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VILLIERS QUADRICYCLE
Instructions

Prototype:

Motorised quadricycles evolved from manually operated tricycles in the early 1920s. The Villiers quadricycle (named after the 2 stroke motor that powered it) was introduced in 1957. It eventually replaced other quadricycle designs and became the standard type until motorised quadricycles were withdrawn from service in the late 1980s. Over 600 Villiers quadricycles were built by the railways at the Goulburn Workshops.

Intended for one man operation, some (such as the one modelled) were fitted with an additional seat to carry a passenger. They did not have enough power to tow trailers. On some vehicles trays for carrying tools or other equipment were fitted to the outriggers. These had extendable handles to facilitate lifting the vehicle on and off the track.

Introduction:

This kit is intended to be a static model. It is made up from various brass components (etchings, castings, shim and wire) and a polyurethane casting.

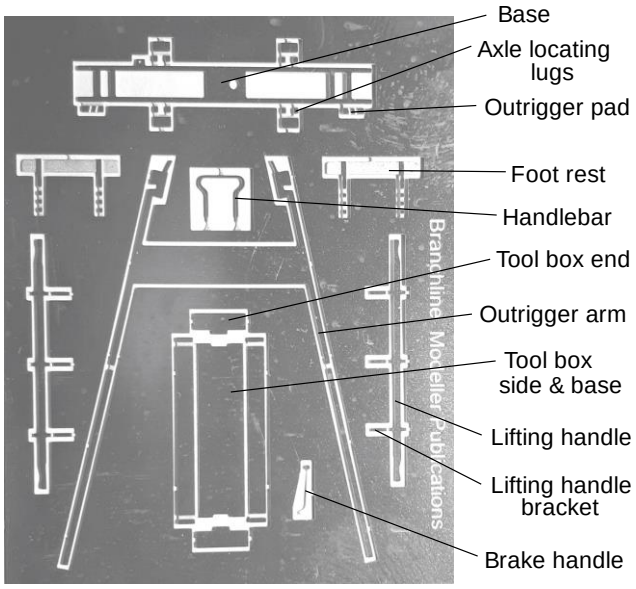
The brass components must be soldered together. It is assumed that the person assembling this kit is quite proficient at soldering. This is not a beginners kit and if you are not proficient at soldering you won't be able to put it together.

A few brass parts have to be glued to the polyurethane casting with superglue. Some brands of superglue will not stick the polyurethane used to make this kit. Unless you know a particular brand of glue will work, testing the glue is recommended. Green 'Zap a Gap' is a superglue known to work.

When they are required, release the etched parts from the fret by cutting through the tabs from the half-etched side with a sharp, pointed knife. At the appropriate time, remnants of these tabs can be removed with a fine flat file. When folding etched parts to 90°, the bend must be made towards the etched line and when over-folding parts to an angle of 180° the bend has to be made away from the etch line.

Familiarise yourself with the names of the various etched components in Diagram 1.

Diagram 1.



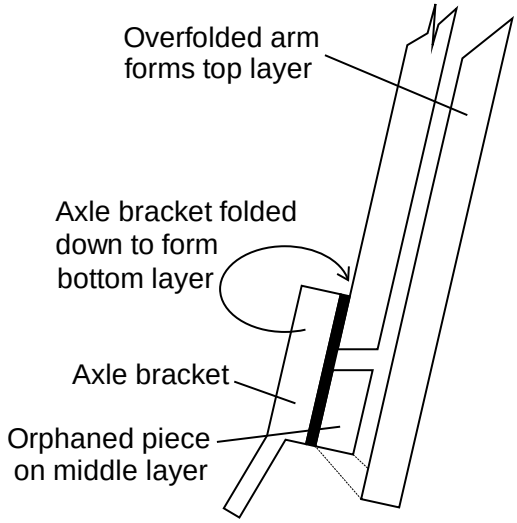
Assembly Sequence:

1. The chassis of the quadricycle is formed by bending and soldering various etched parts to form an underframe onto which the wheels are fitted. The underframe is built up as a number of sub assemblies and it is suggested that you build the easiest sub-assemblies first.
2. The tool box consists of three etched parts; one part folds up to form the base and sides while the other two are the ends. Fold the base and sides into a square cornered 'U' shape making sure that the corners are folded to exactly 90°. Each end slides into etched slots in the sides so that the tab at the bottom

of the end fits into the recess in the base. Test fit and if necessary file away excess material until each end fits neatly. Solder the ends to the base and the sides and run a fillet of solder along the fold lines in the base.

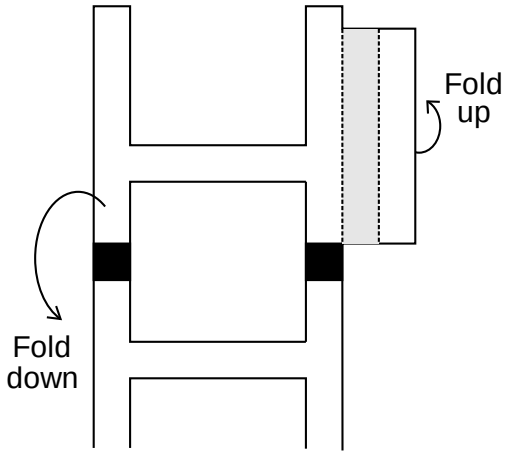
3. Remove the lifting handles and brackets from the fret. Over-fold the three brackets back onto themselves and solder them to the handle. Place this against the side of the tool box so that the brackets are facing outwards and are centrally positioned. If correctly placed the handles will protrude an equal distance at each end. Solder in place and repeat for the other side of the toolbox.
4. Each arm of the outrigger has a fold line etched mid-way along it. Over-fold the arm at this point so that it becomes a double thickness then solder the two layers of brass together. The orphaned piece of the bottom layer (Diagram 2) must also be soldered to the over-folded arm. Solder MUST be used sparingly here otherwise the slot for the wire will become clogged and/or solder will foul the etch line and prevent the axle bracket being over-folded. If necessary, remove any excess solder using de-soldering braid. Over-fold the axle bracket but don't solder it in place just yet. Repeat for the other arm.

Diagram 2.



5. Insert the piece of wire through the 'holes' formed between the top and bottom overlays. Apply solder to secure both the wire and the axle bracket. Trim the wire and file off any tab residue on the outrigger arms remembering that they are square in section. The axle brackets sit on the underside of the outrigger.
6. The base is the most complicated sub-assembly to make. Each end of the base requires two over-folds to build it up to its final thickness (Diagram 3).

Diagram 3.



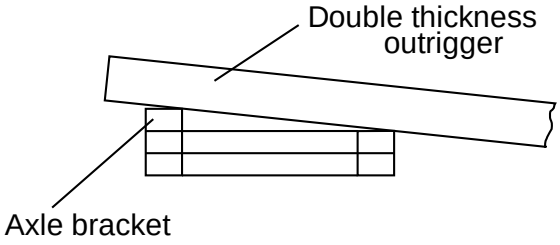
Bottom view

7. Over-fold each end of the base. The first over-folded layer will be on the top of the base. Solder the two layers together then over-fold the outrigger pad so that one side of the top of base is three layers thick. Solder this pad in place.
8. Over-fold the axle locating lugs and solder these to the underside of the base. Each pair of axle locating lugs have a tab attached. The tab is designed to keep the lugs parallel and straight while they are being over-folded. These tabs have to be removed after the lugs are soldered to the base. The easiest way to do this is to hold the lugs and the edge of the base in a pair of smooth nosed pliers and bend the etched line up and down until the tab breaks off.
9. Remove the four cast wheels from the brass casting and carefully file away any remnants of the sprue. Take care not to damage the flange on the tyre. There are two types of wheels; one type has an axle through it and the other (plain type) does not.
10. Place the axled wheels under the base with the flanges on the opposite side to the outrigger pads. The axles should sit in the gap between each pair of axle locating lugs. Photo 1 shows the off-centre location of the wheels. Once satisfied with the position of each wheel, solder its axles to the base. File off any excess so the ends of the axles are level with the side of the base.

Photo 1. The wheel is offset in the body. Note how the mudguard fills the full inside of the body.

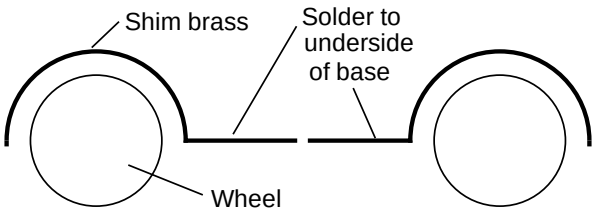
11. Separate the motor from the brass casting leaving a short length of sprue attached. Insert this into the hole in the base. This hole is closest to the front of the vehicle and the head of the motor faces forward. Solder the motor to the base and then trim off the protruding sprue.
12. Bend the axle at the end of each arm of the outrigger upwards to an angle of approximately 175°. Fit a plain wheel onto the etched axle at the end of each arm. Make sure the wheel is square to the track then solder it in position.
13. Place the arms of the outrigger on the outrigger pads at each end of the base (the etched lines on the pad provide a guide). Note that the outrigger is not horizontal, rather it should slope downwards away from the base (Diagram 4). Line up the wheels on a short length of track. When satisfied the wheels are in gauge and the outrigger is correctly positioned on the base solder the end of each arm to its outrigger pad.
14. Solder the toolbox / lifting handle assembly to the outriggers. Pack the underside of the outer edge with a small offcut of brass fret so that it will sit horizontally on the sloping outrigger.

Diagram 4.



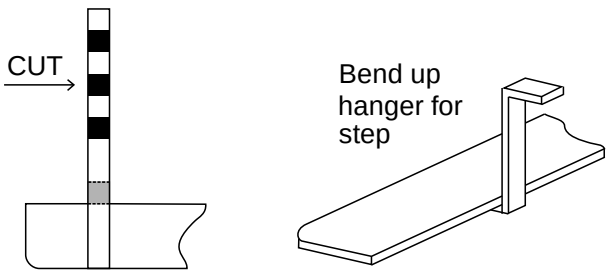
15. Cut the shim brass to a strip exactly 2.5mm wide. Bend up the mudguards from this strip (they should sit 0.8mm from the wheel) and solder these to the plate under the motor (Diagram 5).

Diagram 5.



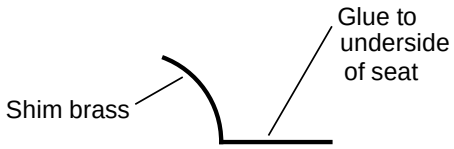
16. The body of the quadricycle is a polyurethane casting. Remove any flash and test fit it to the base noting that the petrol tank faces forward. The casting should sit squarely on the base and there should be an interference fit between it and the mudguards. For this reason there shouldn't be a need to glue the polyurethane body to the chassis.
17. Bend up the steps (Diagram 6) and solder them to underside of the base as shown in Photo 2.

Diagram 6.



View from underside

Diagram 7.



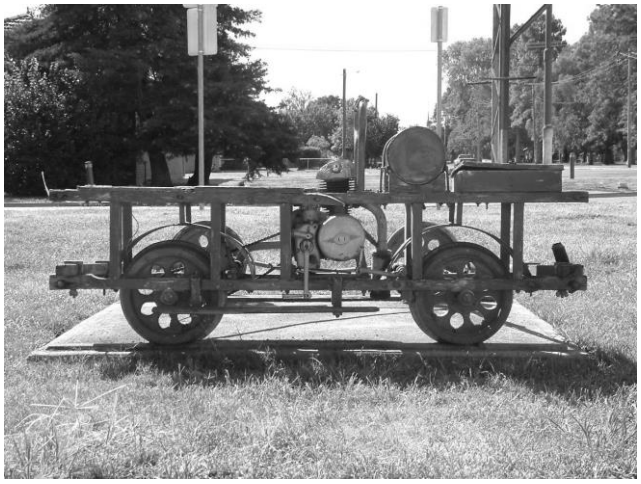


Photo 2. Position of the steps.

18. Glue the handlebars into the two holes behind the petrol tank. There is a guard in front of the seat to prevent the driver accidentally touching the hot motor. This guard is made by bending a piece of 2.5mm wide shim to the shape indicated in Diagram 7 and then supergluing the flat end to the underside of the seat.
19. While a brake handle is identified on the fret in Diagram 1, it is too fine to be used. Throttle, gear and brake handles could be made up from lengths of fine wire if desired.
20. Clean the brass chassis with a glass fibre brush to remove any oxide then thoroughly wash the model in water and detergent, gently scrubbing with a soft toothbrush, to remove any flux residue. Rinse, dry and paint the model with etch primer. When thoroughly dry, paint the model red. Hand brush the tyres of the wheels a steel grey colour. The motor and the lid of the box in front of the petrol tank are a light grey colour while the seats are a dark green or brown.

References:

Triking the Length - A short history of railway track vehicles in NSW 1855-1984 (2010); Jim Longworth, ARHS (NSW Division), Pages 69-76.

NSW Track vehicles 1950-1985 (2019); Stephen Ottaway, Australian Journal of Railway Modelling - No 12, Pages 25-32.

Photo 3. Front wheel axle detail

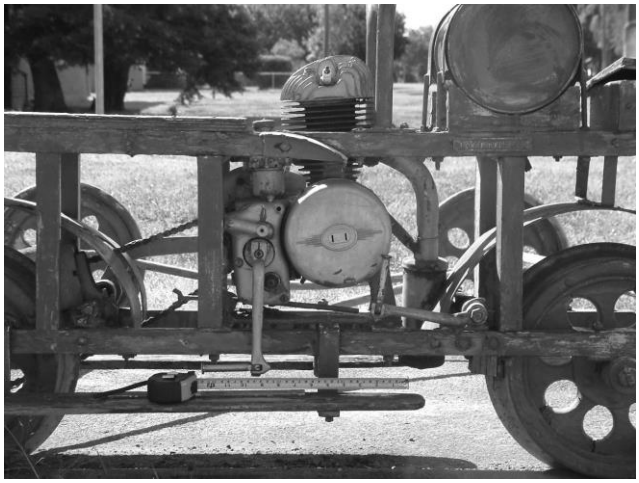


Photo 4. Motor

Photo 5. Rear wheel, outrigger and mudguard

Note: An electronic version of this document with clearer photos can be accessed at:
https://stephenjohnsonmodels.com.au/instructions/