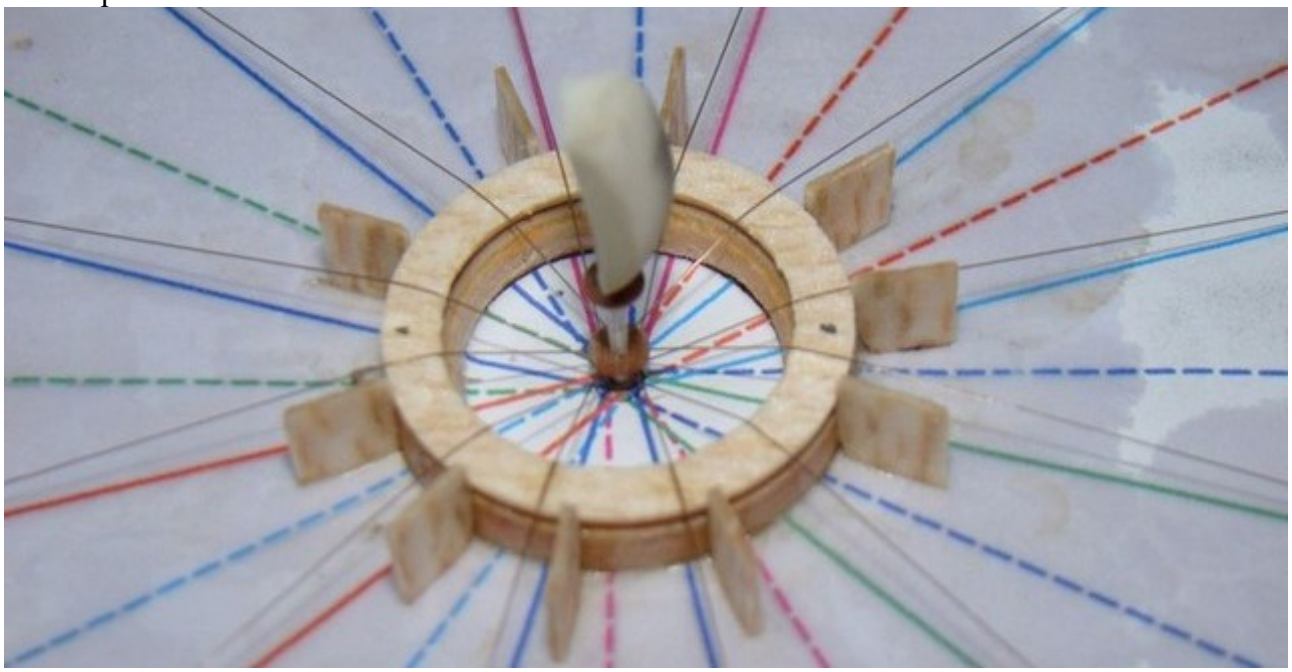
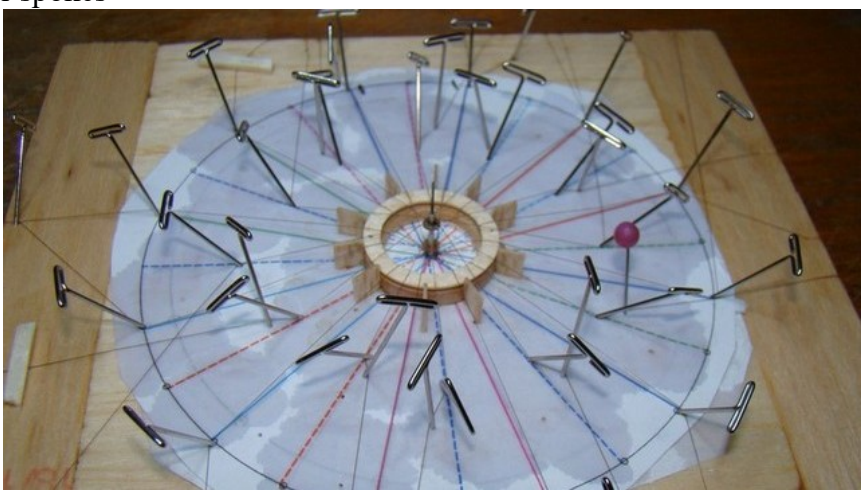
Close up

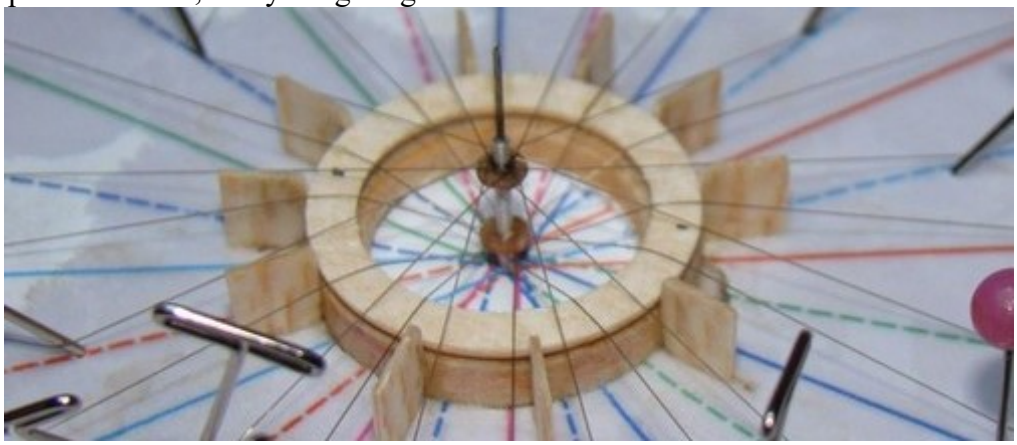


After the one side is done, the second one, the upper spokes, follows. This one is much quicker, plus the spokes are mostly in the air, so they are automatically aligned due to the thread tension. Again, the art here is to apply the same amount of tension, so that it equals in the end to that of the bottom spokes (symmetry...)

Start of the upper spokes



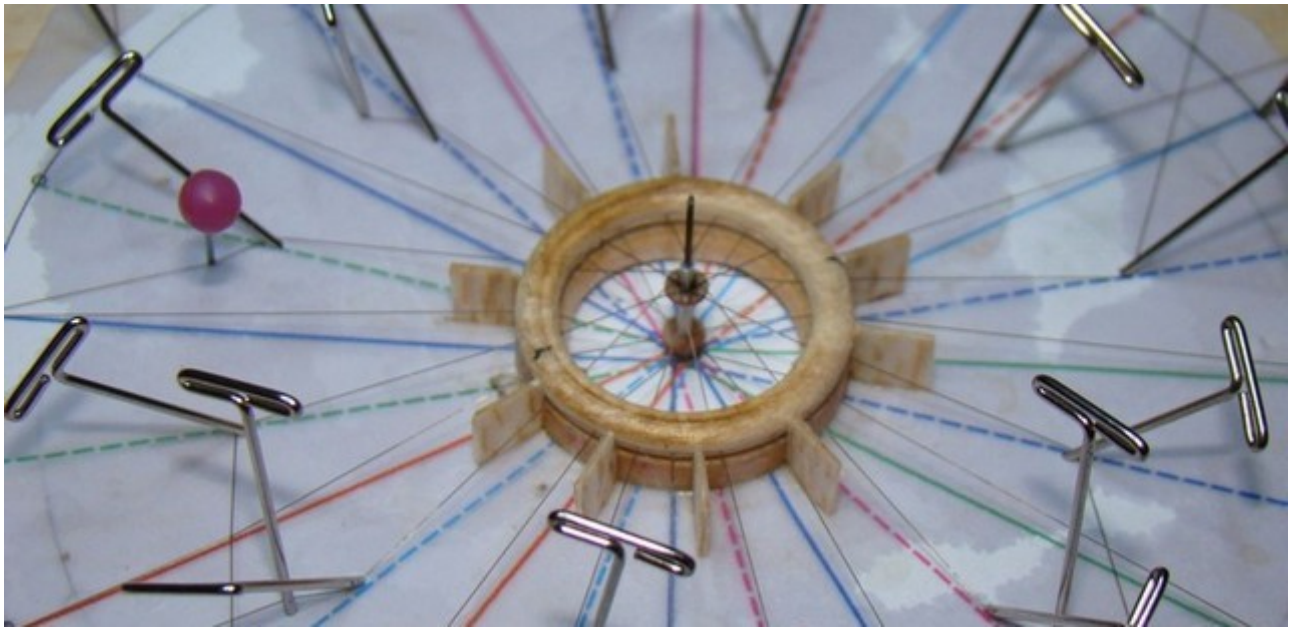
All upper spokes finished, ready for gluing



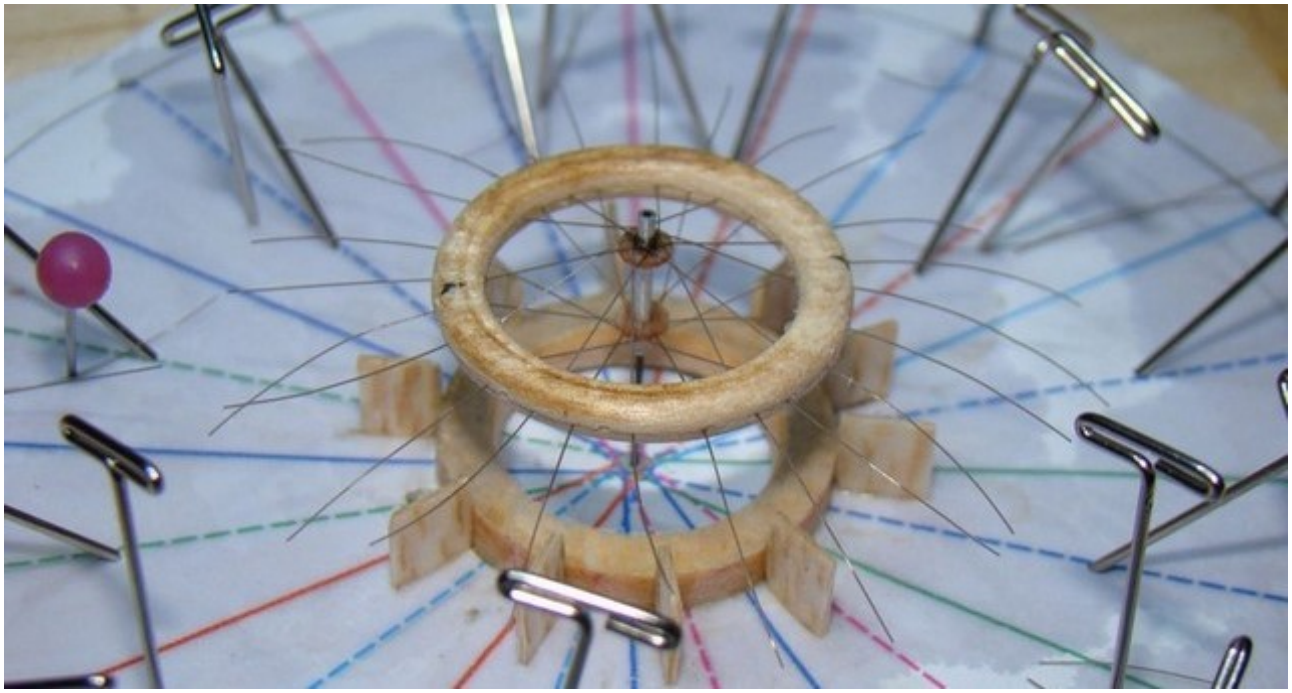
With all spokes in place, it is time for gluing together. Using your favourite glue, preferably not a very fast drying one, apply it to the wheel halves and put the second one in place.

Over it some more balsa disks in order to clear the extending axle height, and finally some weight to keep the wheel halves in contact while the glue dries.

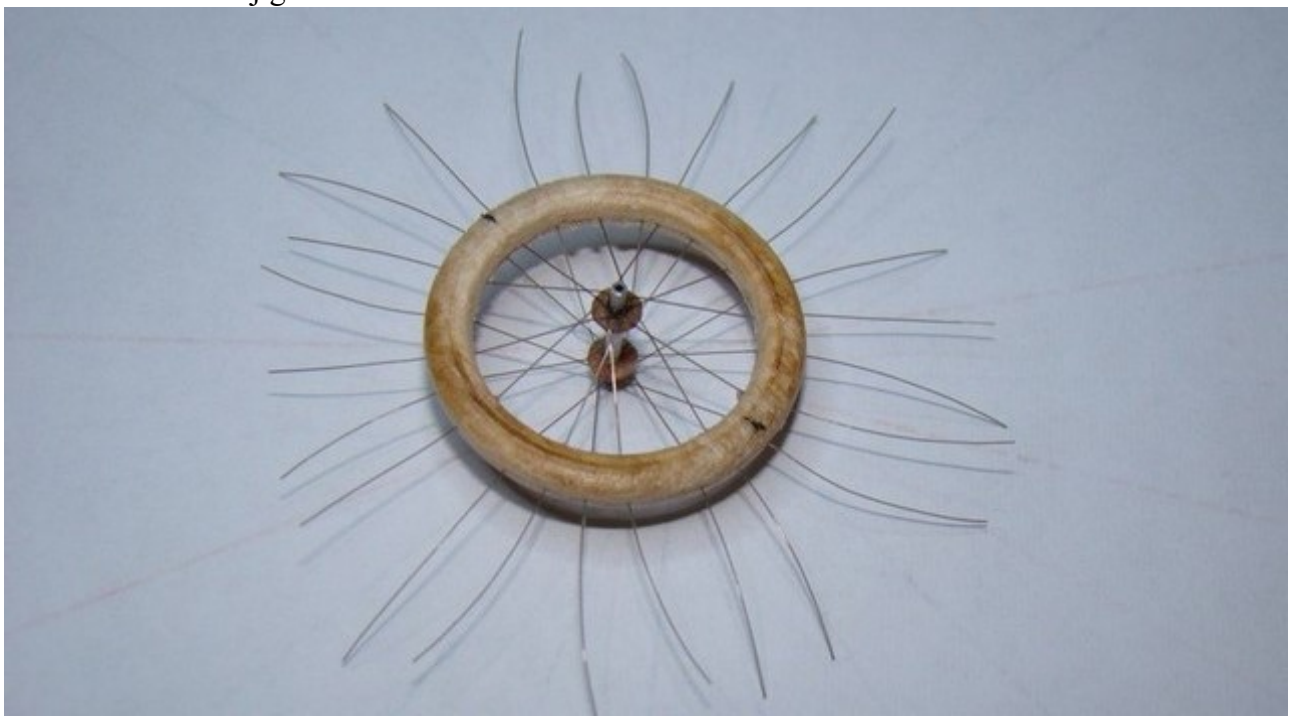
When dry, you simple remove the weight, cut the spokes and slowly lift from the jig. It is very probable that some glue might have spilled over to the jig centering tabs. Of course, they could be waxed or made of non stick material, so that would not be an issue.



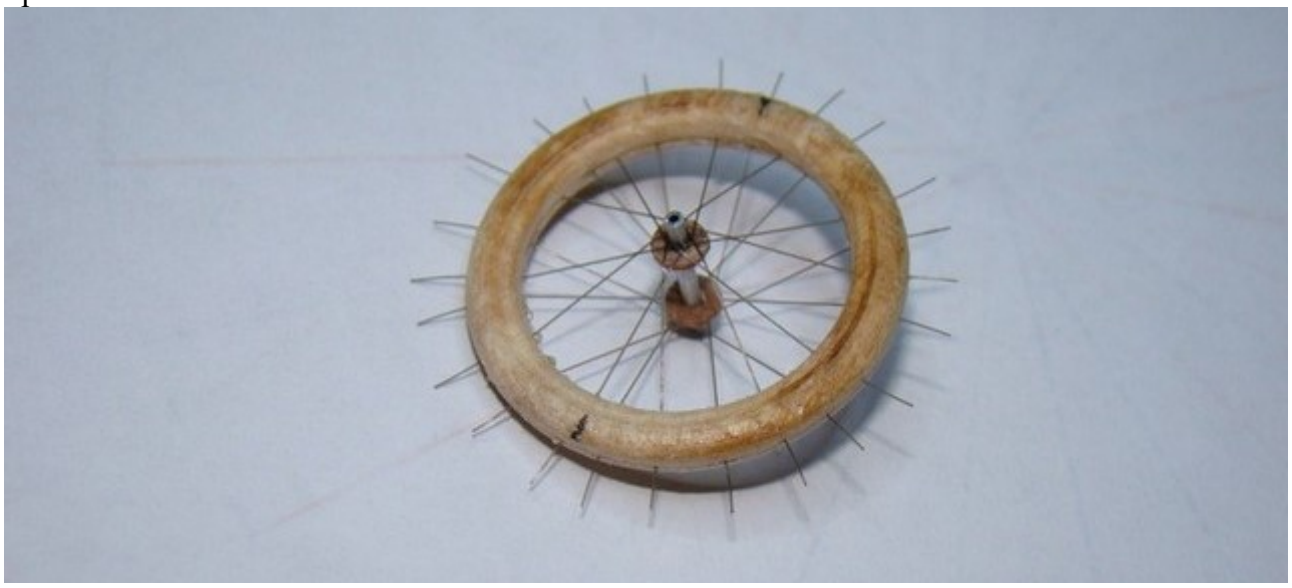
No need to cut the spokes flush at this point, it can be easier done when the wheel is free.



Removed from the jig



Spokes cut short

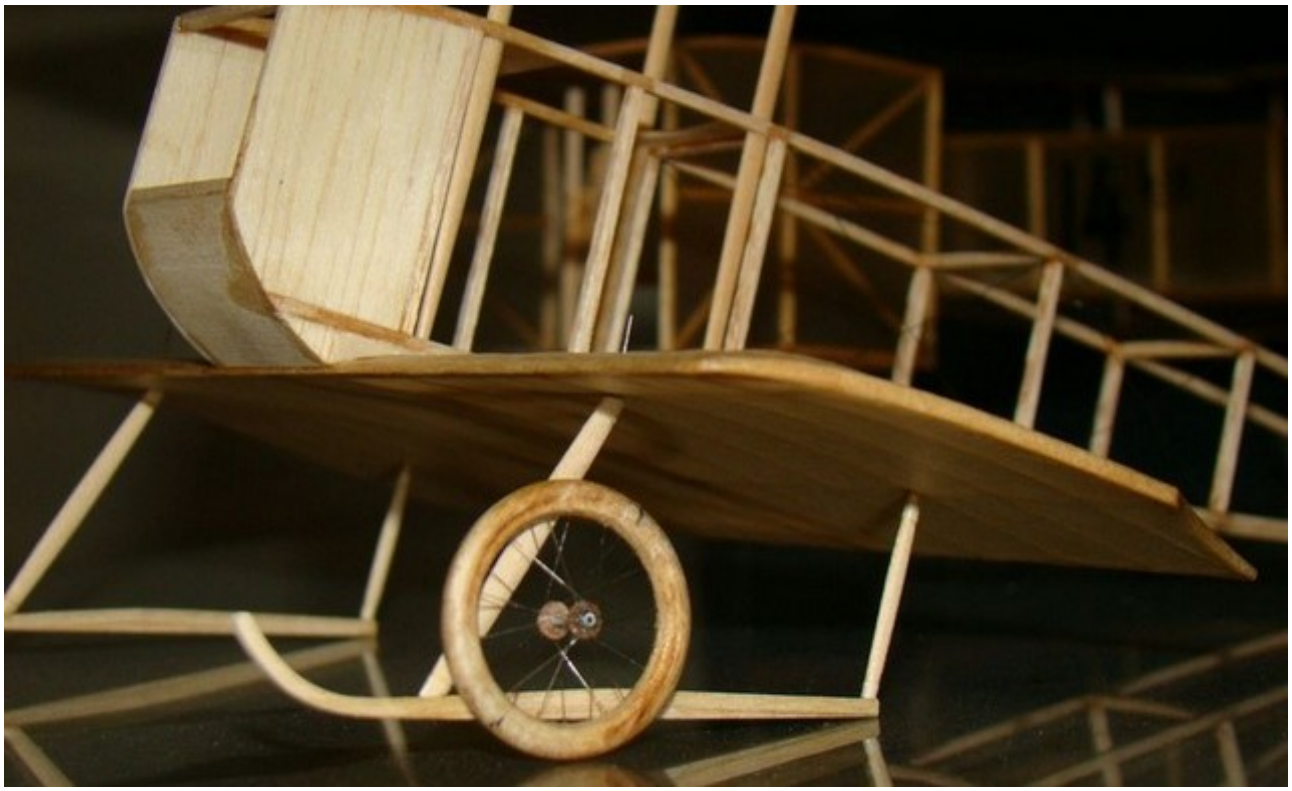


Spokes cut flush.

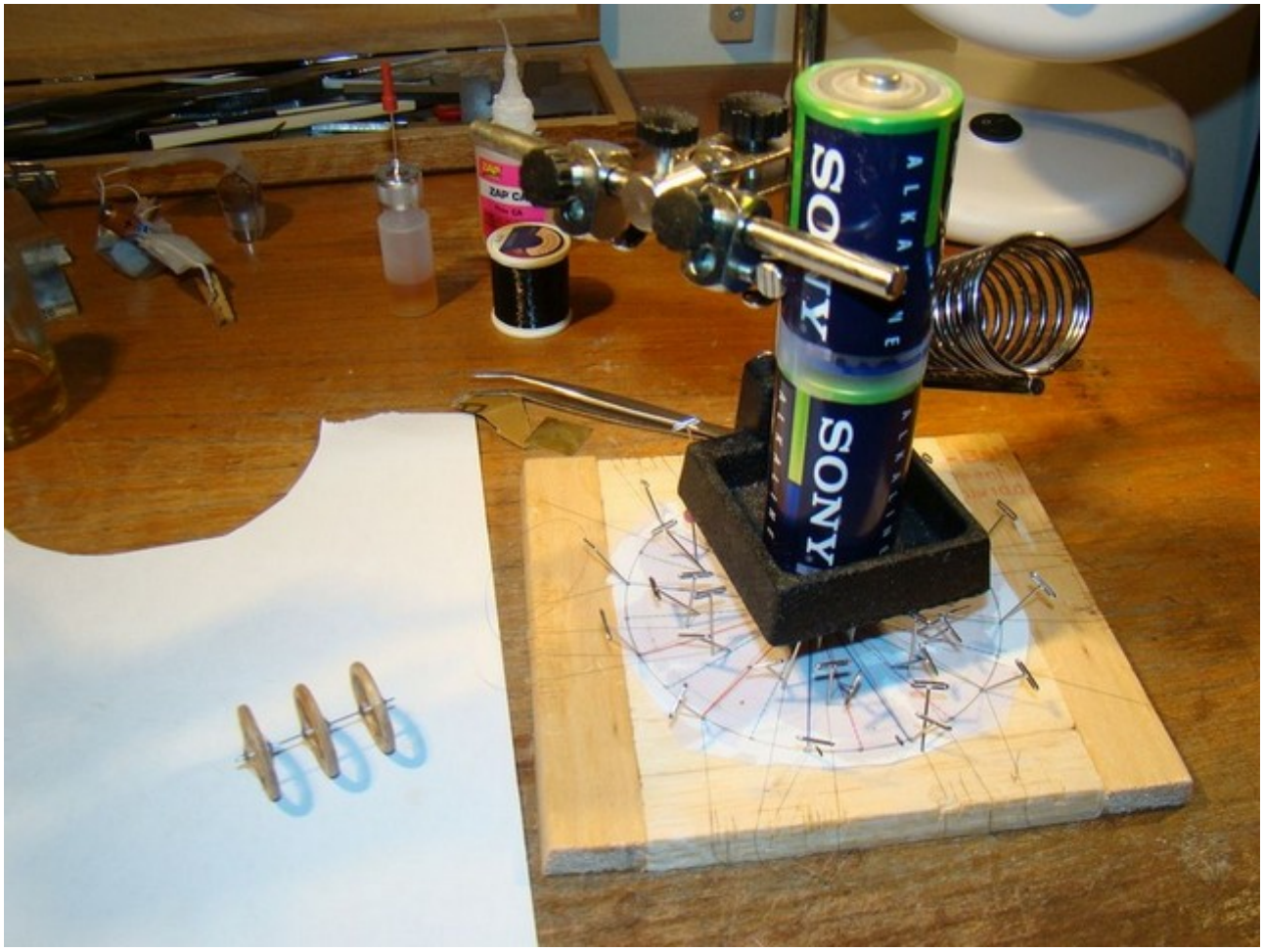
Extra coats of glue or dope can be added at the external seam. Light sanding smoothes the seam for a continuous surface. The internal seam is not as easy, because of the spokes, but also possible to do.

Like most things, the more time you spend, the better results you get. Finished weight for an unpainted wheel of roughly 1” diameter, 0,1 grams.

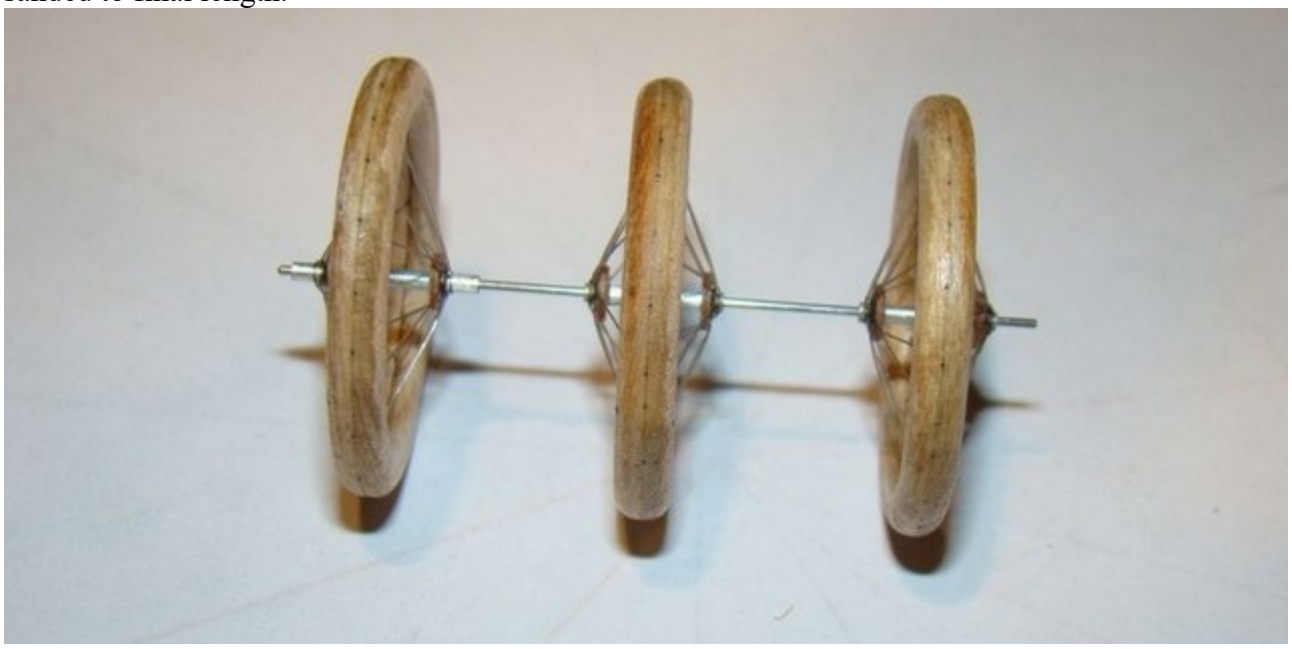
Test fitting on the model. One done three more to go…



Final wheel in the jig waiting for the glue to dry…



Here, the three finished ones. Notice the left one still has an over length axle, the other two have it sanded to final length.

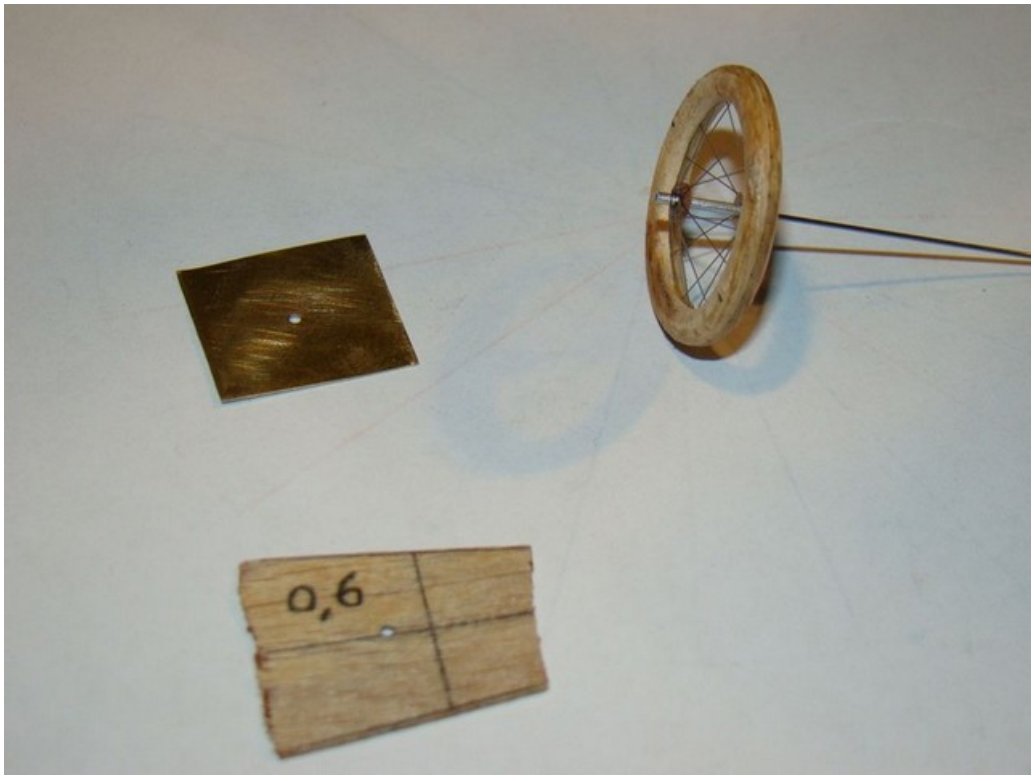


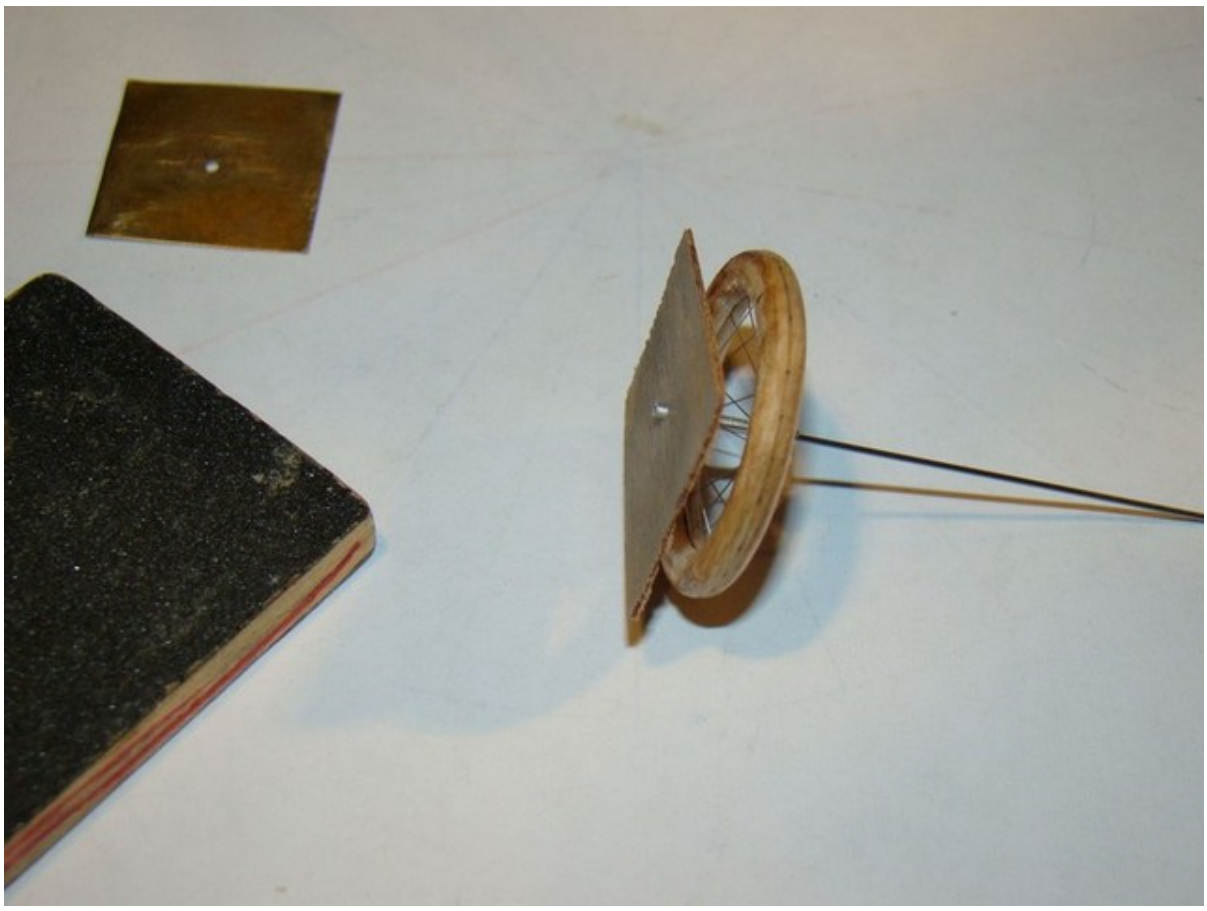
That would be the last step, bringing the axle to its correct length...

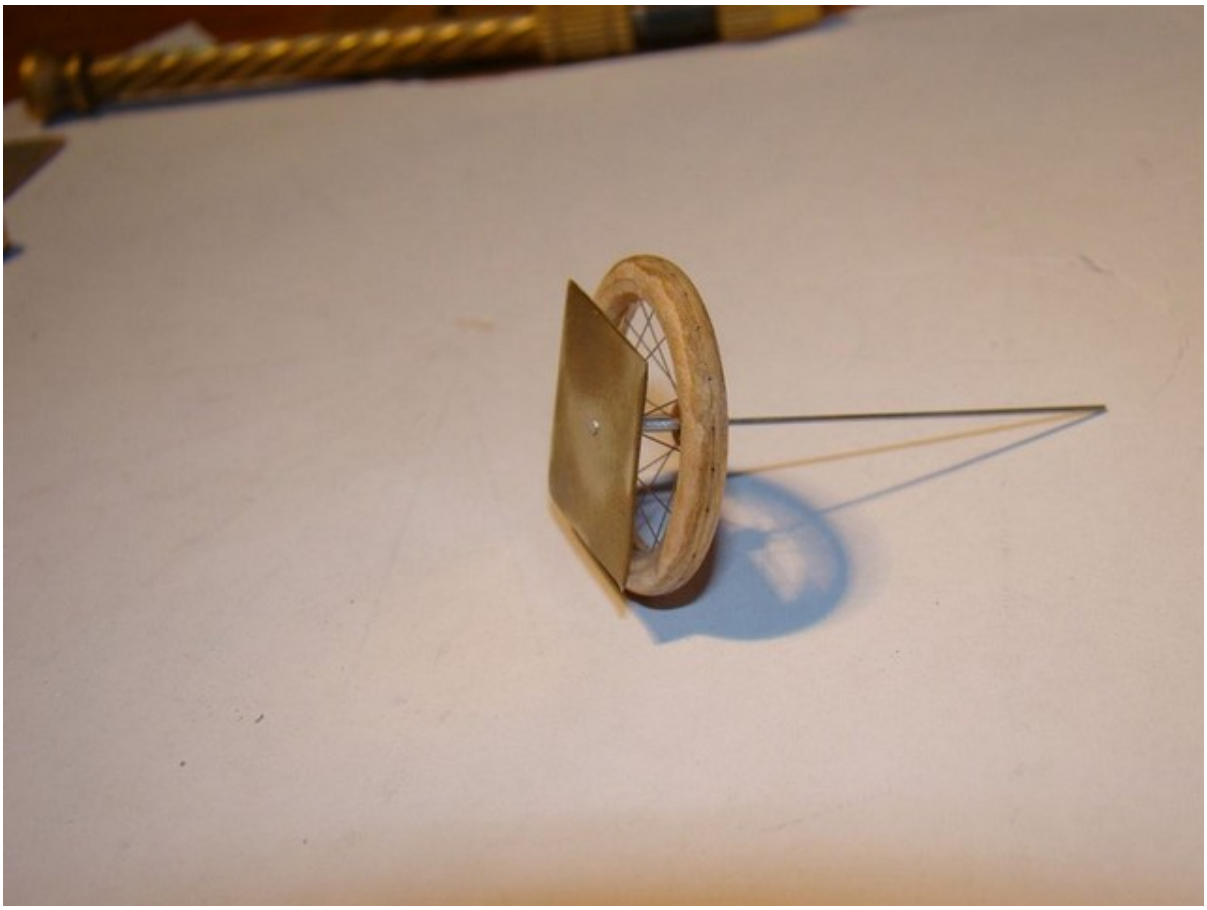
Prior to that, it is assumed that you have applied glue to the axle flanges, in order to stick the spokes permanently. You have to push the thread as close as possible to the flange.

Then, it is a matter of decision or design, how much extra axle length you want. a simple space made of ply or brass or any kind of sheet, with a hole for the axis, forms a perfect jig for accurate sanding to final length.

So, that should be it, as far as wheel construction is concerned.







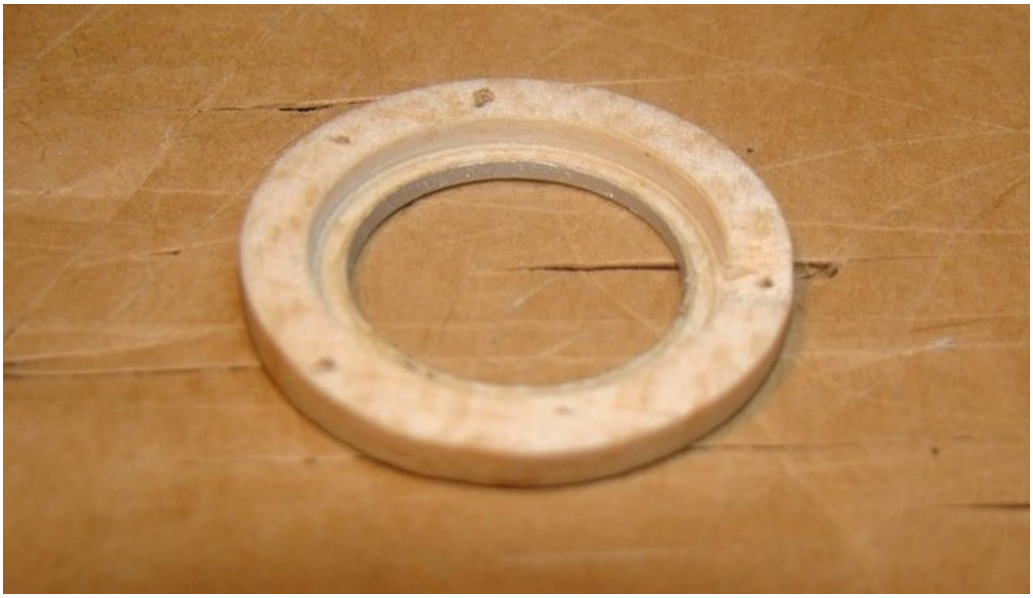
Last and necessary step, of course, is painting...

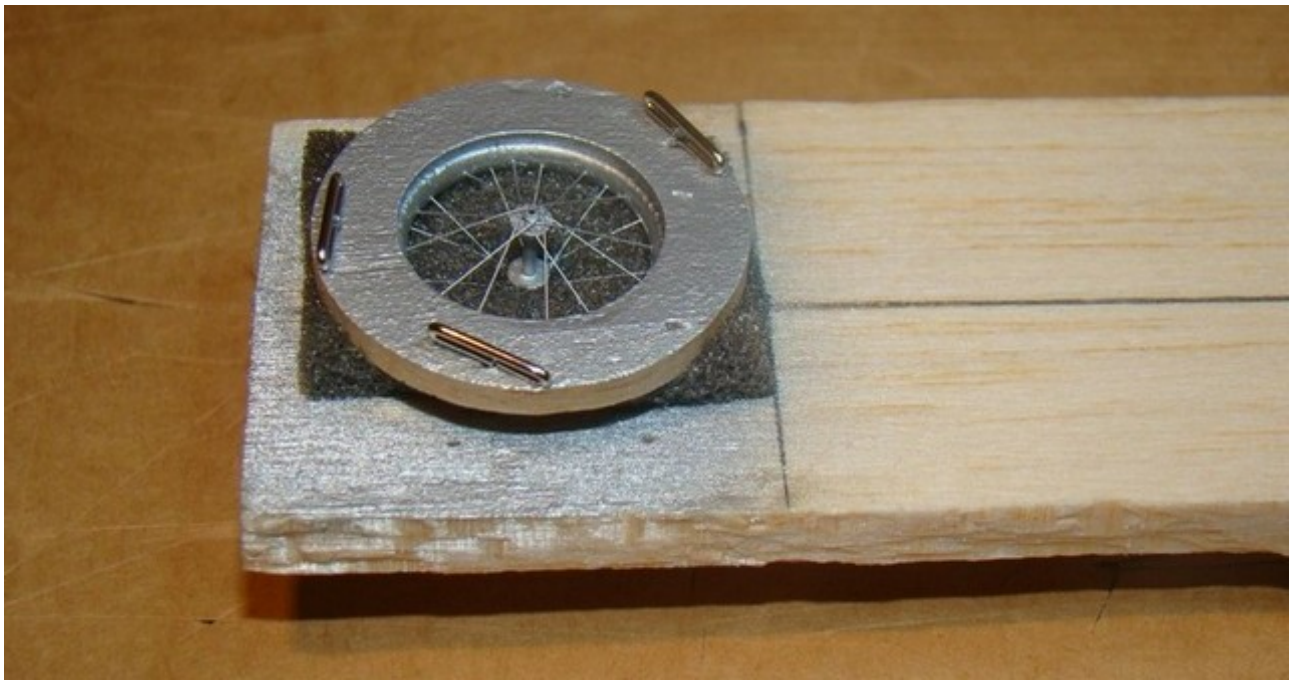
Again, prior to that, the smoother the balsa surface, the better the end result. I coat and sand 3-4 times in order to get rid of the balsa grain.

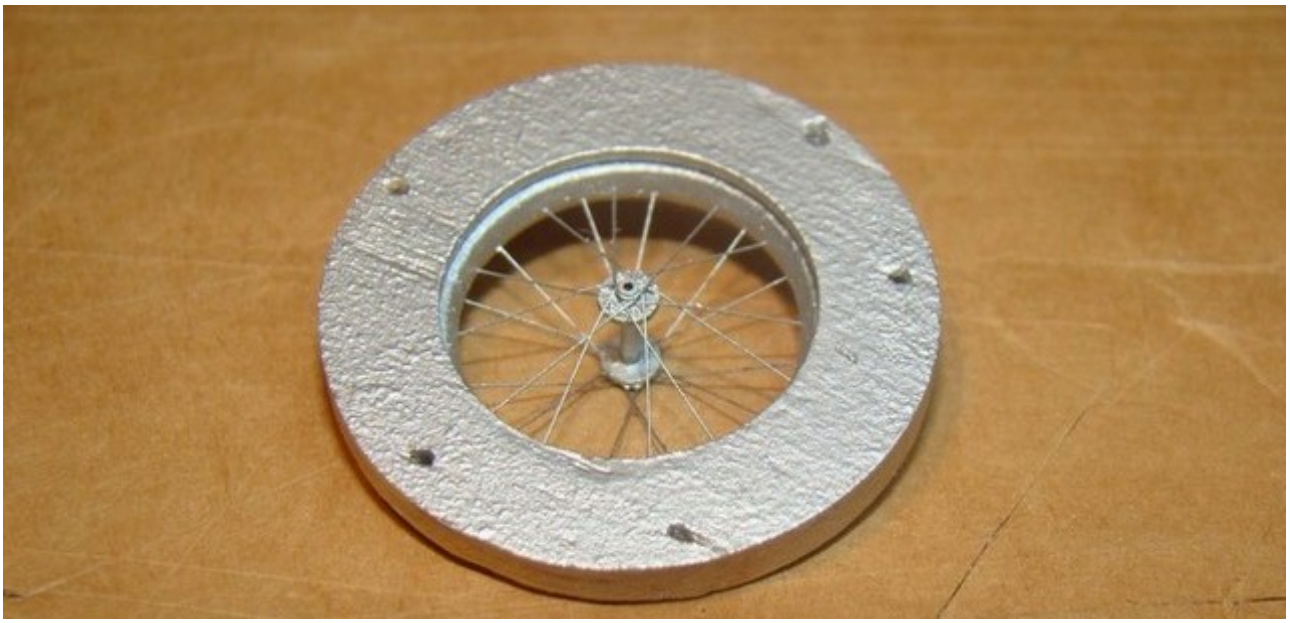
Anything goes for paints, enamel, acrylic or what you like best. Spraying or airbrushing is best, especially for the silver spokes and wheel rim. The tyre can be painted with a brush.

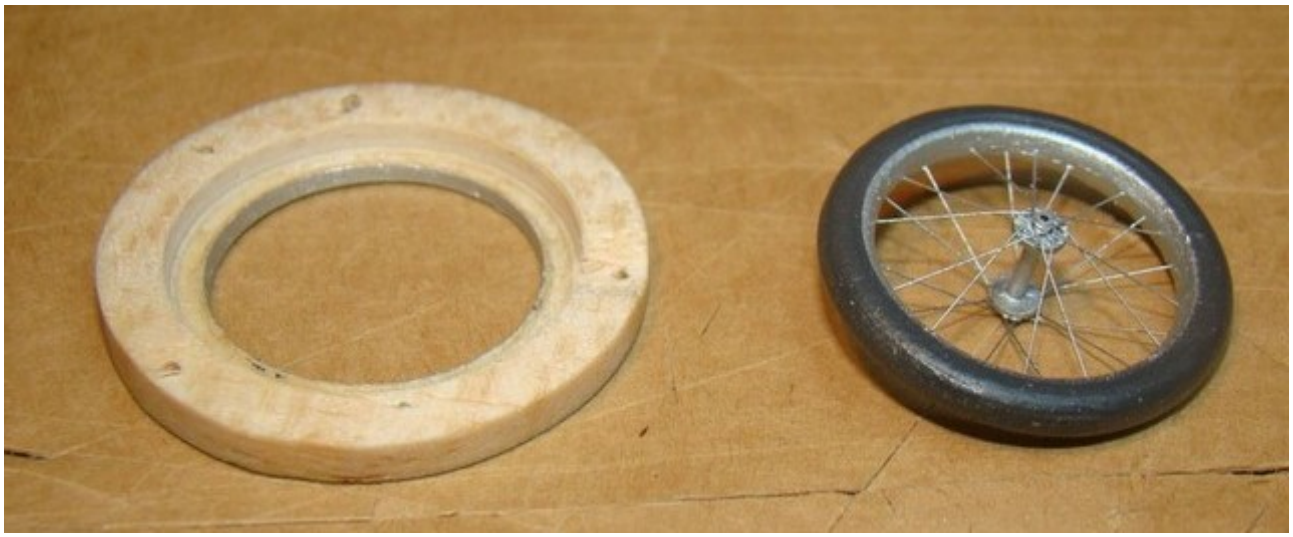
I paint the tyre first, as a matter of fact I over paint the rim as well.

A simple turned disk acts as a mask, for spaying the rim and spokes, protecting the already painted tyre surface. A piece of rubber foam takes care of overspray for the underside.









So, here we have the finished wheels...

Four were needed for the Lizzie, they turned out pretty similar and strong enough for normal flying, i.e. not excessive crash shocks.

I have never tested them to destruction to see how well the hold. They do. But there have been failures in cases of a vertical dive to the ground. The model did not look much better either...

And all four finished… The weight, not bad…

So, this is the basic tutorial. It is of course possible to make variations, where one feels there might be a better or easier way, and that is the fun of it and our hobby anyway.

For a more advanced and rather controversial method, it is possible to make and use 3D printed parts, as done on my Avro F. That was also documented in SFA, so also lost, some pictures are to be seen in the corresponding thread in HPA.

I am thinking of combining the two, using printed parts for rims and balsa for tyres.

Another “advanced” method would be to make the wheel without tyres, and mould these from silicon rubber. A mould will be needed, plus an inside collapsible core. Some CAD work for the future... I might try that with the Sikorsky S-39, no spoked wheels there, just big balloon wheels, where the elasticity of the silicon rubber will be exactly where you need it for smooth landings.

As if there not enough things to do...

George Kandylakis