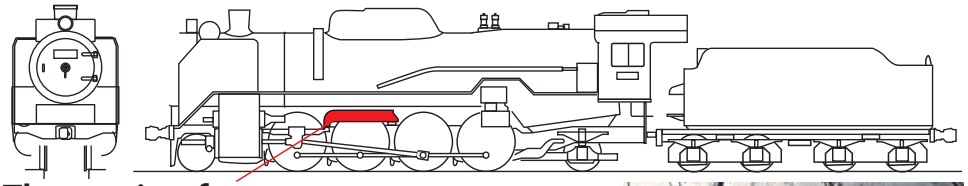
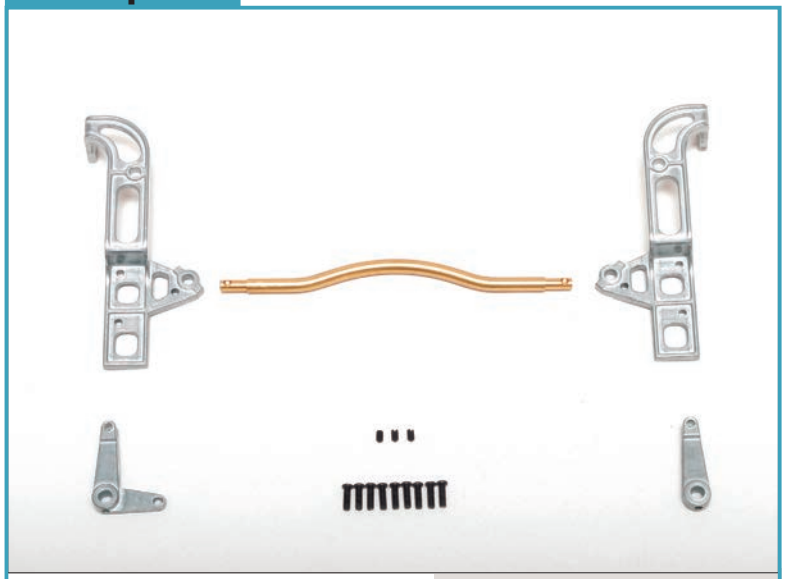
The motion frame



The motion frame

Your parts

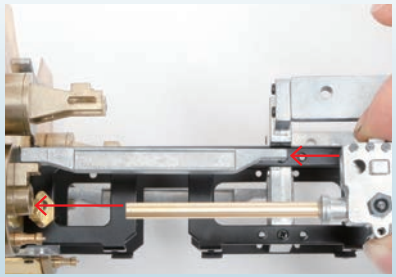


Left motion plate
Reverse shaft
Right motion plate
Reverse link left
Reverse link right
2 × 2.6mm set screws × 3
2 × 6mm screws × 9

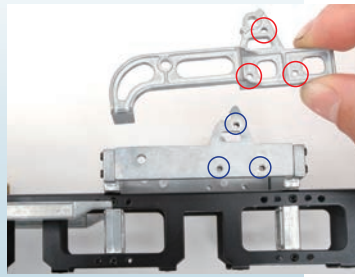
Required tools

Phillips screwdriver
Flat-head screwdriver

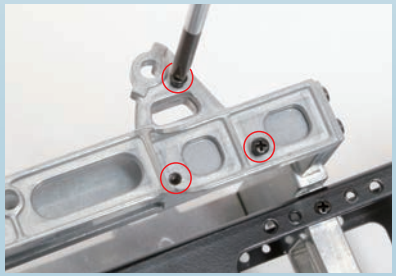
1 Fitting the left motion plate



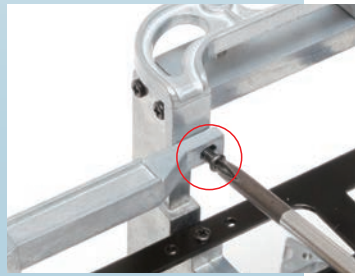
Place the left crosshead into position.



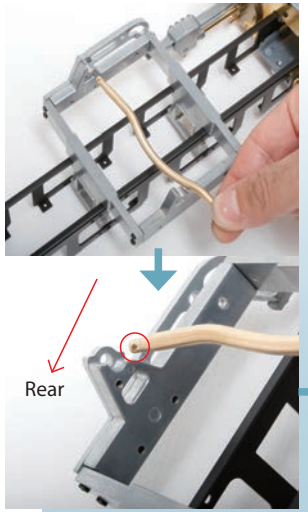
Locate the three holes on the motion frame side plates and the three holes on the left motion plate.



Align the two sets of holes and tighten a 2 x 6mm screw into each of them.

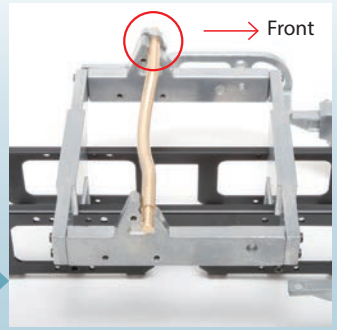


Secure the motion bars to the underside of the motion frame with a 2 x 6mm screw.



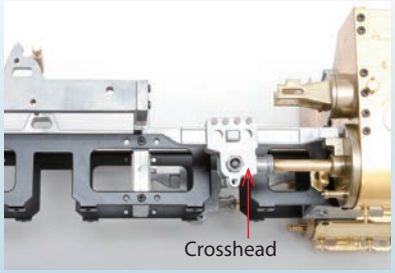
2 Fitting the reverse shaft

Hold the shaft over the motion frame and turn it so the hole at the end (circled, left) is facing towards the rear.



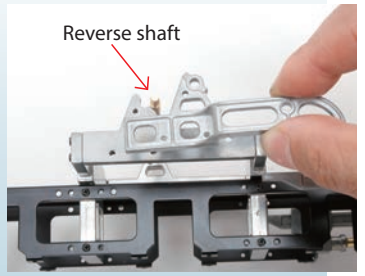
Insert the end of the shaft into the hole in the left motion plate (circled, above).

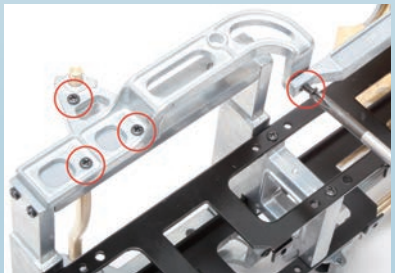
3 Assembling the motion plate



Re-fit the right crosshead into position.

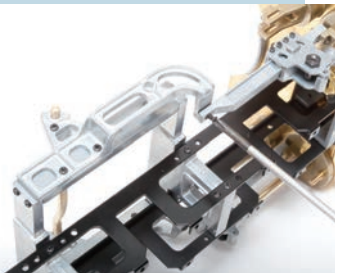
Place the right motion plate over the right side of the motion frame, so that the screw holes align and the shaft protrudes through the hole.



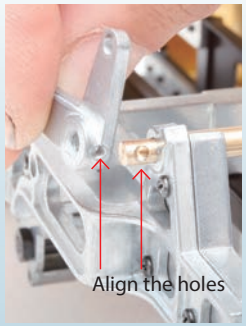


Half-tighten a 2 x 6mm screw into each of the circled holes.

Ensure that the shaft can rotate smoothly, then tighten all the screws fully.

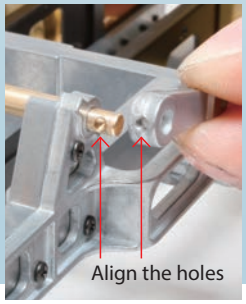


4 Fitting the reverse link



Place the left reverse link over the left side of the reverse shaft, aligning the holes of both.

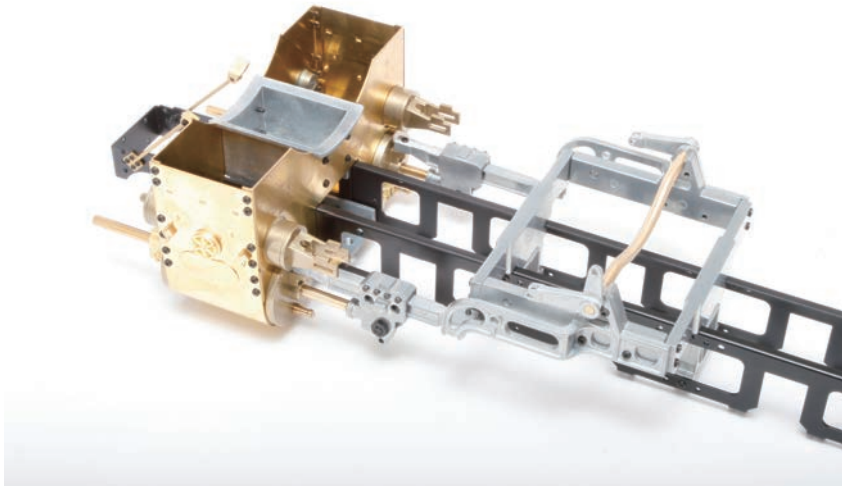
Tighten one of the 2 x 2.6mm screws into the hole of the link to secure it to the shaft.



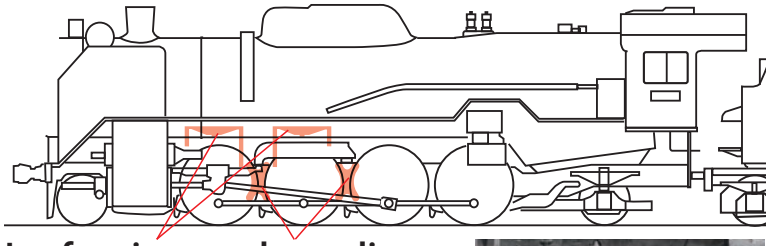
Place the right reverse link over the right side of the shaft, aligning the holes.

Tighten a 2 x 2.6mm screw into the hole of the link.

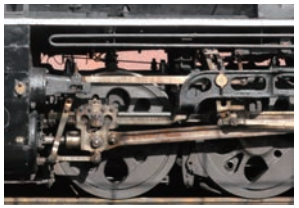
Assembled parts



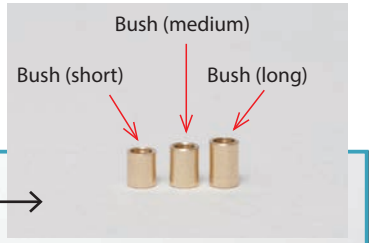
The suspension

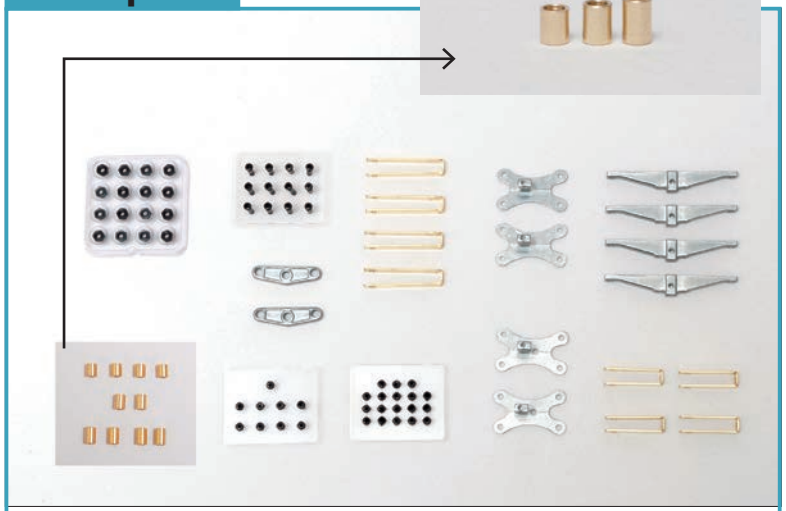


Leaf springs and equalisers



Your parts





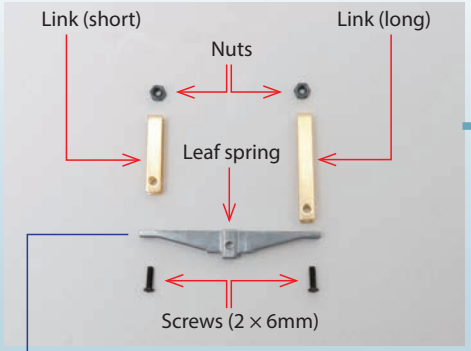
- Nuts × 16
- Bushes (short) × 4
- Bushes (medium) × 2
- Bushes (long) × 4
- 2 × 8mm screws × 12
- Equalising bars × 2
- 2 × 6mm screws × 9
- Links (long) × 4
- 2 × 4mm screws × 18
- Equaliser brackets A × 2
- Equaliser brackets B × 2
- Leaf springs × 4
- Links (short) × 4

Required tools

Pliers
Phillips screwdriver

Useful to have:
Contact adhesive
or PVA glue

1 Assembling the leaf springs



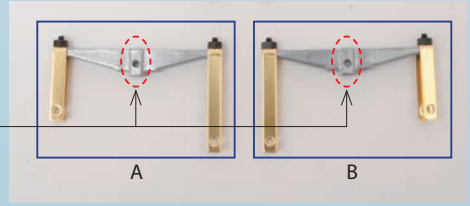
Position a short link, a long link, two nuts, a leaf spring and two 2 x 6mm screws, as shown in the photo above.

Tighten the screws through the ends of the spring, the two links and into a nut.

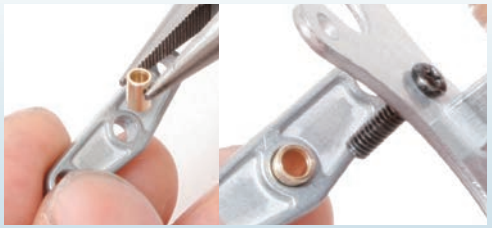
Tip

Use contact adhesive or PVA to improve the grip of the nut on the screw.

Make two sets of each type of spring assembly, as shown.

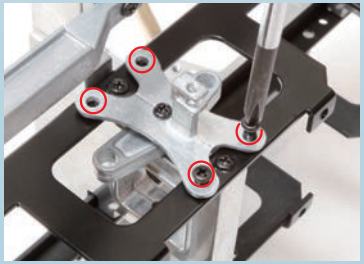


2 Fitting the equaliser

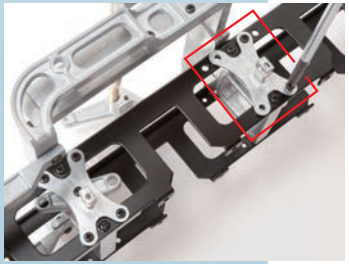


Insert one medium bush into the hole in the centre of one of the equalising bars. Then place a 2 x 8mm screw through the central hole of an equaliser bracket B and into the bush of the equalising bar.

Holding the bracket and bar together, insert the screw into the circled hole in the motion frame, and tighten into place.

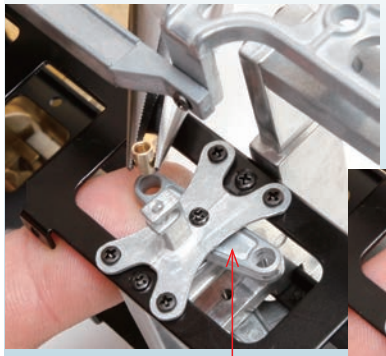


Tighten a 2 x 4mm screw into each of the circled holes of the bracket.

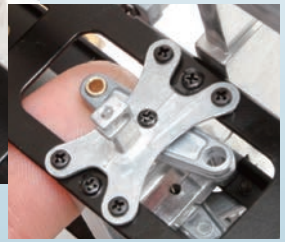


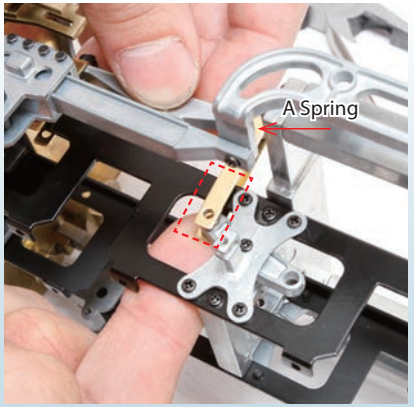
Screw an A bracket into place below the rear end of the motion frame.

3 Fitting the leaf spring 1

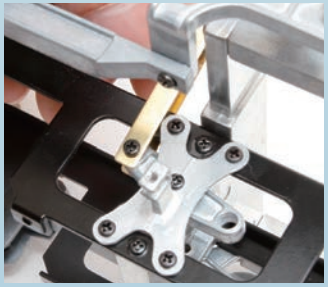


Insert a long bush into the hole at the end of the equaliser bar and hold in place.



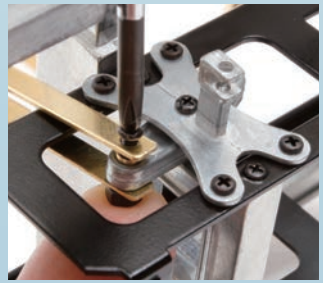


Position an A spring over the underframe so it is either side of the equaliser bar, holding the bush in place.

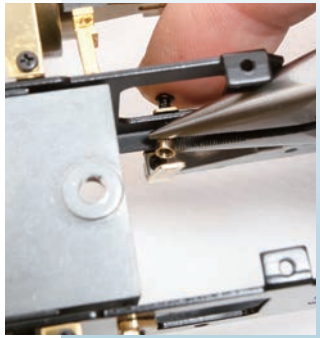


Insert a 2 x 8mm screw through the side of the link and through to the other side.

Hold a nut at the other end of the screw and turn the screw into the nut.



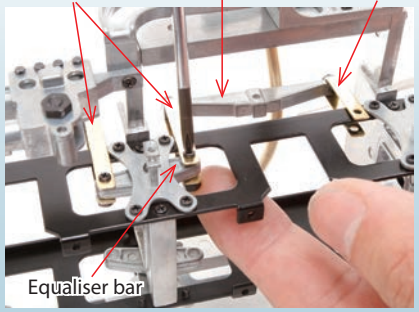
4 Fitting the leaf spring 2



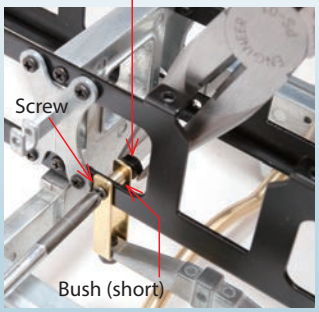
Turn the model over and place a short bush between the underframe and the short link. Then insert a 2 x 8mm screw through the link, from one side to the other.

Hold a nut at the end of the screw, and tighten the screw into it.

5 Fitting the leaf spring 3

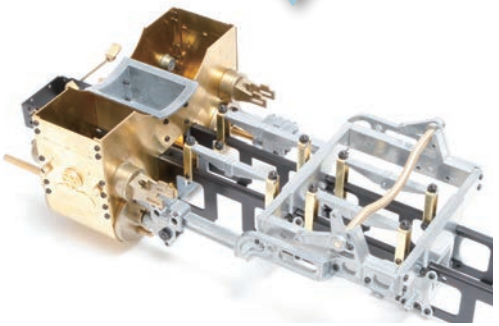


Put a long bush in the hole of the equaliser bar. Position a B spring over it, and tighten a 2 x 8mm screw through the link and into a nut.



Place the short link of the B spring over the underframe and a short bush, and secure with a 2 x 8mm screw and nut.

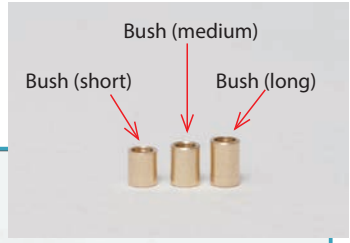
Assembled parts

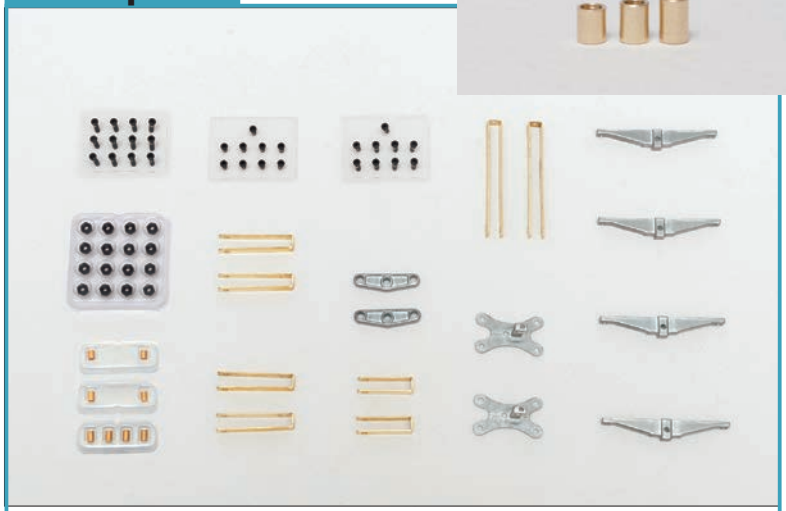


Repeat Steps 2-5 for the right side of the model.

The suspension

Your parts





2 × 8mm screws × 12
Nuts × 16
Bushes (short) × 2
Bushes (medium) × 2
Bushes (long) × 4
2 × 4mm screws × 9
Links (medium) × 4
2 × 6mm screws × 9
Equalising bars × 2
Links (short) × 2
Links (long) × 2

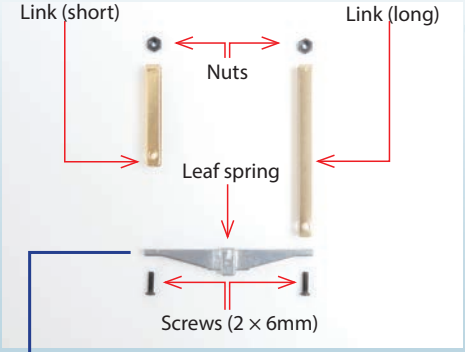
Equaliser brackets × 2
Leaf springs × 4

Required tools

Pliers
Tweezers
Phillips screwdriver

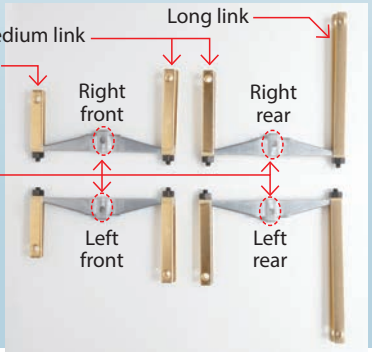
Useful to have:
Contact adhesive
or PVA glue

1 Assembling the leaf springs



Position a short link, a long link, two nuts, a leaf spring and two 2 x 6mm screws as shown in the photo above.

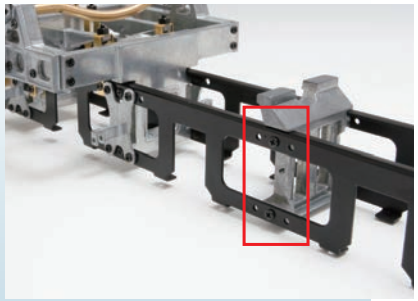
Tighten the screws through the ends of the spring, the two links and into a nut.



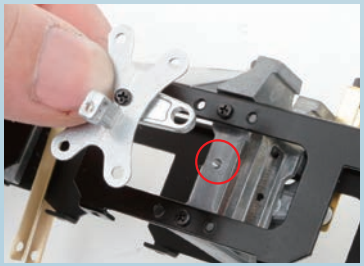
Make one of each of the types of spring assembly shown.

2 Fitting the equaliser

Insert one medium bush into the hole in the centre of one of the equalising bars. Then place a 2 x 8mm screw through the central hole of the equaliser bracket B and into the bush of the equalising bar.

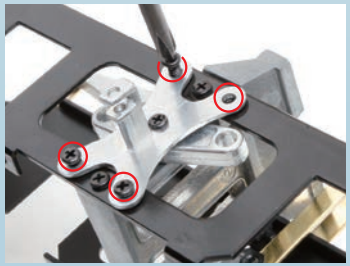


The bracket and bar will be attached to the underframe, either side of the brace.

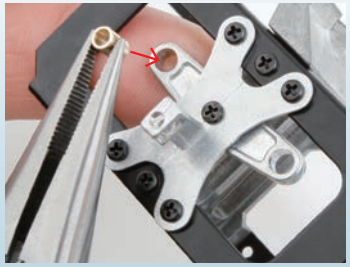


Holding the bracket and bar together, insert the screw into the circled hole in the motion frame, and tighten into place.

Tighten a 2 x 4mm screw into each of the circled holes of the bracket.

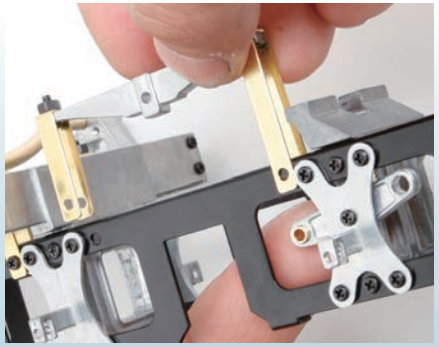


3 Fitting the leaf spring 1



Insert a long bush into the hole at the end of the equaliser bar.

Position the left front spring either side of the equaliser bar, holding the bush in place.



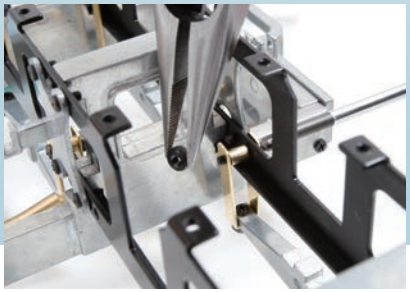
Insert a 2 x 8mm screw through the link and tighten into a nut to the other side.

Place the short link over the underframe, aligning the holes of both.

4 Fitting the leaf spring 2

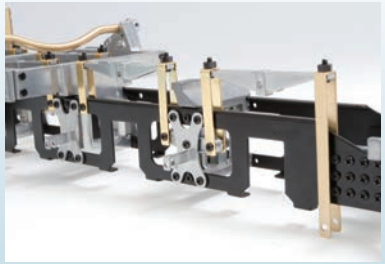
Turn the model over and place a short bush between the underframe and the short link.

Then insert a 2 x 8mm screw through the link, from one side to the other. Hold a nut at the end of the screw and tighten the screw into it.

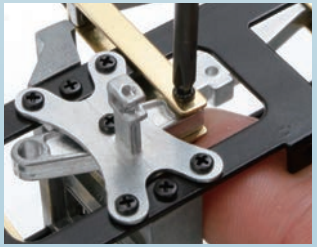


5 Fitting the leaf spring 3

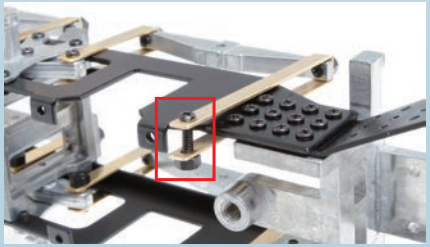
Insert a long bush in the hole of the equaliser bar.



Position the left rear spring over the equaliser bar, holding the bush in place.

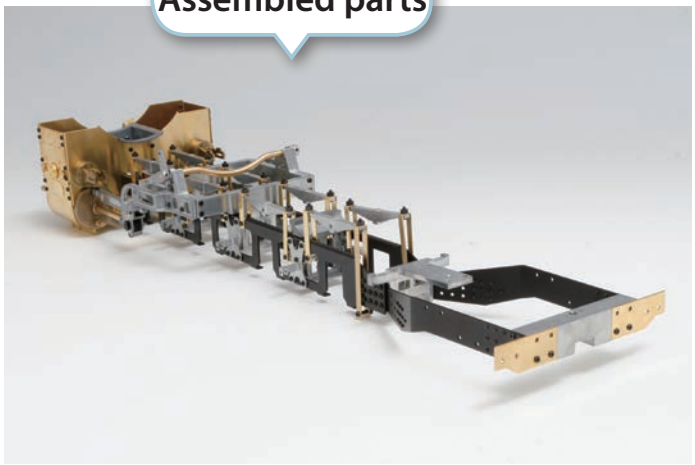


Tighten a 2 x 8mm screw through the link and into a nut.



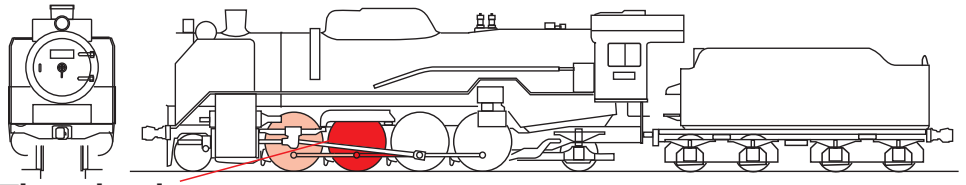
Temporarily tighten a 2 x 8mm screw into the end of the long link, as shown.

Assembled parts



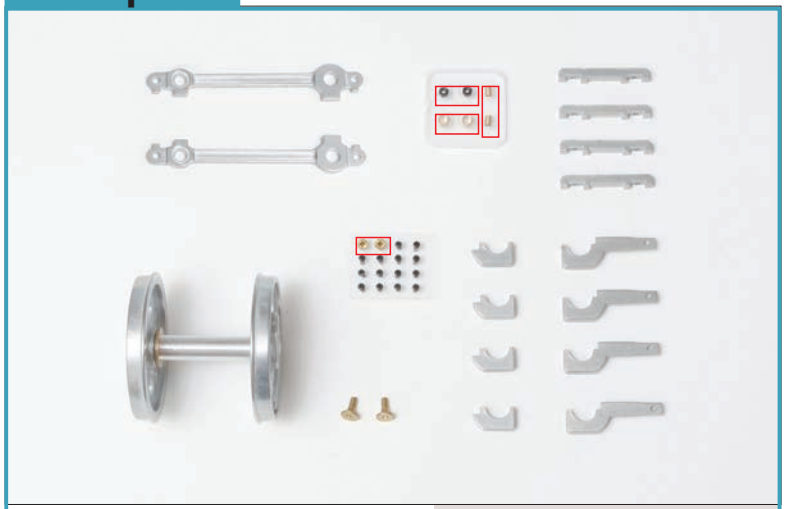
Repeat Steps 2-5 for the right side of the model.

Fitting the wheels



The wheels

Your parts

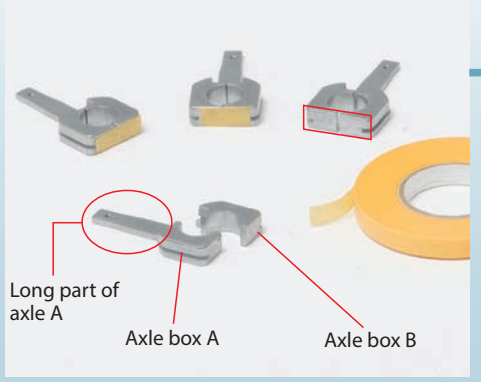


- Right connecting rod
- Left connecting rod
- Wheels
- Nuts × 2
- Bushes (small) × 2
- Bushes (large) × 2
- 2 × 6mm rod pins × 2
- 2 × 6mm screws × 14
- 3 x 8mm rod pins × 2
- Axle box guards × 4
- Axle boxes B × 4
- Axle boxes A × 4

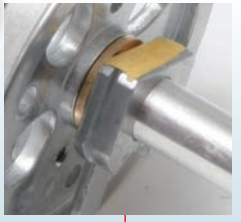
Required tools

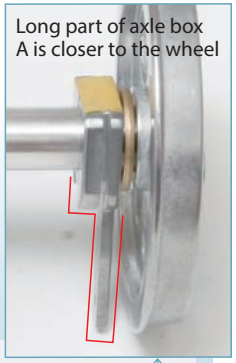
- Tweezers
- Phillips screwdriver
- Masking tape

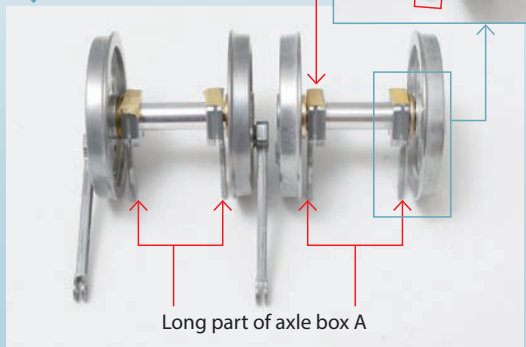
1 Preparing the parts



Assemble axle boxes A and B. Place some masking tape on the area outlined in red on the temporarily assembled axle boxes, as shown above.

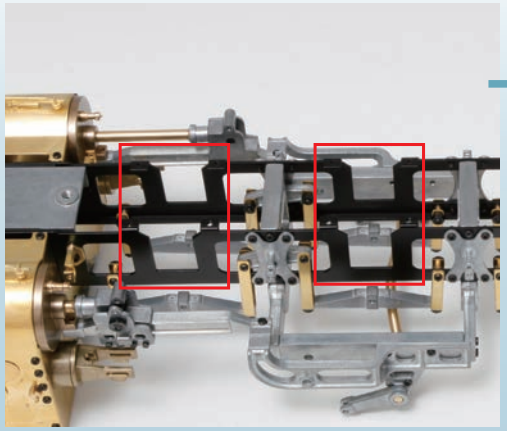




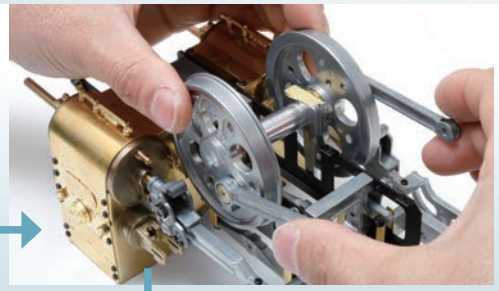


Place the assembled boxes over the axles of the two wheels, inside of the bush at each end of the axle, with the long part of axle box A closer to the wheels.

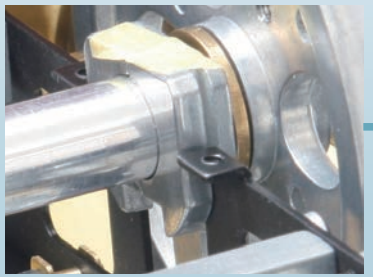
2 Fitting the wheels



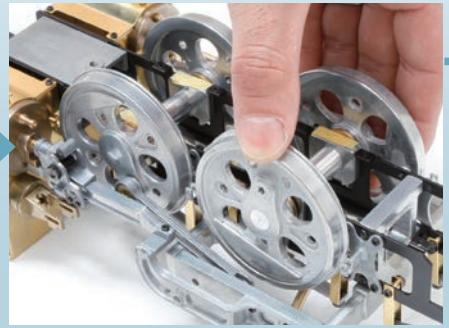
Turn the assembly over and locate the two U-shaped cut-outs on the underframe.



Place the wheel assembly from Stage 4 into the cut-out at the front of the underframe.

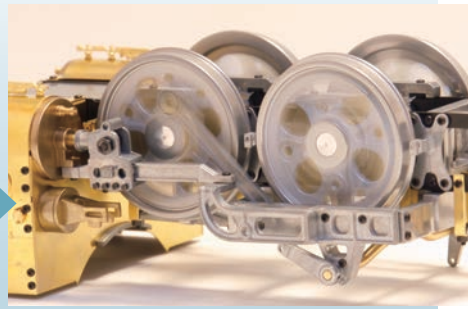


Position the wheels so that the underframe rests in the groove of the axle boxes.



Fit the wheel assembly from this stage into the second cut-out. Remove the tape.

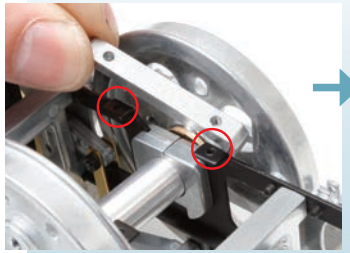
Once both wheel sets are in position, rotate them to check that the movement is smooth. Be careful of the coupling rod.



Tip!

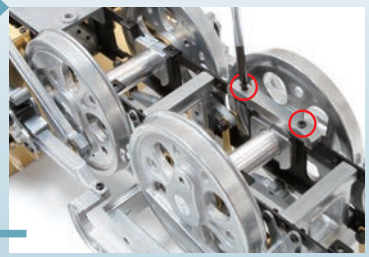
If the wheels don't rotate smoothly, then check the inside edges of the axle boxes for any burrs. Remove any found with a half-round file.

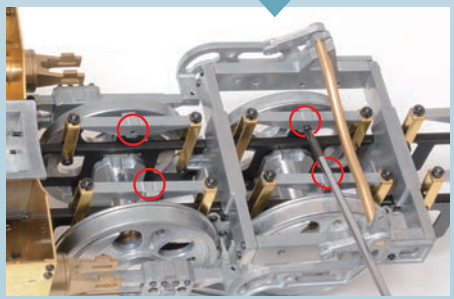
3 Fitting the guards



Place an axle box guard onto the underframe, aligning the holes with those circled.

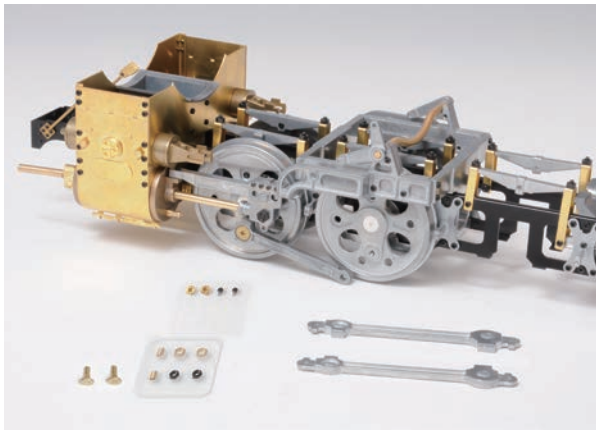
Tighten a 2 x 6mm screw into the two holes on the axle guard, securing it in place. Repeat this process for the remaining three guards.





Turn the assembly back over and tighten a screw into the circled holes on the leaf springs to secure them to the ends of the long parts of the axle boxes.

Assembled parts



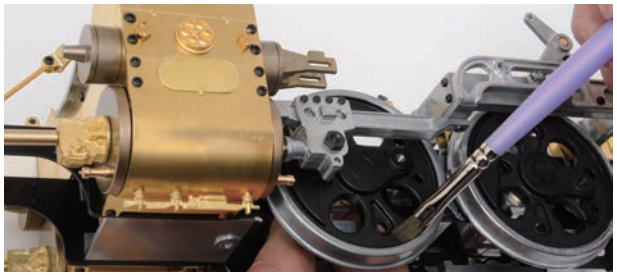
D51 Paintwork

Painted finish

The following two pages show you the variations for the wheels, if you are choosing to paint them or to leave them as they are.

Some parts, such as the wheels, can be painted even when fixed to the rest of the assembly.

The steps will continue with assembling a non-painted model.



Tools and materials required

Paint – (Matt black) Acrylic is used in these images, however, the body is sprayed with a lacquer-based paint.
Paint thinner – one that is appropriate for the paint used.
Brush
Masking tape
Degreasing agent
Primer

You can choose to leave your model in its bare metal state, as shown in the assembly steps, or to paint it black to match the original locomotive.

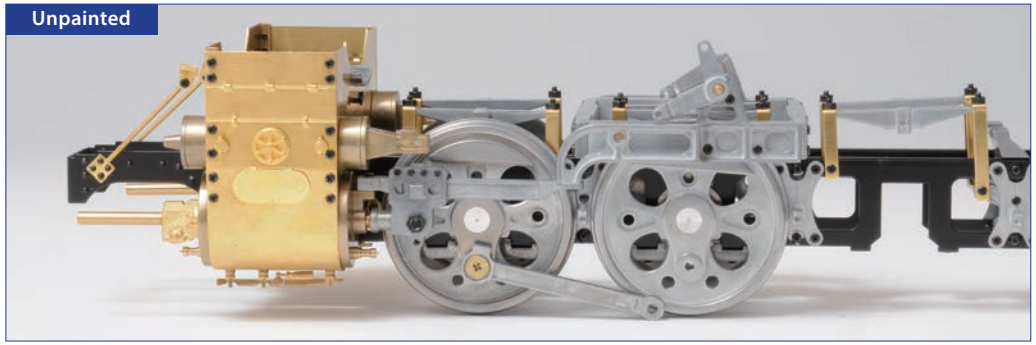
There are three options for how to finish the wheels:

You can leave them unpainted, to showcase the zinc alloy metal finish and the detail

You can paint just the inner area of each wheel, minus the 'tyre' area, to give a sense of depth to the model

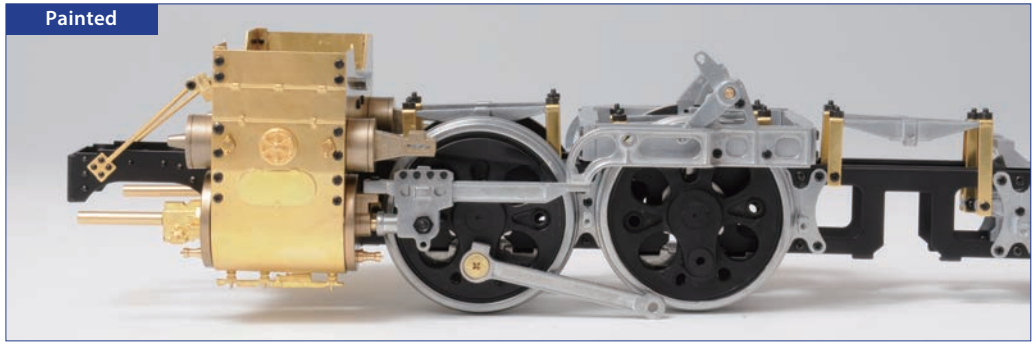
Or you can paint everything but the outer surface, where the wheels are in contact with the track.

Unpainted



The wheels are made from a zinc alloy. If they are left unpainted, you are able to see the full texture and details.

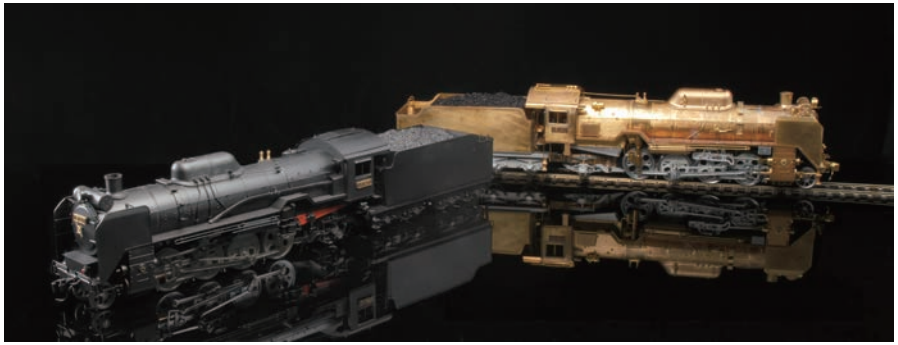
Painted



If you choose to paint the wheels, the finished model will more closely resemble the real locomotive.

Examples of wheels on the real train.

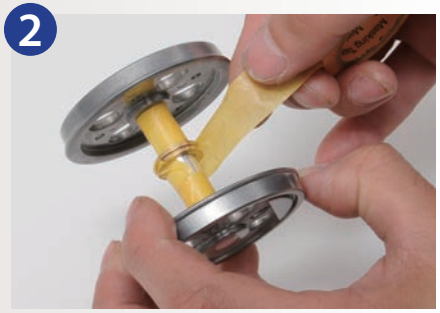
Bare metal finish | Painted wheel, without 'tyre' paint | Painted wheel, with 'tyre' paint



1

Spray the entire surface of the wheel with a degreasing agent.

2



Apply masking tape to the axle between the two wheels to protect it from the paint. You don't have to cover it, but it may make it easier to paint the wheels.

3

Paint the wheel with black paint. If you choose to prime the wheel before painting, glue mixed with paint will work well.

4

As the surface of the wheel isn't perfectly smooth, you will need to apply more than one coat of paint.

5

Wipe away any paint that has run onto areas of the wheel that you don't want to have painted.

6

Paint the inner surfaces of the wheels, as shown above. When the paint is dry, remove the masking tape.