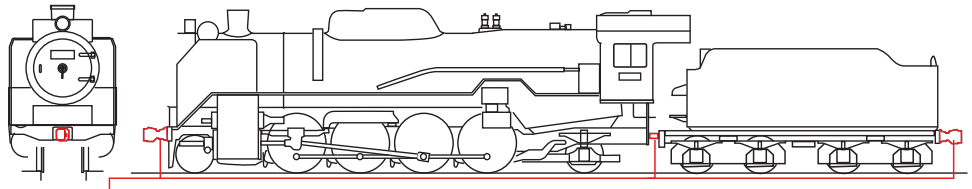
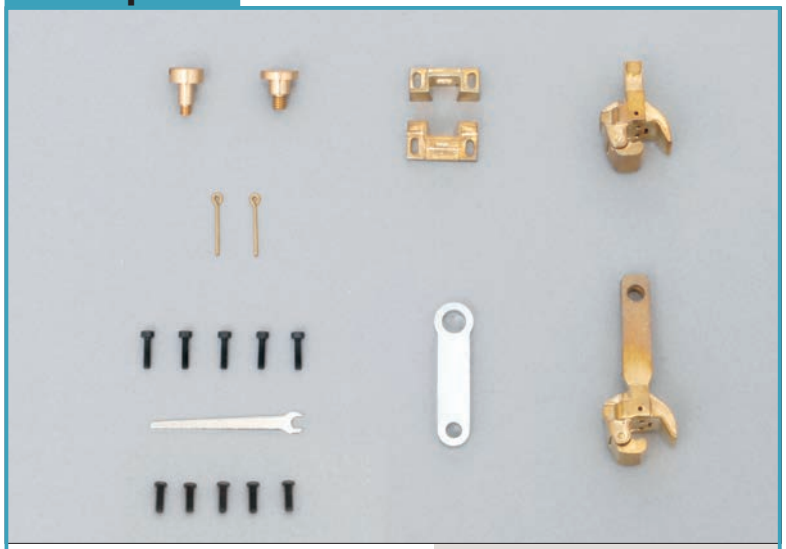
The couplers



The couplers

Your parts

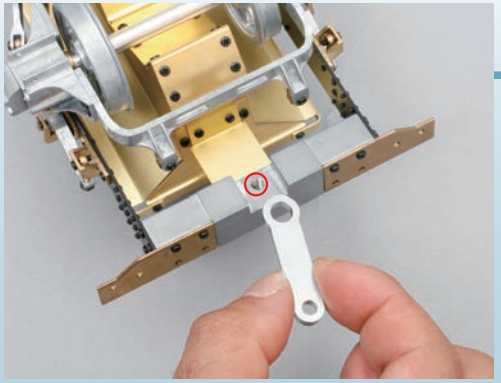


Pivot screw B
Pivot screw A
Locking pins × 2
Coupler seats × 2
Coupler A
Bolts (2 × 8mm) × 5
Miniature wrench
Screws (2 × 5mm) × 5
Drawbar
Coupler B

Required tools

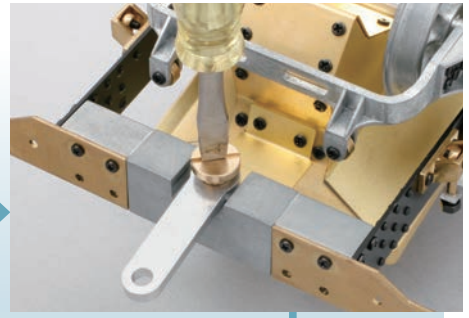
Screwdriver
Instant adhesive

1 Fitting the drawbar

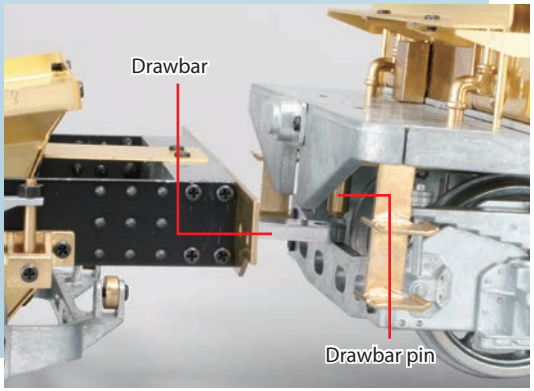


Turn the underframe body over, and align the larger hole of the drawbar with the threaded hole in the end beam.

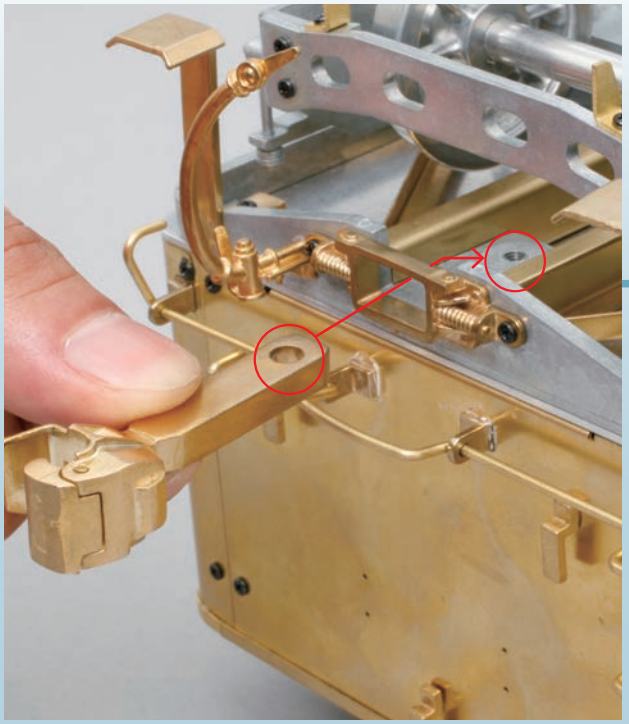
Turn the underframe back over. Insert the drawbar pin under the front of the tender and into the smaller hole in the drawbar. Once test-fitted, detach the tender.



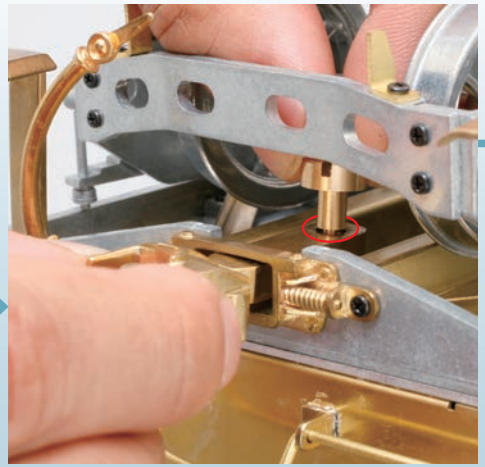
Tighten pivot screw A into the hole.



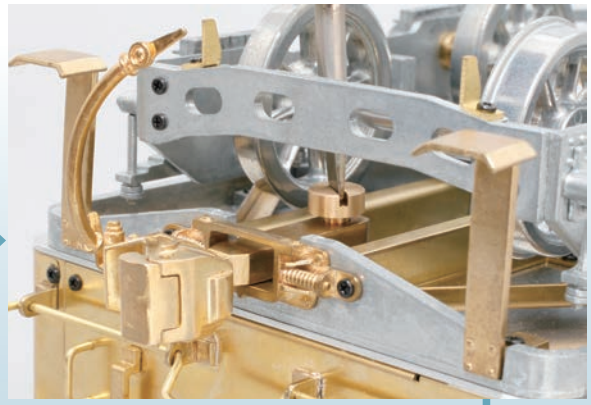
2 Fitting the coupler



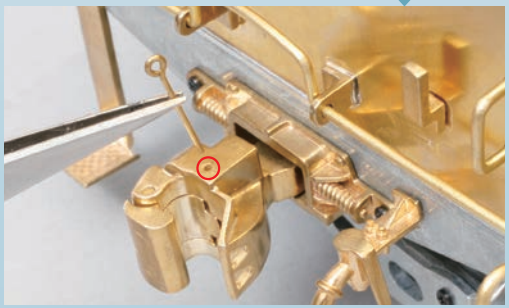
Place the tender upside down. Insert coupler B through the hole in the coupling buffer and align the hole with the one in the tender base.



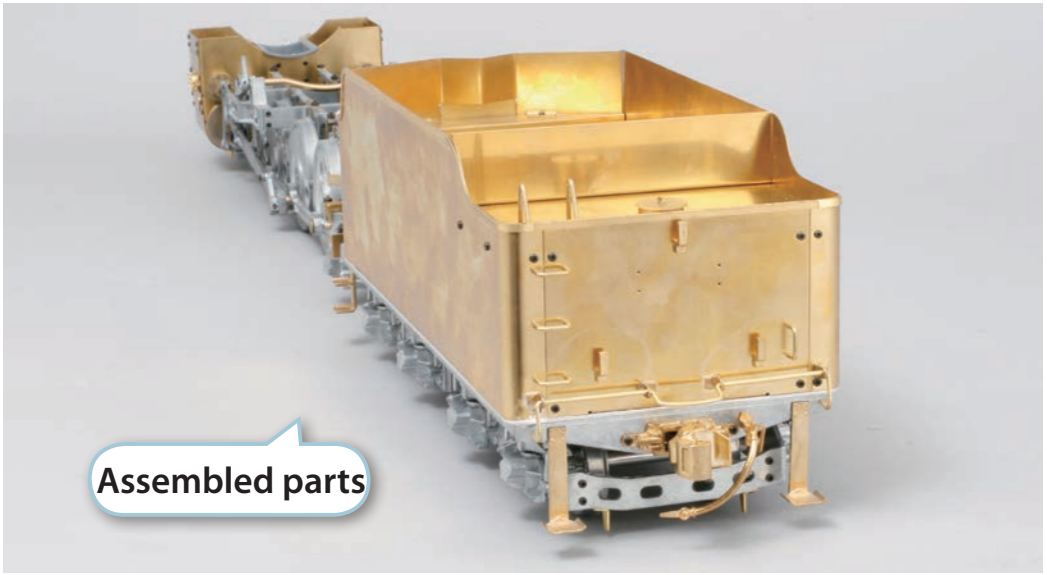
Insert pivot screw B through the hole in the coupler and into the hole in the tender.



Tighten pivot screw B into place.



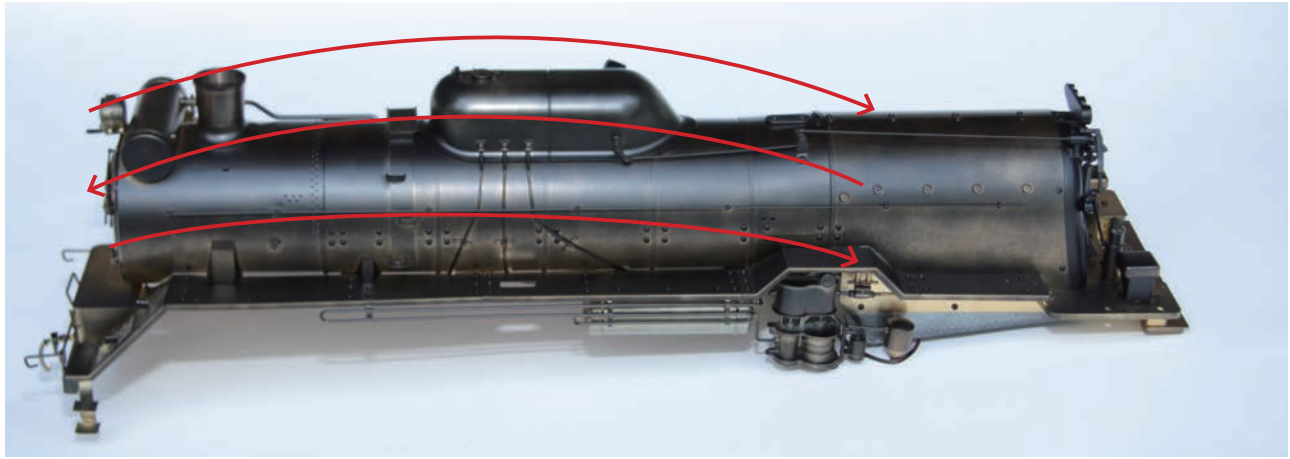
Turn the tender back over and insert one of the locking pins into the circled hole.



Painting

When you have completed the undercoating and masking stages, your model is ready to be painted.

For the black finish, you will need black paint, matt black spray paint, paint thinner and a brush. For a clear finish, you will need clear spray and a brush. Always take your time during the painting process.



Spray from about 30cm away, using long, controlled sweeping movements

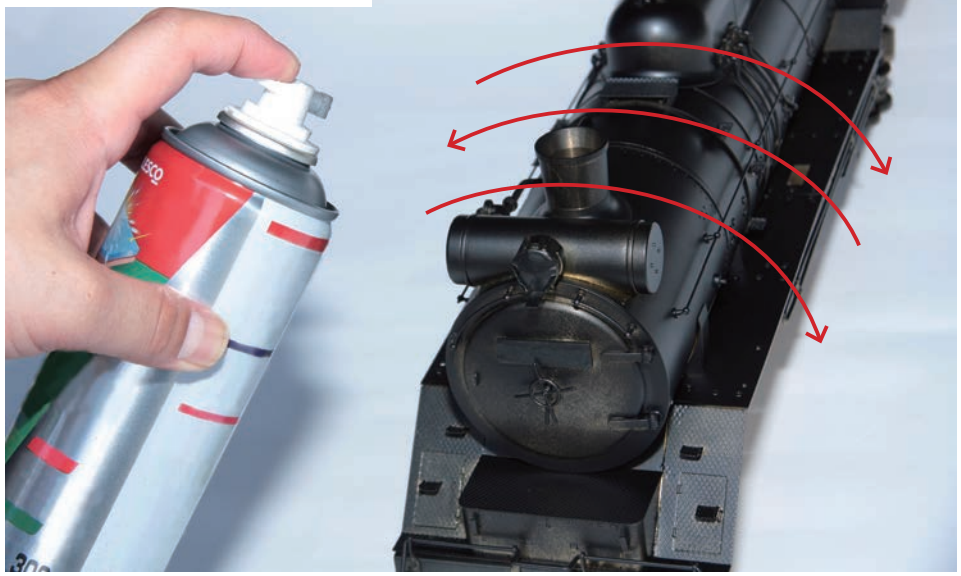
Always paint in a well-ventilated area

It's best to change the angle from which you are spraying after every few sprays, to avoid a build-up of paint and an uneven coating.

Whether you have chosen a clear finish or a painted black finish for your model, the spraying process is the same. In the same way as the primer you applied in the previous painting stage, you should locate and hand-paint any areas that will be hard to reach with the spray.

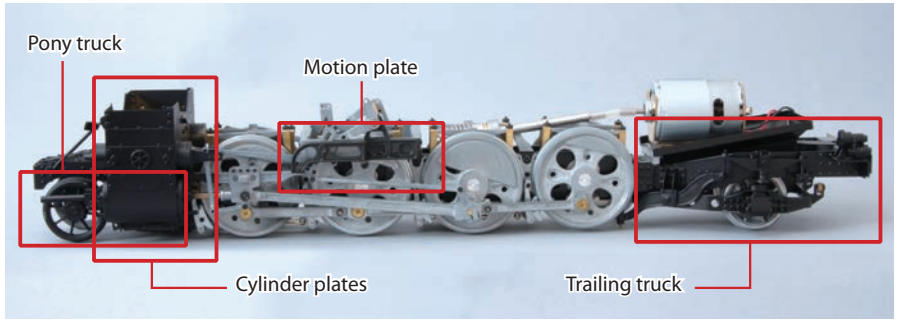
Make sure that the area you will be painting in is well ventilated. Before using spray paint, shake the can well to make sure that the paint inside is mixed properly. When spraying, always use a fast but controlled action, with a sweeping motion from the elbow, not the wrist. Keep the can at a distance of about 30cm from the surface, as this will increase the area you can paint, as well as reduce any build-up of paint. If paint does build up, it will take longer to remove it and prepare the surface again than it will to paint it correctly in the first place.

Spray two or three bursts before moving on to a different area or angle, as indicated by the photos above and on the right, and only return to an area that has already been painted when the paint there has completely dried. This applies to both black and clear sprays. When returning to an area that has already been painted, try to paint it from a different angle, as this will improve coverage. Spray the entire surface once and then leave to dry before applying a second coat. That way, you will be able to see any uneven areas of paint more clearly.

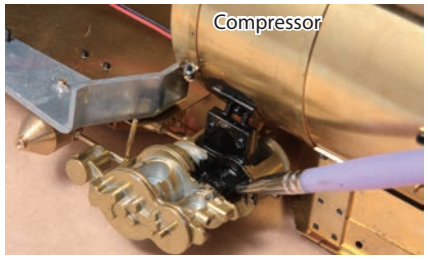


Black paint finish

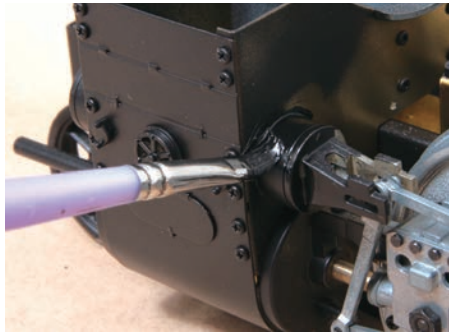
You will need to mask off the wheels and the majority of the underframe. The outlined sections below should be painted. It is easier to spray them, but you can choose to hand paint them instead.



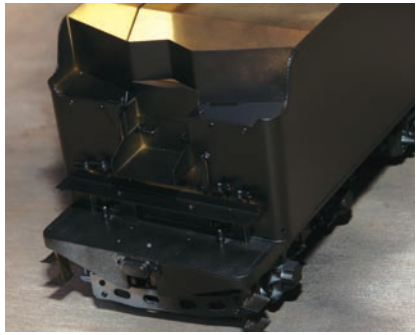
Hand paint all of the pipes around the model, because the spray won't be able to reach the backs of them.



Parts with a complex shape, such as the compressor, should be hand painted.

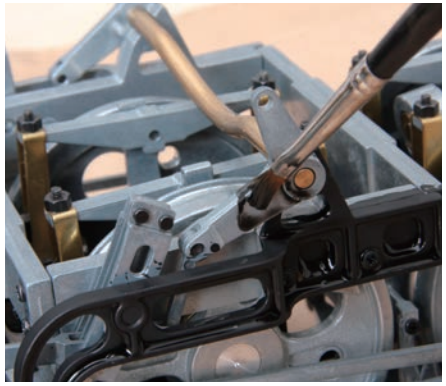


When the masking has been removed, you will need to paint the areas that were masked during the spraying process.



There may still be uneven areas that were missed when spraying.Touch up these areas by hand painting.

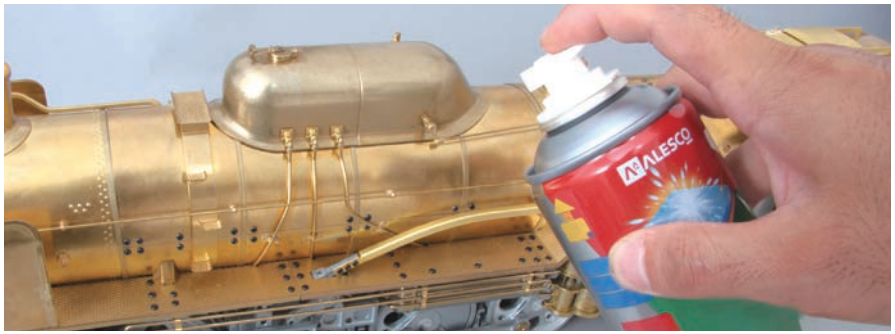
The pony truck and tender trucks, and their wheels, should be painted entirely black. The trailing truck should be painted as shown above, with the wheels left unpainted.

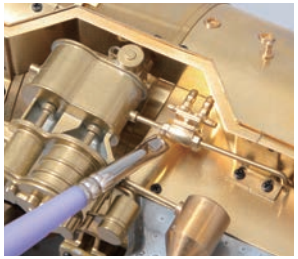


If paint gets onto any surface that you don't want painted, use a paint thinner to remove it before it dries.

Clear finish

If you have chosen a clear finish for your model, you won't need to mask any of it. After cleaning and applying primer, you can spray it with clear paint. You will still need to hand paint some areas to achieve an even coating.



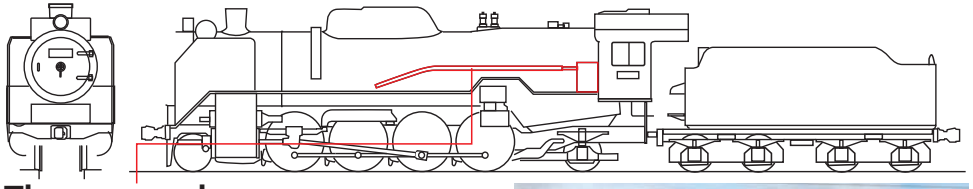


Hand paint the smaller detailed parts.

Make sure you paint the backs of parts such as the sand pipes.

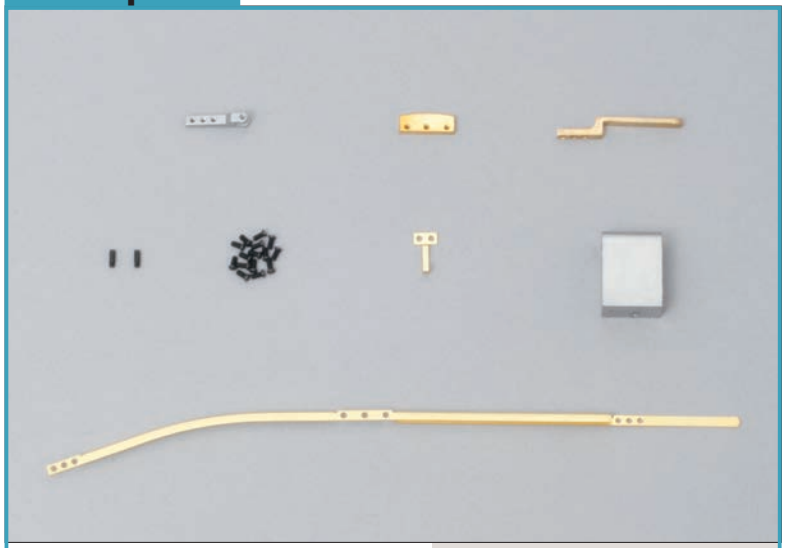
When painting the wheels, take care that the parts don't stick together.

The reverse bar



The reverse bar

Your parts



- Reverse bar link
- Reverse bar B
- Reverse bar A
- Screws (2 × 3mm) × 15
- Screws (2 × 6mm) × 2
- Reverse bar guide
- Reverser
- Reverse bar C

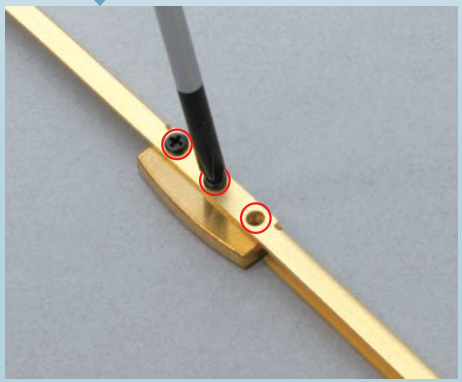
Required tools

- Phillips screwdriver
- Precision screwdriver

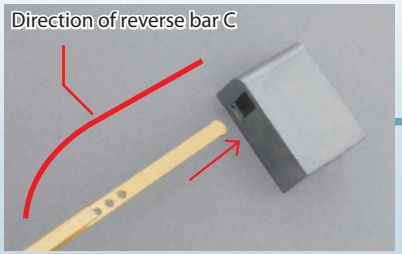
1 Assembling the reverse bar

Place reverse bar parts B and C as shown.

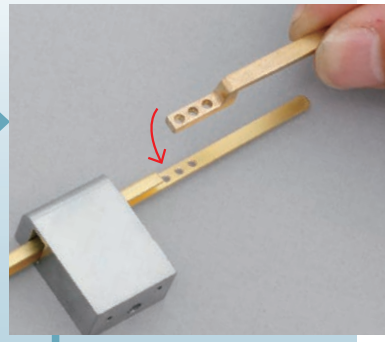
Tighten a 2 x 3mm screw into the three circled holes.



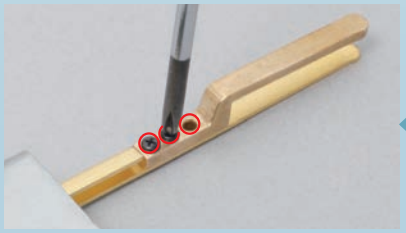
2 Assembling the reverse bar (continued)



Place the end of reverse bar C into the hole in the reverser.

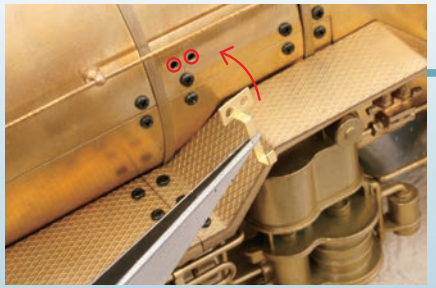


Place reverse bar A onto reverse bar C, aligning the holes of both.



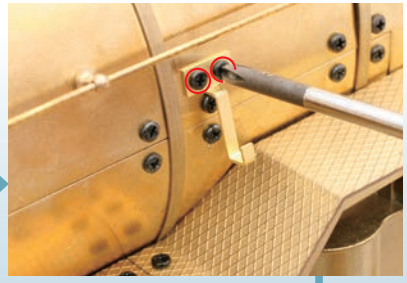
Tighten 2 x 3mm screws into the holes.

3 Fitting the reverse bar



Place the reverse bar guide up against the side of the boiler, aligning the holes at its top with the two circled holes.

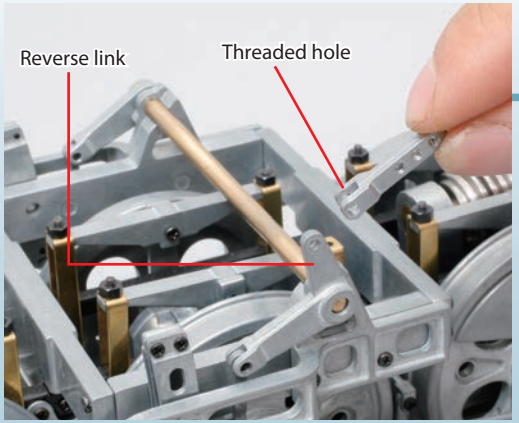
Tighten a 2 x 3mm screw into each hole from underneath the running board.



Tighten a 2 x 3mm screw into each hole.

Align the holes at the bottom of the reverser with the two holes in the running board.

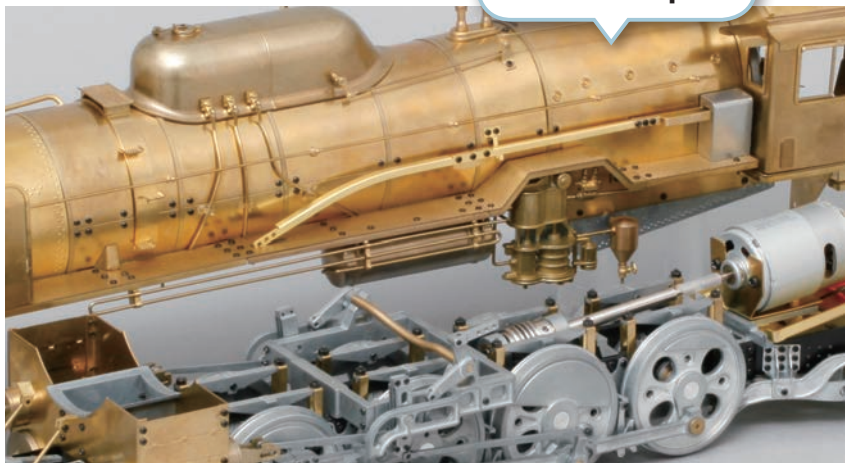
4 Fitting the reverse bar link



Place the reverse bar link over the free end of the left reverse link, with the threaded hole facing inwards.

Tighten a 2 x 6mm screw through the holes of the links.

Assembled parts



Painting the details

If you are painting your model black, then after you have applied the base coat and it is completely dry, you can begin adding the detail work.

If you have chosen the bare metal finish for your model, the painting process is now finished, but for the black finish, there are a few more steps to complete. Previous painting steps showed you how to paint parts during assembly, and the following steps show you what to paint when assembly is complete.

Take the cab apart so that you can reach the inside of it with paint. Spray all of the inside of the cab black, as even though some parts will have a bare metal or painted finish, it is easier to remove the paint from them rather than try to mask them.

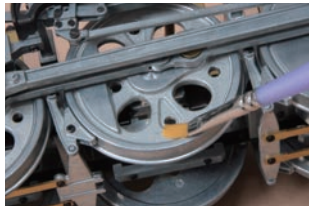
When painting the wheels, make sure that you paint only the exposed areas. Don't try to paint under the rods. Instead, rotate the wheels until the unpainted areas are visible, and then paint them.

To paint the bottom of the firebox the same red as the real locomotive, you will need to mix three paints in equal parts, as shown on the following page.

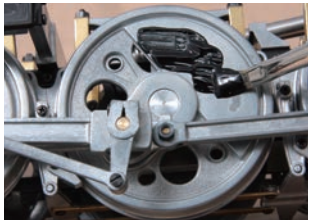
The white line extends below the running boards, from the front of the boiler to the rear of the cab, and along the top edge of the tender. Be careful not to get white paint on the rest of the model when painting these details. If you do, remove the white paint from the surface as quickly as possible and touch up with the black if necessary.

The wheels

Stage 24 showed you how to paint the wheels. If you have waited until now to do so, you can refer back to that stage, as well as following these few steps.



The paint will adhere to the surface of the wheels better if they have been degreased and primed.

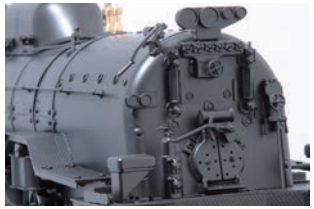


Rotate the wheels by turning the motor shaft.

Rotate the wheels to expose the areas you want to paint. This works much better than trying to paint them underneath the rods.

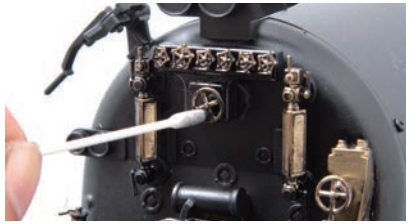
The cab

The end of Stage 59 showed you how to paint the backhead and seats of the cab. You can mask some of the larger parts when painting, but it will probably be easier just to paint all of the parts black and then use a paint thinner to wipe away unwanted paint.

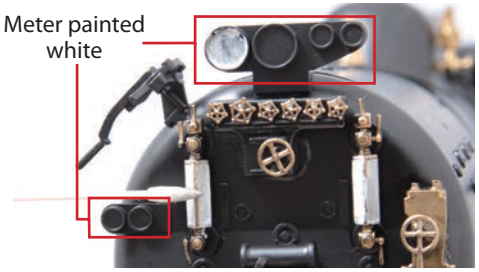


The backhead and seats painted completely black.

Instead of removing the black paint from the seat, you can paint over it when it's dry, using it as a base coat.



Use a cotton swab with paint thinner to remove the black paint from the valves and meters on the backhead.



Paint the meters and gauges with white paint to simulate the glass. You can use a cotton swab or a fine paintbrush for this.

The firebox

To paint the exposed part at the bottom of the firebox, you will need to mix together three paints in equal parts. It is recommended that you use 'Mr. COLOR' paints, as these are what have been used here, but any matching colours should work.

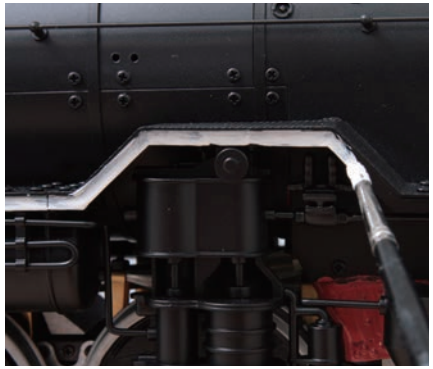
Sandy brown (left)
White (centre)
Character red (right)

The firebox of the actual locomotive

Hand paint the bottom of the firebox with a small brush; this should make it easier to control.

The white line

Using a fine brush, carefully paint the white line below the running board. Apply the paint from the front end beam to the back of the cab, and along the top edge of the tender.



Refer to the photo on the previous page when painting the white line. Remove any excess paint with paint thinner.

Paint the white line along the raised strip at the top of the tender.

The figures and coal

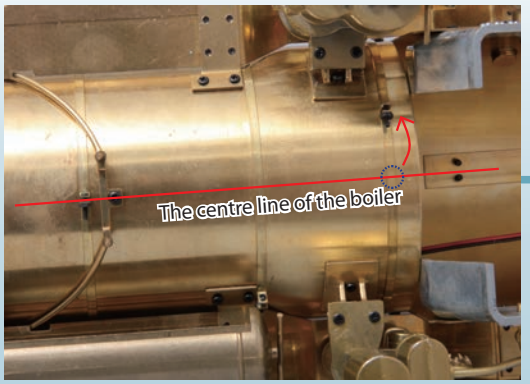
Your parts

Trainspotter
Driver
Fireman
Coal

Required tools

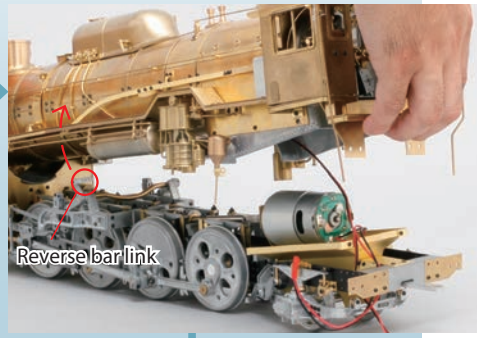
Phillips screwdriver
Socket wrench
Miniature wrench

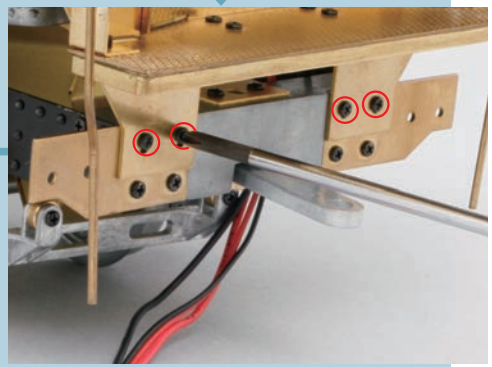
1 Combining the parts



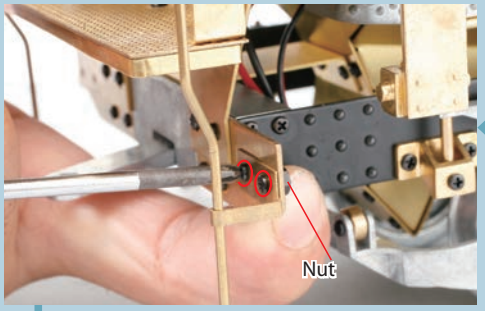
To avoid interference with the silicone tube of the motor, slide the boiler band around the boiler so that the fastening isn't positioned in the centre.

Place the headlight cable through the space in the underframe behind the ash box. The reverse bar link should pass through the hole in the running board. Carefully lower the upper part of the locomotive onto the underframe.

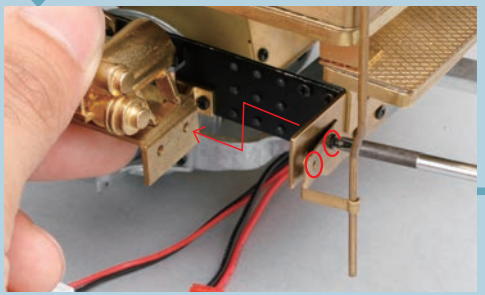




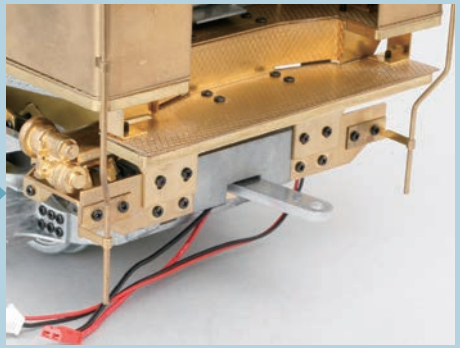
Tighten a 2 × 5mm screw (Stage 97) into each of the four circled holes.



Place the right gutter holder over the right gutter pipe, and tighten a 2 x 4mm screw through the circled holes and into a nut (all parts from Stage 58).

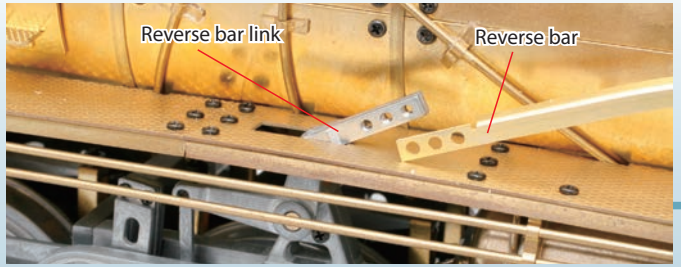


Fit the left gutter holder (Stage 58) to the left pipe and then tighten two 2 x 4mm screws (Stage 57) through the holder, the end beam and into the distribution valve (Stage 57).



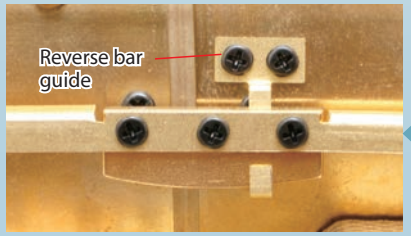
The cab and the underframe are now fixed together.

2 Connecting the reverse bar



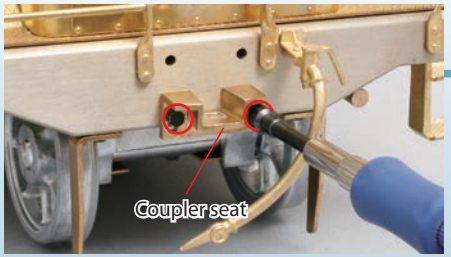
Align the holes of the reverse bar with those of the reverse bar link.

Tighten a 2 × 3mm screw (Stage 98) into each of the three holes.



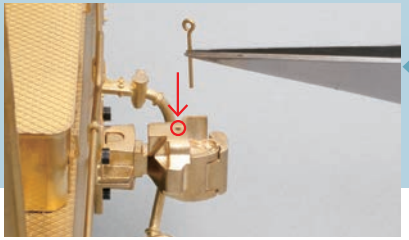
Make sure the bar is positioned in the bar guide.

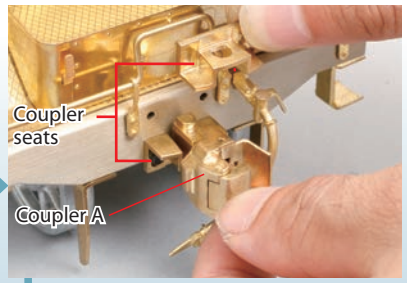
3 Fitting the coupler



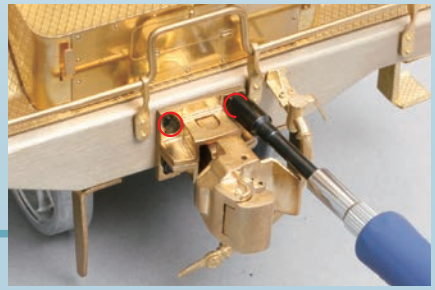
Secure one of the coupling seats to the front end beam with 2 x 8mm bolts (both from Stage 97).

Place the locking pin (Stage 97) into the circled hole in the coupler.



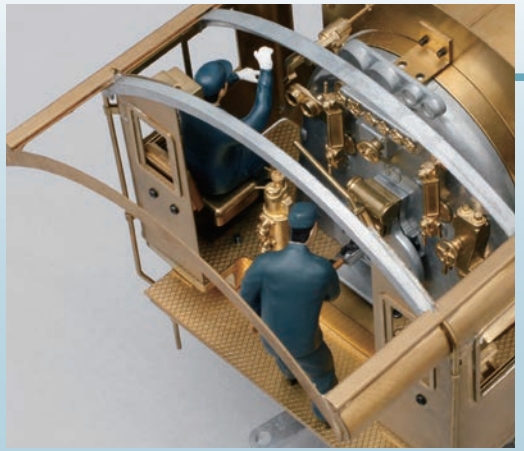


Place coupler A (Stage 97) into the coupler seat. Then place the second coupler seat on top of the first.



Tighten a 2 x 8mm bolt into each hole of the upper coupler seat.

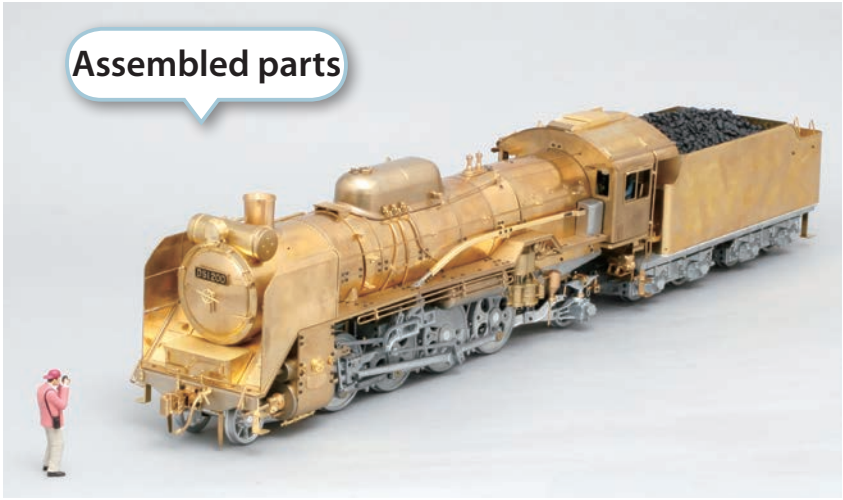
4 Placing the figures and coal



Place the driver on the seat and the fireman in front of the backhead.

Place the coal in the tender.

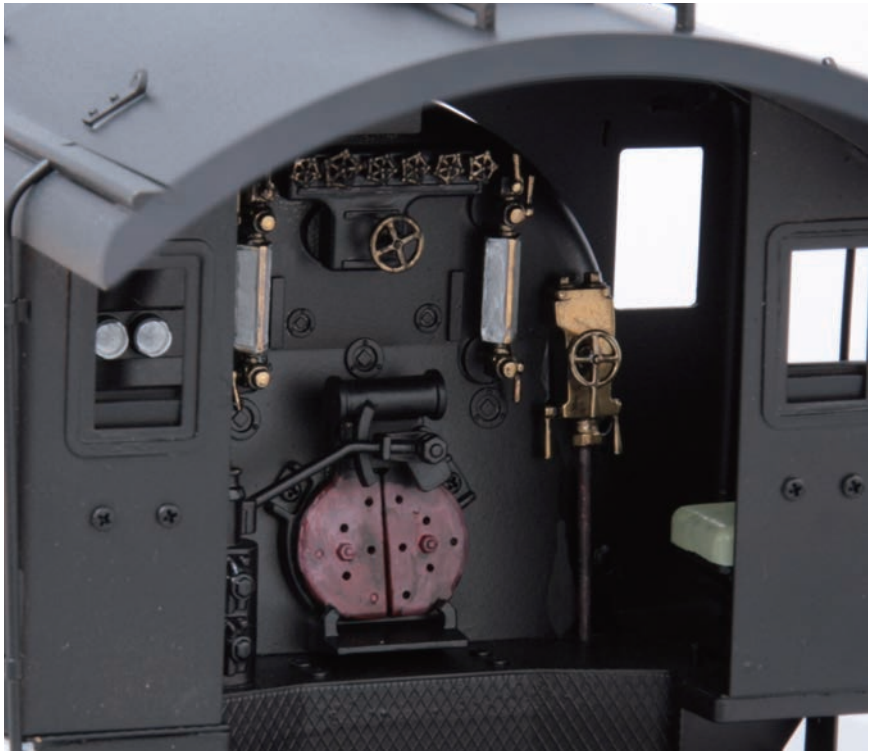
Assembled parts



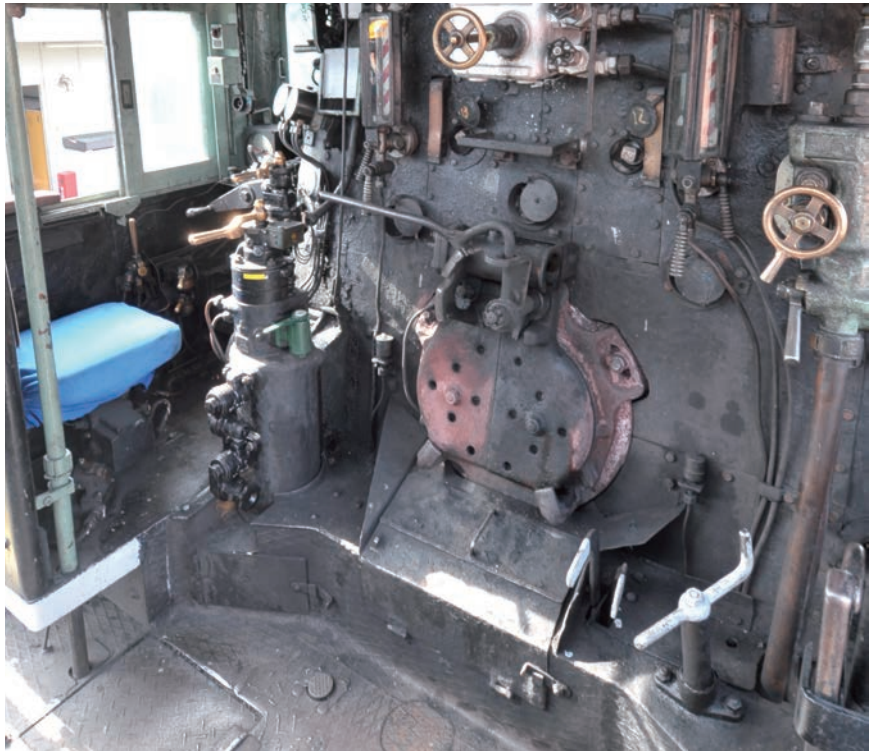
Weathering

Though the painting process is now complete, you can give your model a more authentic and used look by 'weathering' it. This effect mimics the blemishes from wear, repair work, repainting and heat that would appear on the real locomotive. While this doesn't look as appealing, it does add a sense of realism and authenticity to the model.

The steps on the next page explain how to recreate this look, as well as how to repair any uneven areas of paint.



Here, you can see some weathering effects on the firebox door and the valves.

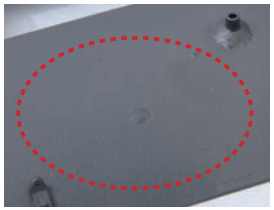


This picture shows the effects of wear and usage on the real locomotive.

Repairing paint

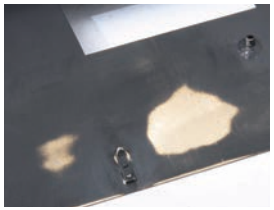
No matter how carefully or correctly you paint your model, you are likely to find some parts where the surface is uneven, due to excess paint or bubbling. You can repair the uneven areas of paint by following the steps shown here on the right.

Repairing with sandpaper



Locate any areas of uneven paint.

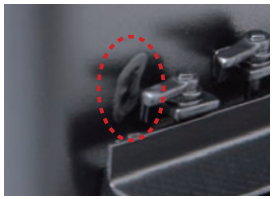
Make sure the paint is dry, and then smooth the area with sandpaper.



Keep sanding until the paint is removed.

Re-spray the area until it matches the surrounding paintwork.

Repairing with paint thinner



Some areas can't easily be reached with sandpaper.

Apply paint thinner using a brush or cotton swab.

Re-spray the affected area.

It is harder to repair cleanly using this method, so some trace may be left.

Weathering methods

Weathering creates a more accurate reproduction of the textures of the actual vehicle, but there is no 'correct' way to do this, so it will involve some trial and error. One effective method is to paint over the sprayed matt black paint with a water-based black paint to create a different texture on the surface.

This is a detail shot of the paint on the boiler of D51 200.

Reproducing the paint texture

The photo above left shows the paintwork of the actual D51200. You should be able to see that it has been repainted many times. The picture above right shows the texture reproduced on the model.

Using water-based paint

The photo above left shows the model's surface after it was painted with matt black paint. The photo above right shows the same surface after it was roughly painted over with a water-based black paint.

The firebox door

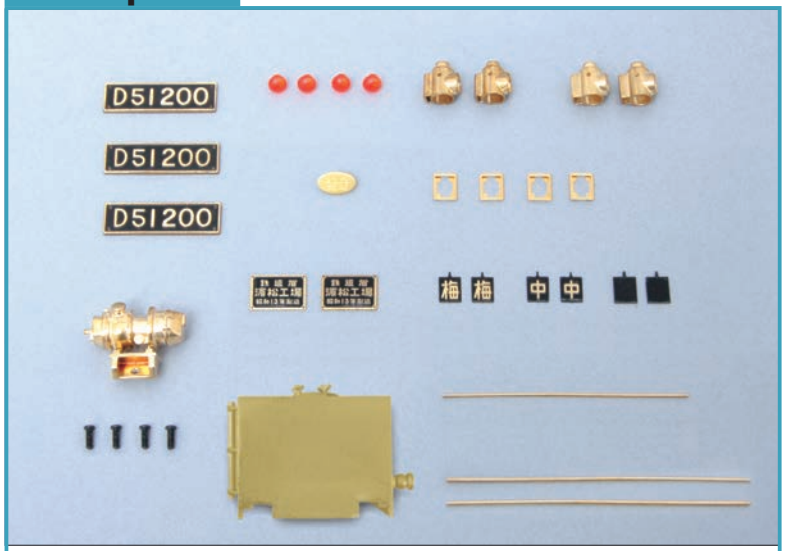
Paint over the black firebox door with a mix of red and white paint, thinned down to give the desired effect.

The valves and gauges

Paint the bare metal valves and gauges with thinned black paint to recreate the look of dirt and grease.

The final parts

Your parts

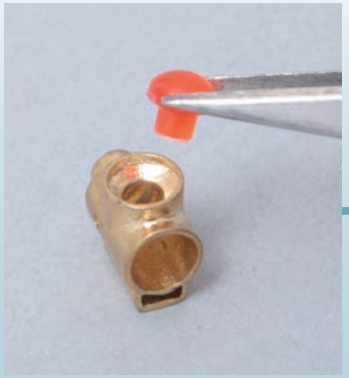


- Number plates × 3
- Lamp lenses × 4
- Lamps A × 2
- Lamps B × 2
- Commemorative plate
- Tag holders × 4
- Maker's plates × 2
- District tags C × 2
- District tags B × 2
- District tags A × 2
- Turbine generator
- Screws (2 × 4mm) × 4
- Tank
- Brass wire
- Tender handrails × 2

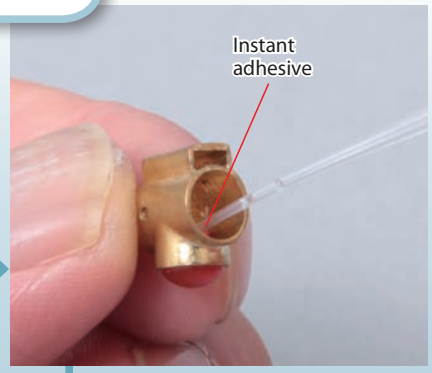
Required tools

- Phillips screwdriver
- Cutters
- Instant adhesive
- Pliers

1 Assembling and fitting the lamps

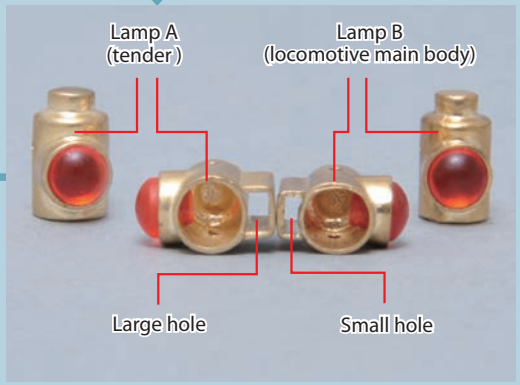


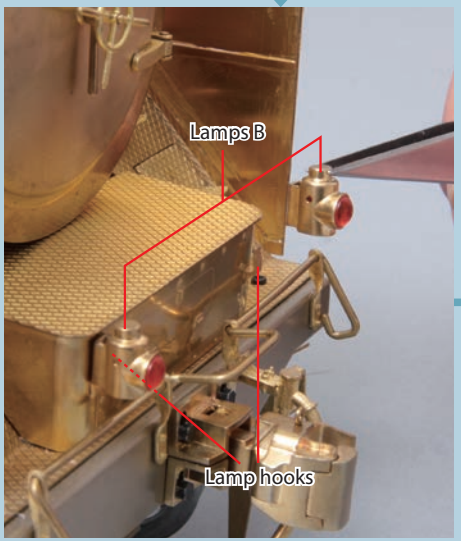
Insert the lamp lenses into lamps A and B.



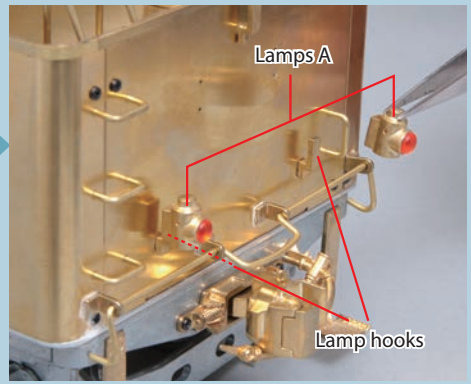
Apply instant adhesive to the back of the lens from the inside of the lamp.

Before proceeding, make sure you identify the two types of lamp – A is for the tender and B is for the front of the locomotive. Lamps A have a large hole at the back, and lamps B have a small hole, which won't fit over the tender's lamp hooks.





Place the two lamps B over the lamp hooks at the front of the locomotive.

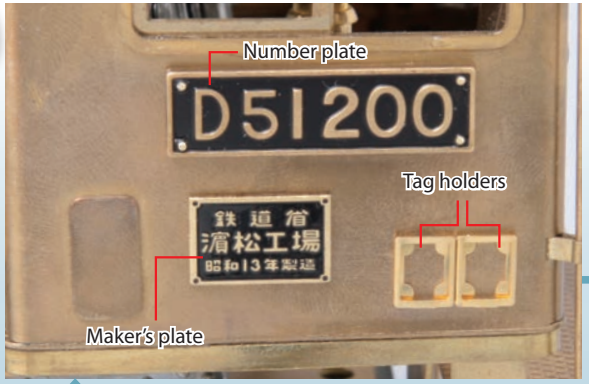


Place the two lamps A over the lamp hooks at the rear of the tender.

2 Fitting the cab number plates

Insert the brass wire into the hole in the corner of the number plate. Apply instant adhesive to hold it in place.

When the glue is dry, cut the brass wire flush with the front of the plate. Repeat this for all corners of the plate, and then for another plate, so that you have two plates prepared in this way.

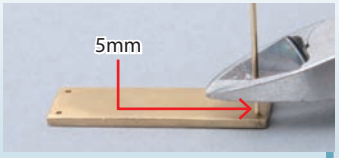


Glue the number plate, the maker's plate and two tag holders to the left side of the cab, in the positions shown.

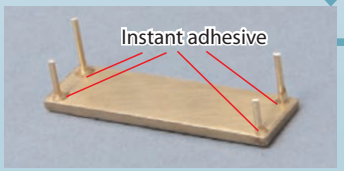
Insert district tag B or C into the left tag holder and tag A into the right. District tag B is "Nakatsugawa engine depot" and district tag C represents the "Umekoji engine depot".

Glue the second prepared number plate, the second maker's mark and the other two tag holders to the right side of the cab. When inserting the district tags, make sure they match those on the left.

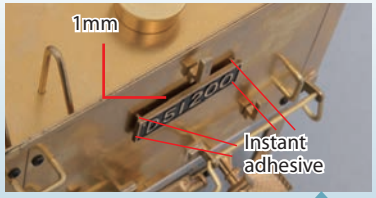
3 Fitting the tender number plate



Place the brass wire into one of the holes of the number plate. Cut it off 5mm from the back of the plate.



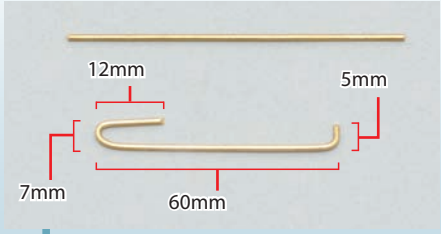
Repeat for each corner and fix in place with instant adhesive.



Position the plate so there is a gap of 1mm between it and the tender, and glue it in place.

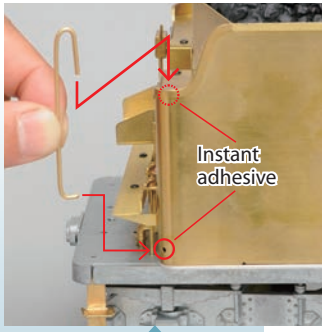
Insert the four lengths of wire into the four circled holes at the rear of the tender.

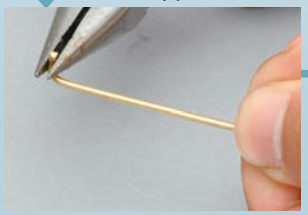
4 The tender handrails



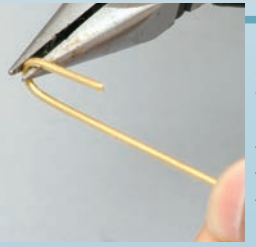
This shows how the tender handrail should appear when shaped.

Insert the end of the 12mm length into the hole just inside the wall of the tender, and the 5mm length into the hole in the corner. Fix with instant adhesive, then repeat for the other side of the tender.



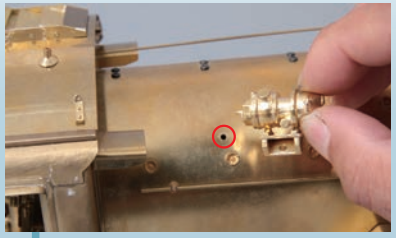


Use needle-nose pliers to bend the rail 5mm from the end.



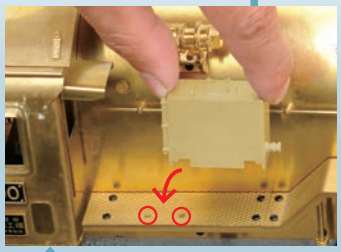
Bend the other end while moving it through the pliers to achieve the rounded 7mm section.

5 Fitting the parts

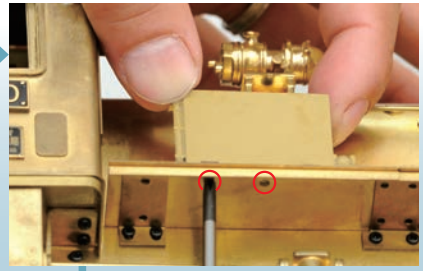


Align the hole of the turbine generator with the hole in front of the right side of the cab.

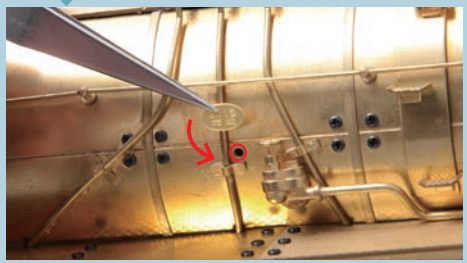
Secure with a 2 x 4mm screw.



Place the tank over the two holes in the running board, below the generator.



Tighten a 2 x 4mm screw into each hole (circled).

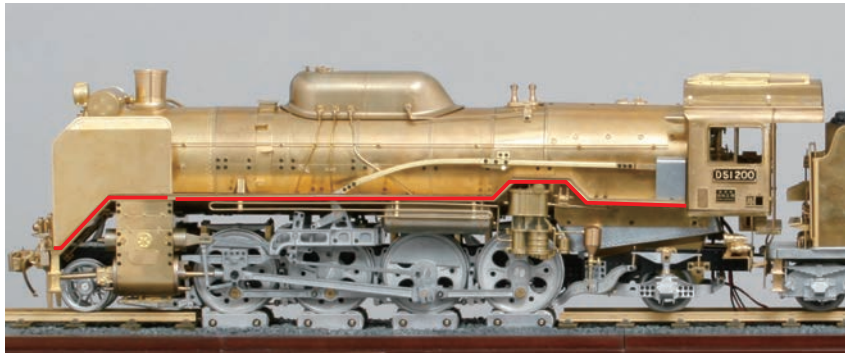


Glue the commemorative plate into the hole in the boiler.

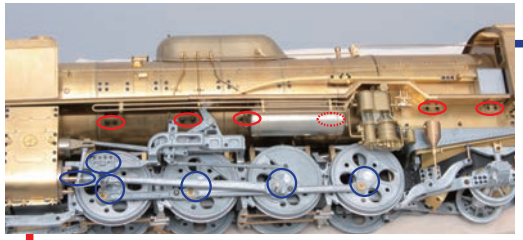
Assembled parts

Final adjustments

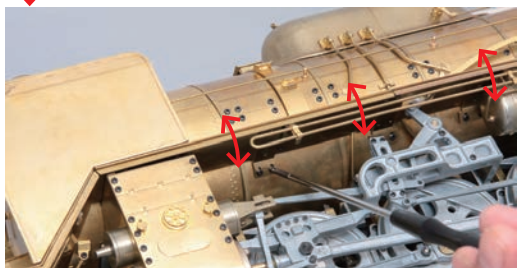
Your D51 model is now complete! There are just a few final checks to ensure that it is ready to be mounted on the base.



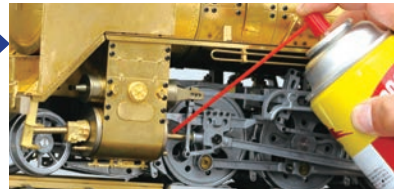
You may find that there is a gap between the running board and some parts of the boiler or front deck. Follow the process described to the right to fix this.



Circled in red are the adjustment screws for the running board (below). Circled in blue are the lubrication points for the wheels (right).



Loosen the screws (circled in the top photo), then adjust the position of the running board and re-tighten the screws.

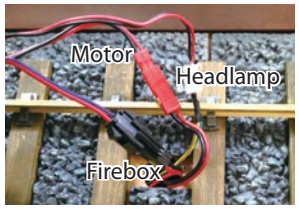


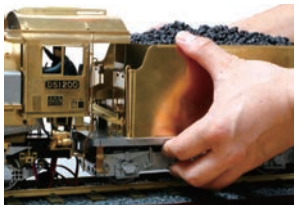
Before each running of the motor and wheels, it is best to lubricate the parts that will be in motion, such as the rods and pistons.

When the model is in use, the vibration may loosen some of the screws, so it is best to check the screws before operation. If you find some have come loose, you can use a thread-locking adhesive to hold them in position.

D51 COMPLETED

The boxes below explain the different switches on the switchboard, as well as giving the numbers of the relevant stages to check if you have any issues with how the parts run.





When all adjustments are complete, you can place the model onto the display stand. Connect the motor, headlamp and firebox wires with the corresponding wires in the base. Then connect the tender and locomotive couplers and secure them with the pin.

Headlamp

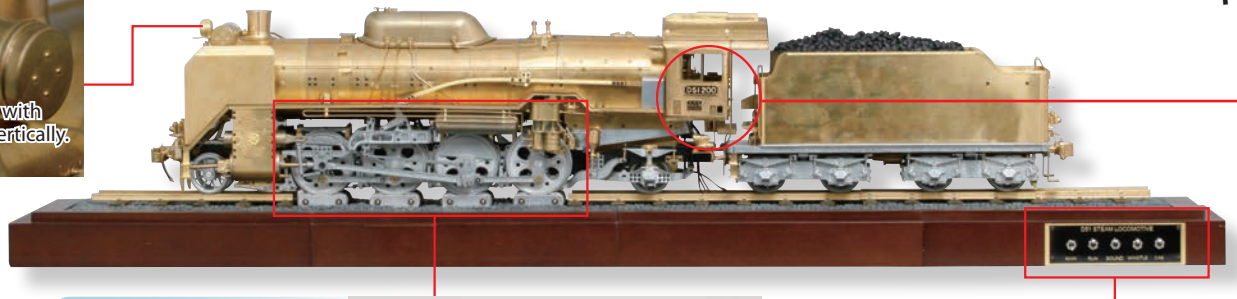
The CAB switch will turn the headlight on.

CHECK
Stages 29, 30, 88 and 89.

Sound and whistle

The SOUND and WHISTLE switches add sound to the movement of your model.

CHECK
Stages 87, 88 and 89.



Firebox

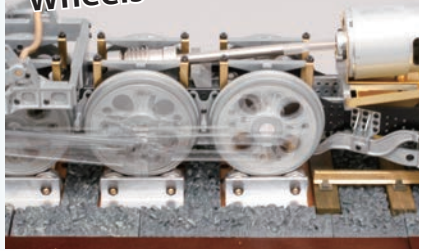
The CAB switch also turns the firebox light on, recreating the light from the burning coals.

CHECK
Stages 52, 61, 88, 89.

The RUN switch starts the motor, turning the shaft, gear and wheels. It is recommended that you do not run the wheels for a long time.

CHECK
Stages 17, 24, 25, 26, 27, 28, 88, 89, 92, 94, 95, 99.

Wheels



MAIN: Turns on the power supply
RUN: Starts the motor
SOUND: Running sound
WHISTLE: Whistle sounds
CAB: Headlight and firebox light