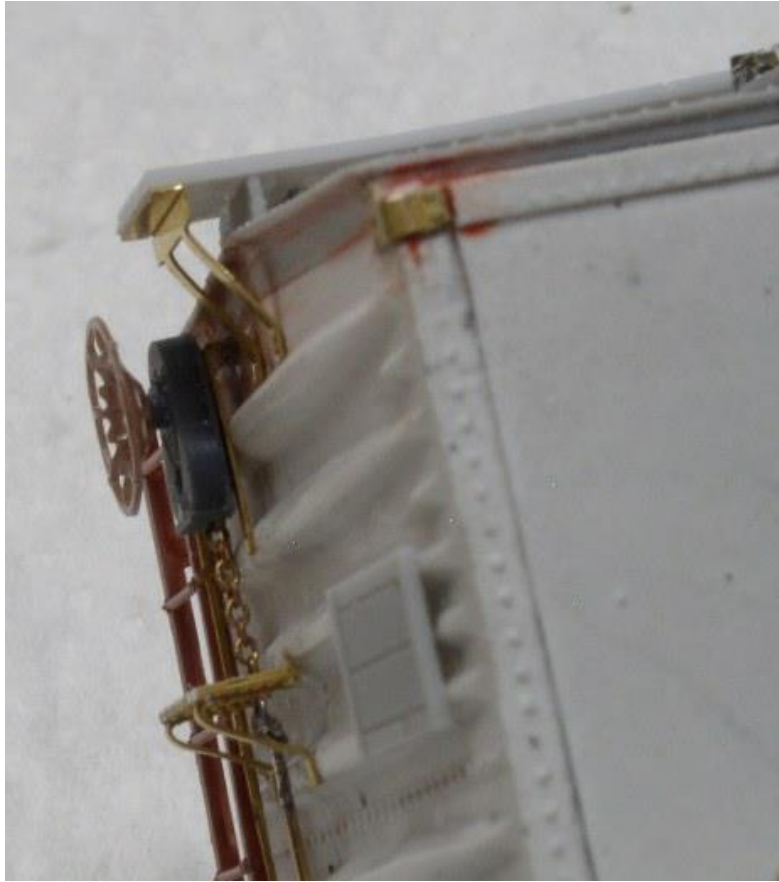


Figure E16

### **The Underframe Part 2**

1. Make two coupler draught gear pads out of 0.020" plastic and install. See Figure U.

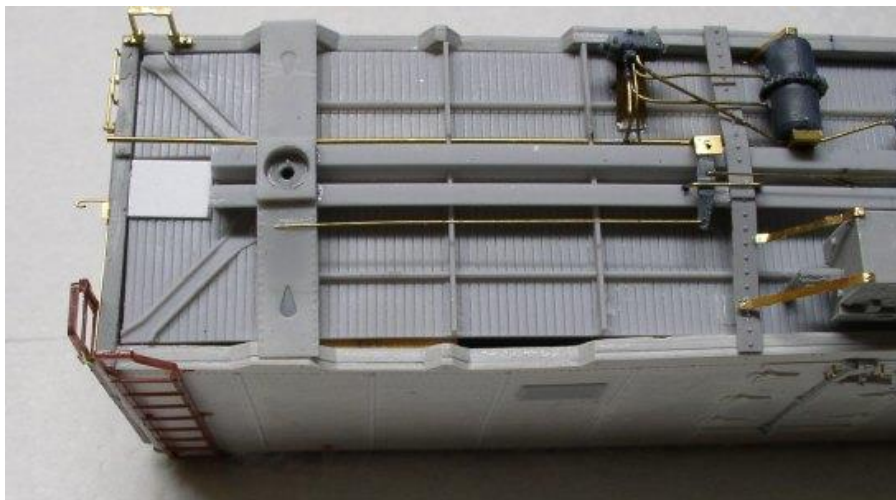


Figure U26

2. Bend the Glad Hand Bracket 90° and attach the glad hand casting. See Figure U27.

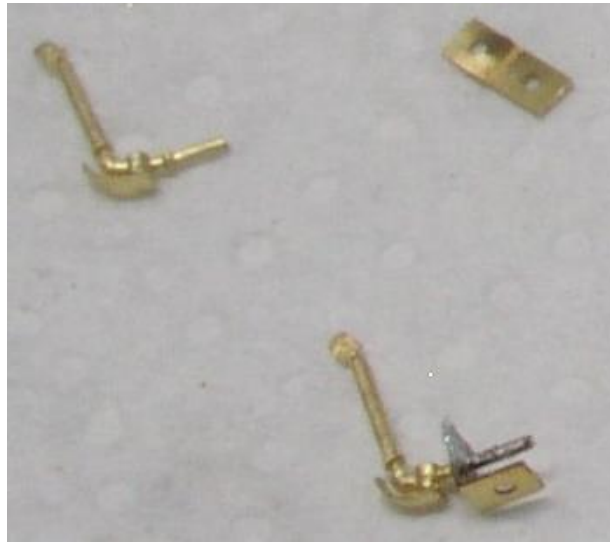


Figure U27

3. Drill a 0.032" hole just in front of the brake line and cut back the brake line so that it just touches the inside edge of the end. Cut a short piece of 0.032" rod and glue in the hole. This will serve as a post for the Glad Hand/Glad Hand Bracket. See Figure U28.

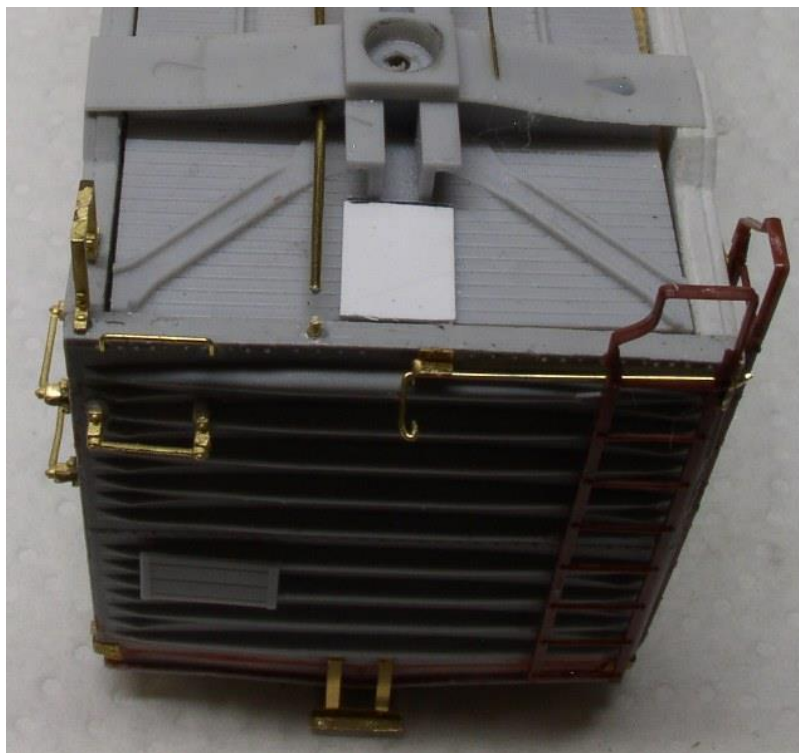


Figure U28

4. Test fit the Glad Hand/Glad Hand Bracket on the post. Trim if necessary. Install the Glad Hand/Glad Hand Bracket on the post. It should provide the appearance of an extension of the Brake Line. See Figure U29.

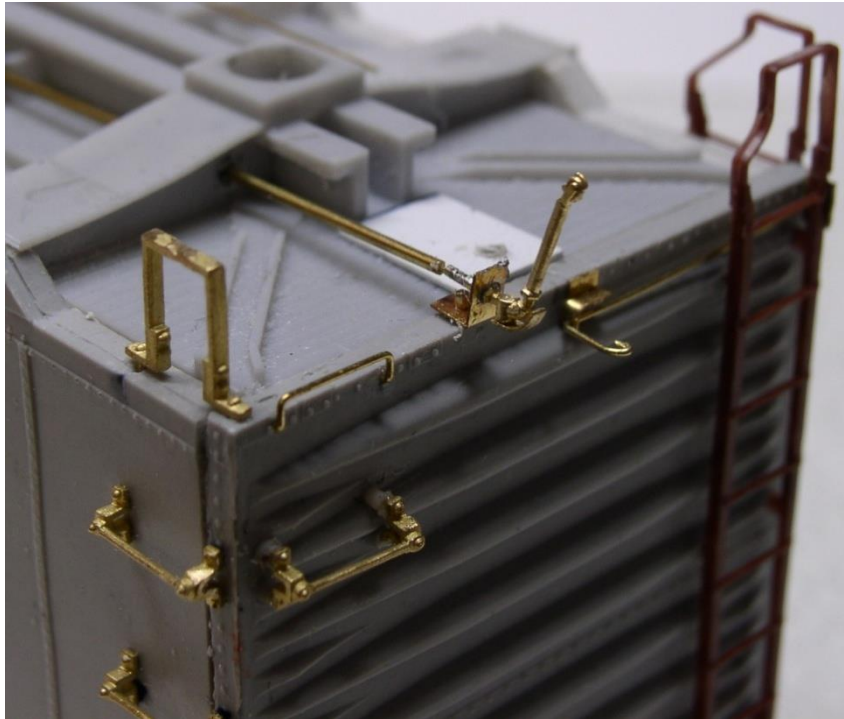


Figure U29

5. Test fit the SHS couplers provided in the kit. You may have to adjust some things to get a good fit. The couplers shown are Sergeant which are no longer available. This is what we use so that is why they have been installed. See Figure U30.



Figure U30

6. Attach about 28" of chain to 0.020" brass rod. Attach the chain to the Brake Cylinder/Long Brake Lever combination. Attach the free end of the brass rod to the bolster. A Series 2 underframe is shown for comparison. See Figure U31.

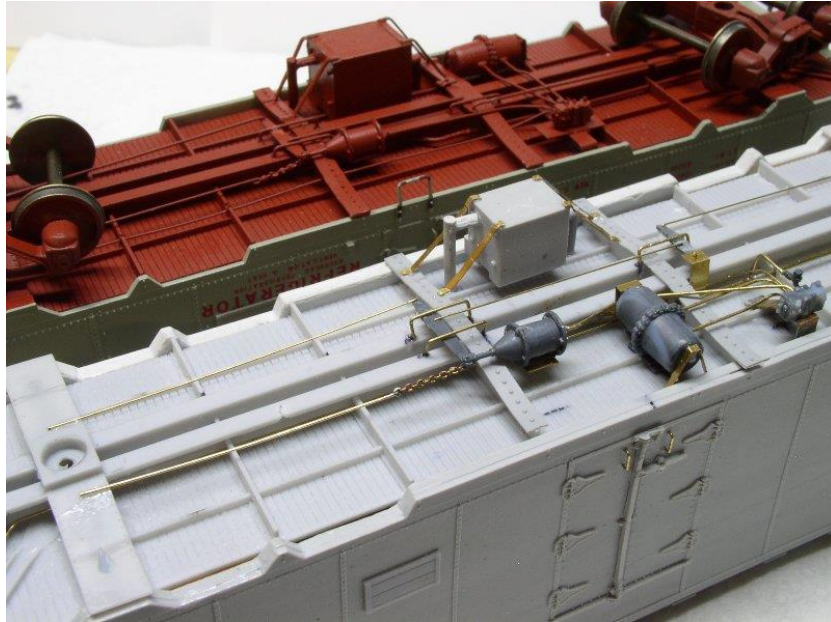


Figure U31

7. Clip the ends of the bolsters so that they are recessed from the edge of the side about 2". Cut pieces of the 0.030" square plastic rod 15" long. These will represent the jacking pads. Glue them in front of the bolsters on the body gussets. See Figures U32 and U32b.

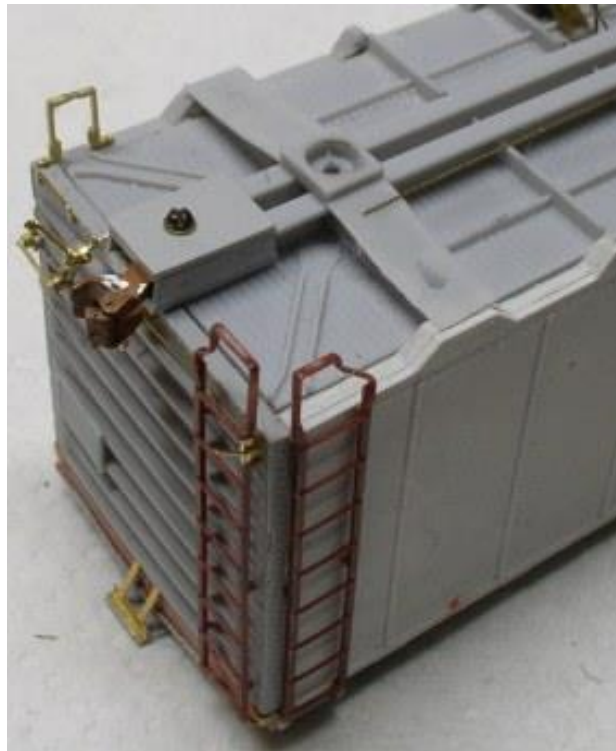


Figure U32



Figure U32b

**Last Details**

1. The side placards were originally placed directly below the top horizontal rivet line in the second panel to the right of the door. This lasted from August 1939 until December 1939 which is a 4 month window. In December 1939, they were moved to sit directly below the bottom horizontal rivet line in the same panel. Both are shown in Figure LD1. We chose to place the placard in the lower place. Do the same for both sides. See Figure LD1.



Figure LD1

- The Liquidometer originally was placed beside the lowest left hinge on the side where the charcoal heater is. Later, on some of the cars, it was moved to the centre of the panel. We have photos showing Series 1 cars in later colour schemes with the original positioning and the later positioning. You can choose. We chose the original placement. See Figure LD2.

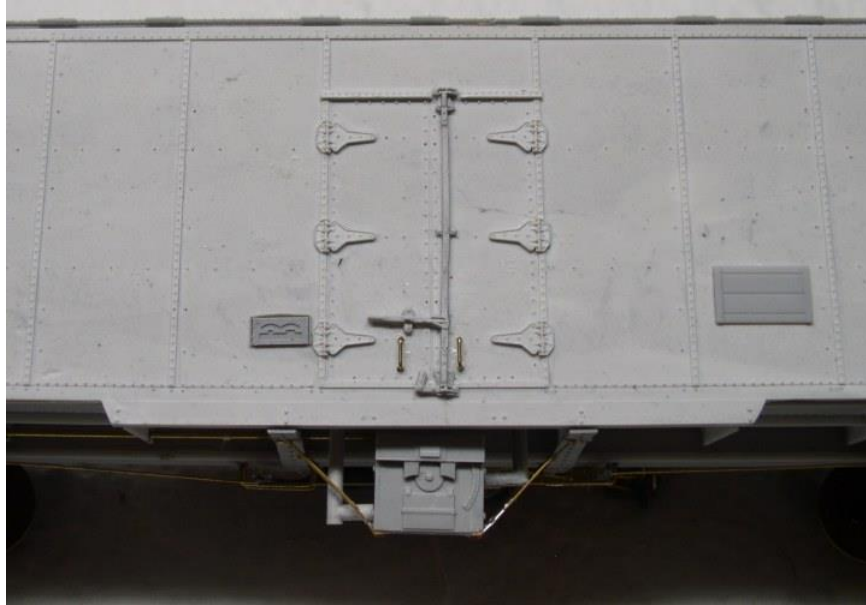


Figure LD2

- Add the stirrup steps in the holes you drilled earlier under to the right of the doors. See Figure LD3.

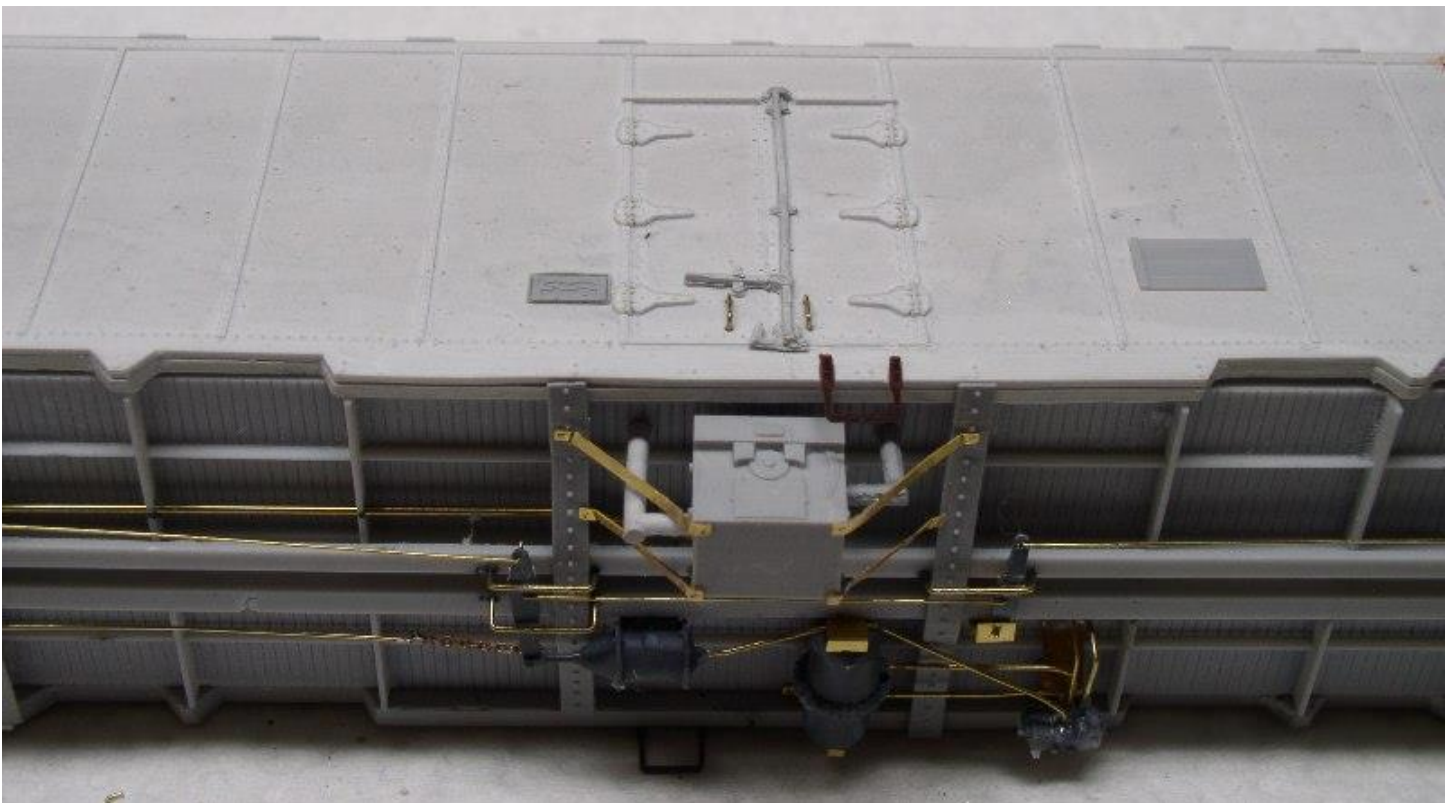


Figure LD3

Congratulations, you have finished the building part. Test out your new car and add whatever weight you deem proper.



Series One – Three Detailing A End



Series One – Three Detailing B End

## Painting Instructions

Series 1 and Series 2 cars, as built, were all CNR Red Number 11 (Mineral Brown) with white lettering, no maple leaf. As they were shopped they received the Grey Number 11 scheme with red lettering, the green maple leaf and the angled wafer. Series 3 and beyond were painted CNR Grey Number 11 with a CNR Red Number 11 underframe. Some of them were repainted grey and received the red maple leaf which was only applied to Series 3 and 4 when built. Series 1 cars were shopped in 1946 which was when Series 5 was introduced with the green maple leaf. The angled wafer lasted from 1943 until 1954. After 1954, the wafer was horizontal. Both schemes had CNR Red Number 11 (Mineral Brown) trucks and underframes.

It is our understanding that these cars were all repainted into the Grey scheme when they were shopped in 1946 but there are always exceptions.



CNR 209600 Series 2 in Grey 1943 Scheme

CNR 209590 Series 1 in Original Scheme

If you bought this kit with the original white lettering, it would be in a package of dry transfers. It is best to paint the car and put a flat overspray on the car for this lettering to work successfully. But it's even better to put the lettering on blank clear decal paper and cover the lettering with MicroSol® Liquid Decal Film. Then treat them like a wet decal. A lettering arrangement diagram comes with the set.

If you purchased this car with Black Cat decals, then you are modelling it in the grey scheme. A lettering arrangement is included with these decals.

Series 2 and 3 will have potential for 12 versions and 4 versions of paint schemes depending on era. Series 4, 5 and 6 will have potential for 6 versions and 3 versions of paint schemes

The Express reefer will come out after all the other Series are done.

## Appendix One – Series Information

Series 1 was built in 1939/40. There were 100 built. They had square corner Dreadnaught Ends, Ajax brake wheel and wood running boards. The Ajax brake equipment was located differently like on the 1937 AAR boxcars that CNR had. Mineral Red paint scheme with no maple leaf. Numbers 209500 - 209599

Series 2 was built in 1942. There were 100 cars built. They had 'W' corner Dreadnaught Ends, Ajax brake wheel and wood running boards. The Ajax brake equipment location was changed to the normal location like on the PRS 1937 AAR boxcars. Mineral Red paint scheme with no maple leaf. Numbers 209600 - 209699

Series 3 was built in 1943. There were 100 cars built. They had 'W' corner Dreadnaught Ends, Universal brake wheel and wood running boards. The Ajax brake equipment location was normal. These cars arrived in the grey paint scheme with red lettering and red maple leaf, diagonal wafer. Numbers 209700 - 209799

Series 4 was built in 1944/45. There were 200 cars built. They had 'W' corner Dreadnaught Ends, Universal brake wheel and wood running boards. The Ajax brake equipment location was normal. This series was the beginning of using 7 run ladders with a stirrup step as the eighth rung below on the ends. These cars arrived in the grey paint scheme with red lettering and red maple leaf, diagonal wafer. Numbers 209800 - 209999

Series 5 was built in 1946/47. There were 300 cars built. They had Improved Dreadnaught Riveted Ends, Ajax brake wheel and wood running boards. The Ajax brake equipment location was normal. This series used 7 run ladders with a stirrup step as the eighth rung below on the ends. These cars arrived in the grey paint scheme with red lettering and green maple leaf, diagonal wafer. Numbers 210000 - 210299

Series 6 was built in 1948/49. There were 300 cars built. They had Improved Dreadnaught Riveted Ends, Ajax brake wheel and steel mesh running boards. The Ajax brake equipment location was normal. This series used 7 run ladders with a stirrup step as the eighth rung below on the ends. These cars arrived in the grey paint scheme with red lettering and green maple leaf, diagonal wafer. Numbers 210300 - 210599

Series 7 was built in 1949. There were 300 cars built. They had Improved Dreadnaught Riveted Ends, Ajax brake wheel and steel mesh running boards. The Ajax brake equipment location was normal. BUT this was the start of the end stirrup steps mounted on the side. There were rectangular pieces of metal added to the ends bottom of the sides of the cars that held these. The kit does not cover this series without these modifications. These cars arrived in the grey paint scheme with red lettering and green maple leaf, diagonal wafer.

Numbers 210600 – 210899