

Illustrated Construction Manual: The Newton Reflector Telescope

© Michael Monscheuer

https://michelswunderland.de/solderiron/nst_2021.html

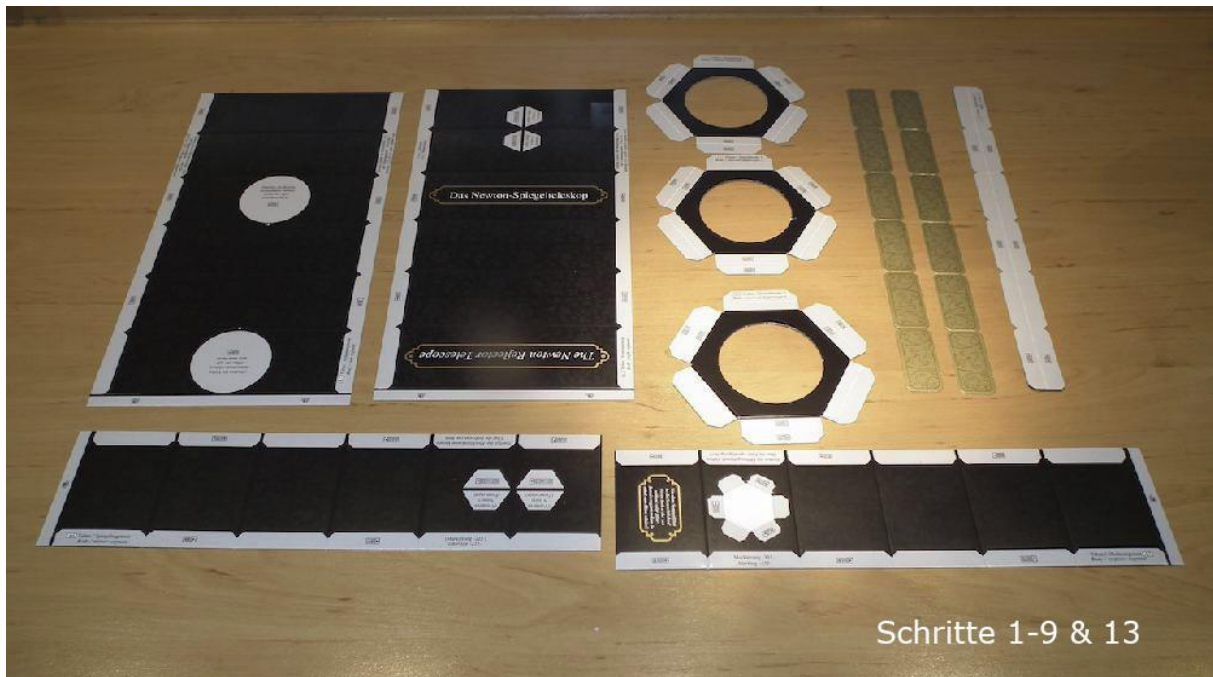


Here we go...



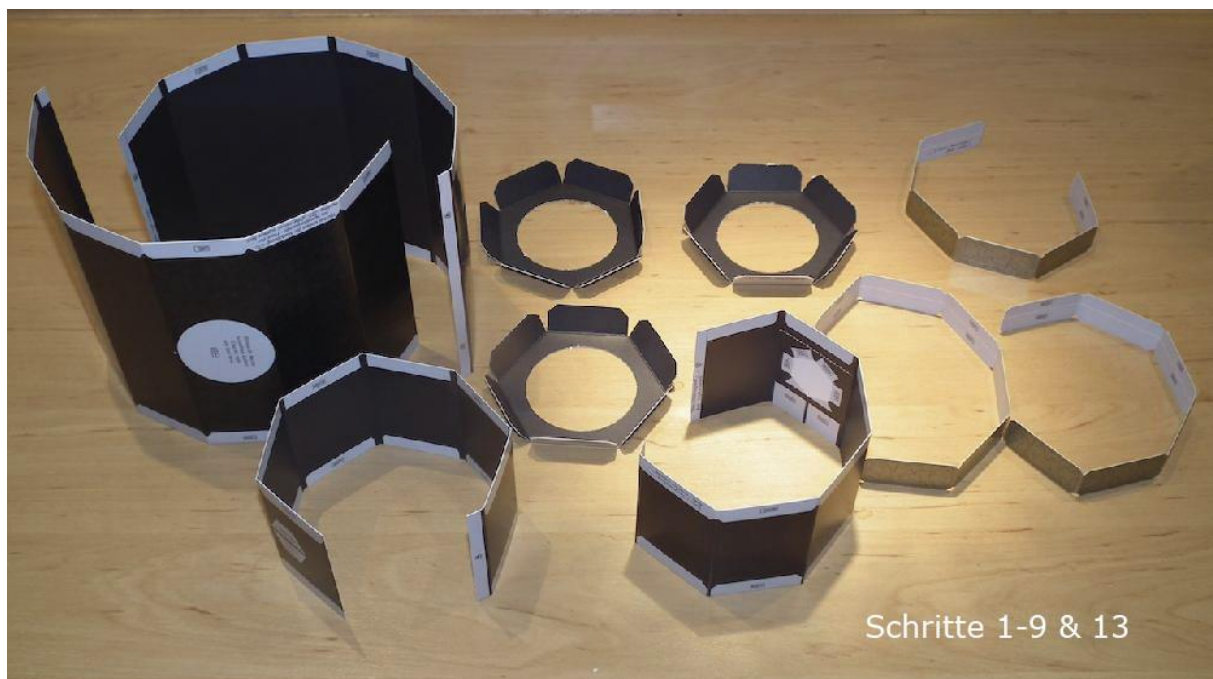
Partly necessary, partly helpful tools.

The long spoon is helpful when assembling the inner panels, the toothpicks facilitate the application and distribution of glue in certain places. Also helpful is, for example, a jar with an opening diameter of about 3.5-4cm (see step 11). The weight and the plywood plate are used for pressing glues.



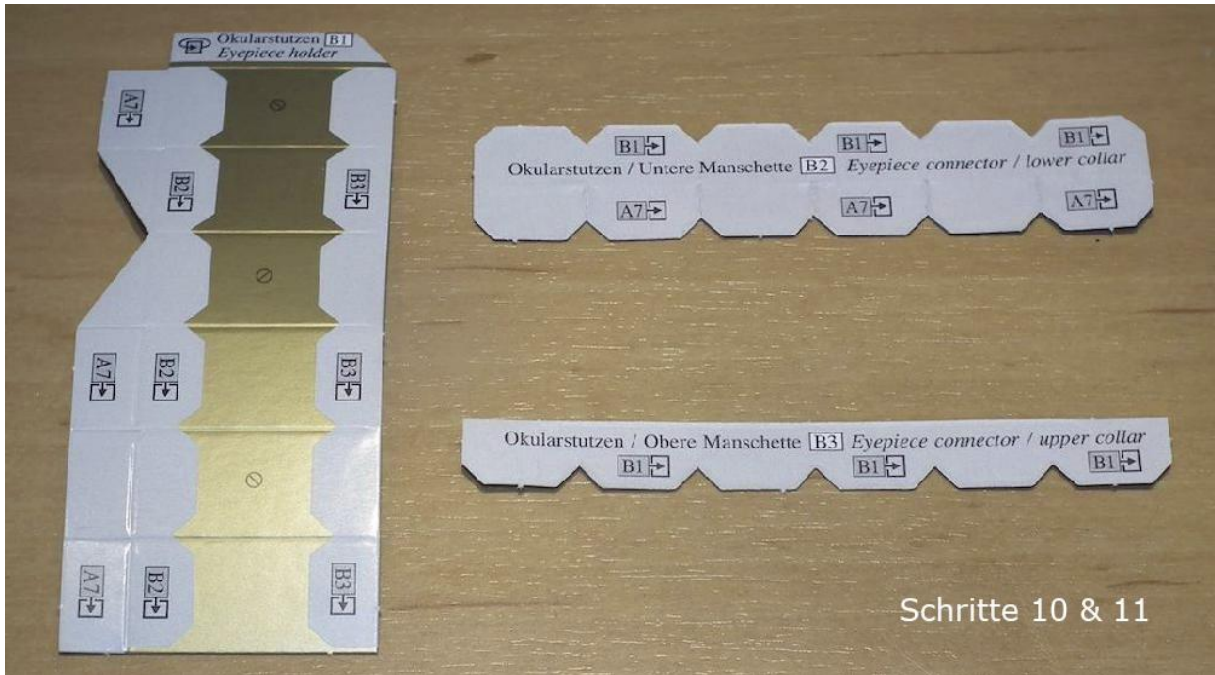
Schritte 1-9 & 13

Steps 1 – 9 & 13: The parts needed for steps 1 to 9 and 13 to create the tube.

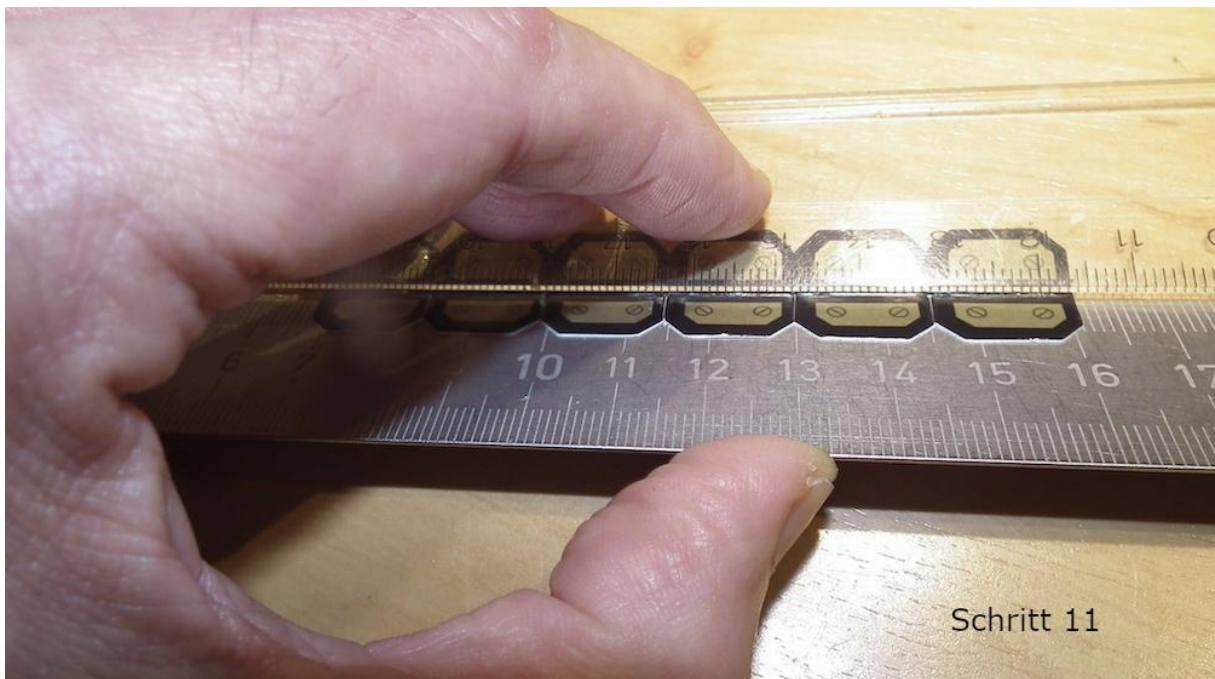


Schritte 1-9 & 13

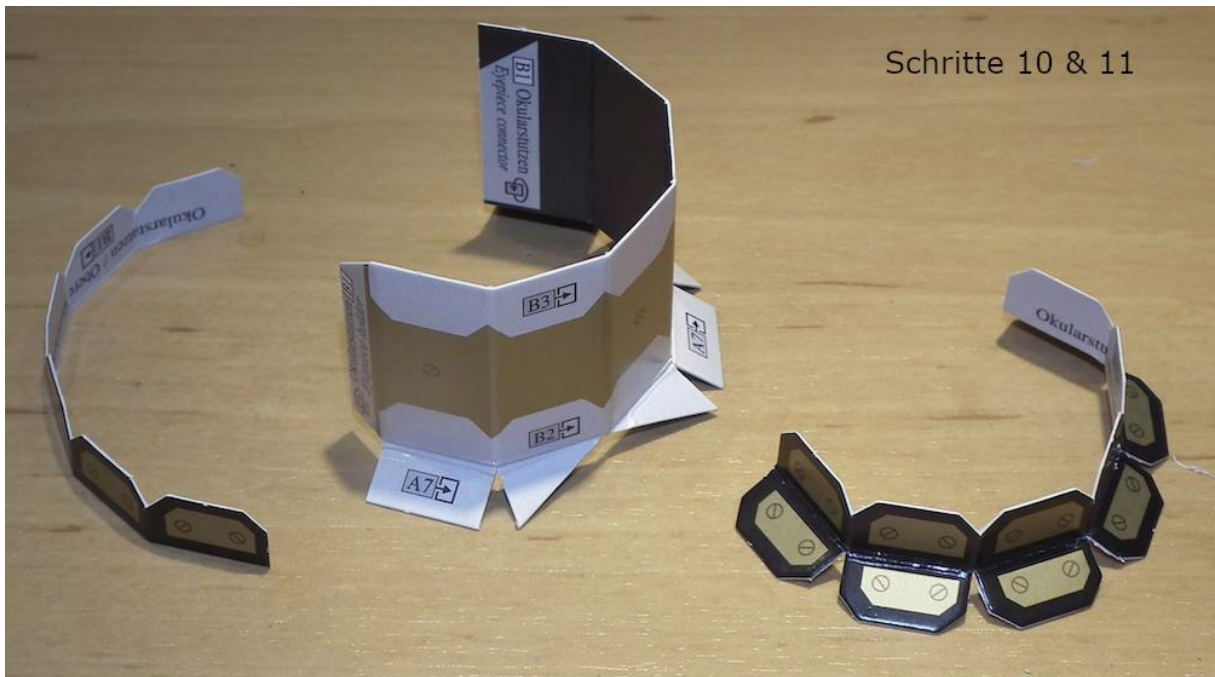
Steps 1 – 9 & 13: The same parts, pre-folded and thus ready for gluing.



Steps 10 & 11: The parts of the eyepiece socket.

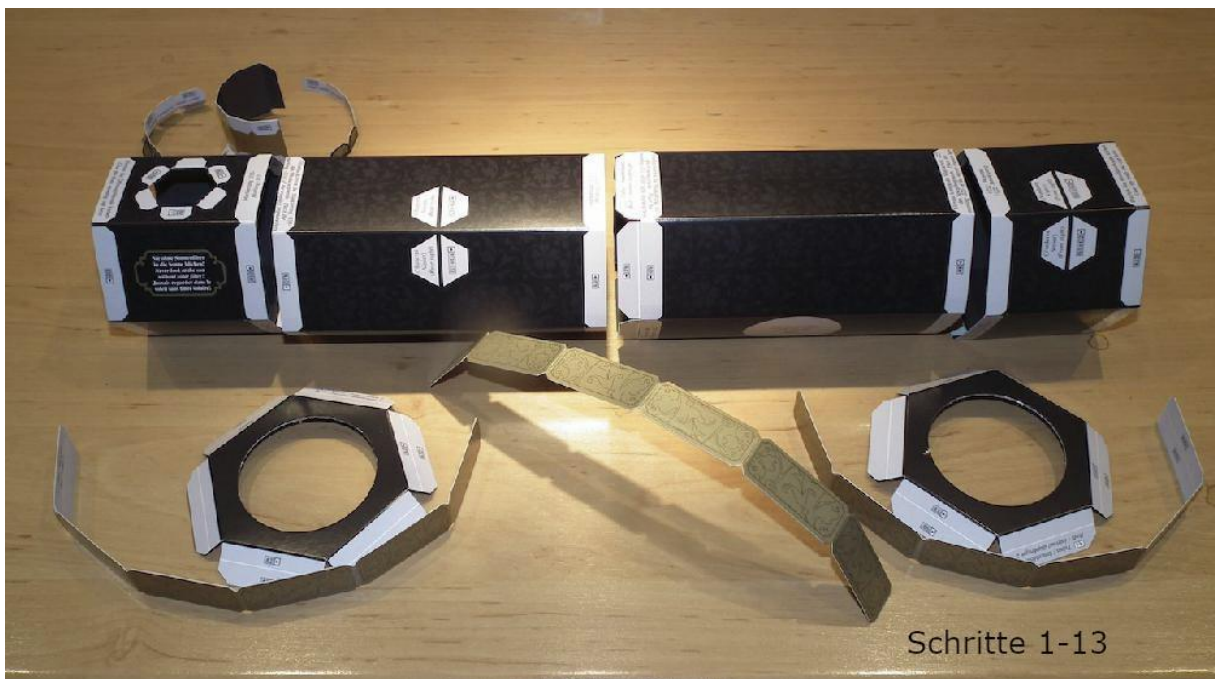


Step 11: For exact folding of the lower cuff, it is helpful to use two rulers.



Schritte 10 & 11

Steps 10 & 11: The pre-folded parts of the eyepiece socket ready for gluing.



Schritte 1-13

Steps 1 – 13: Tube segments, inner shutters, parts of the eyepiece socket and the sleeves before mounting them.



Schritt 11

Step 11: While the weighted glue of the eyepiece socket is drying, the edges of the cuffs are dyed



Schritt 11

black....

Step 11: Instead of the toothpick suggested for reinforcement, a 2mm brass profile, glued in place with a two-component adhesive, was used.



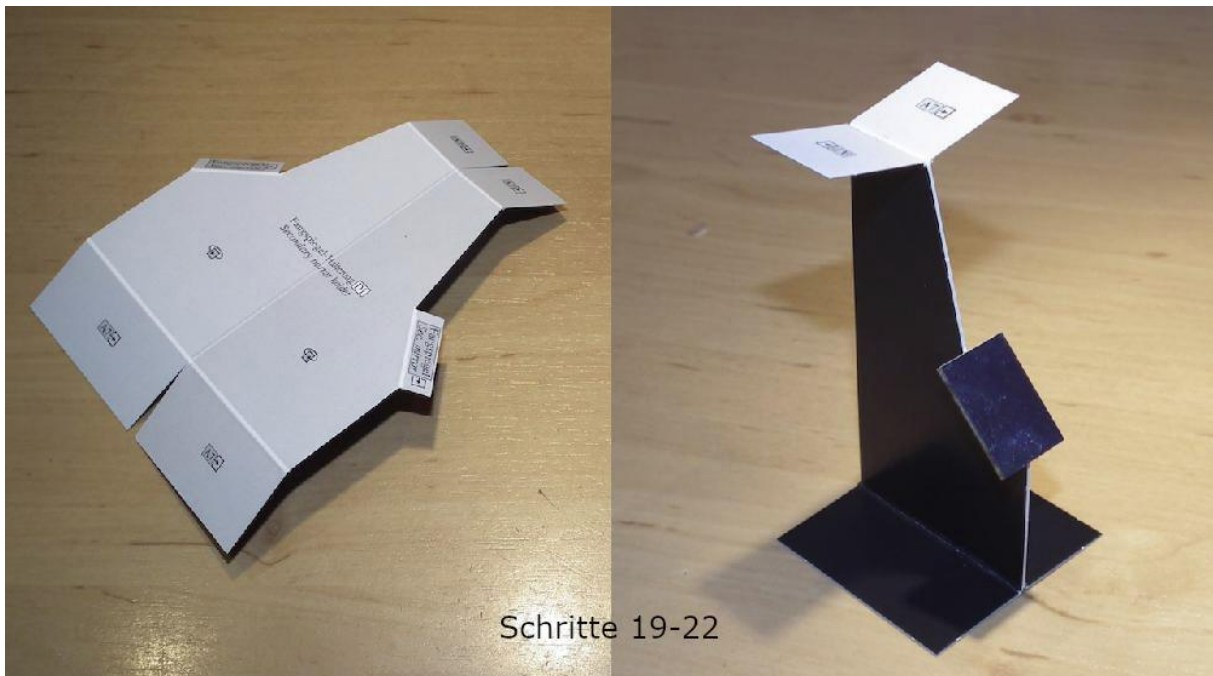
Steps 11 - 13: The tube shortly before its completion.

Step 13: Tube with finished eyepiece holder, prepared for attaching the axle bearings.



Steps 14 - 18: The nine parts each of the right and left axle bearings.

Steps 14 - 18: The axle bearings are made in a layered construction.



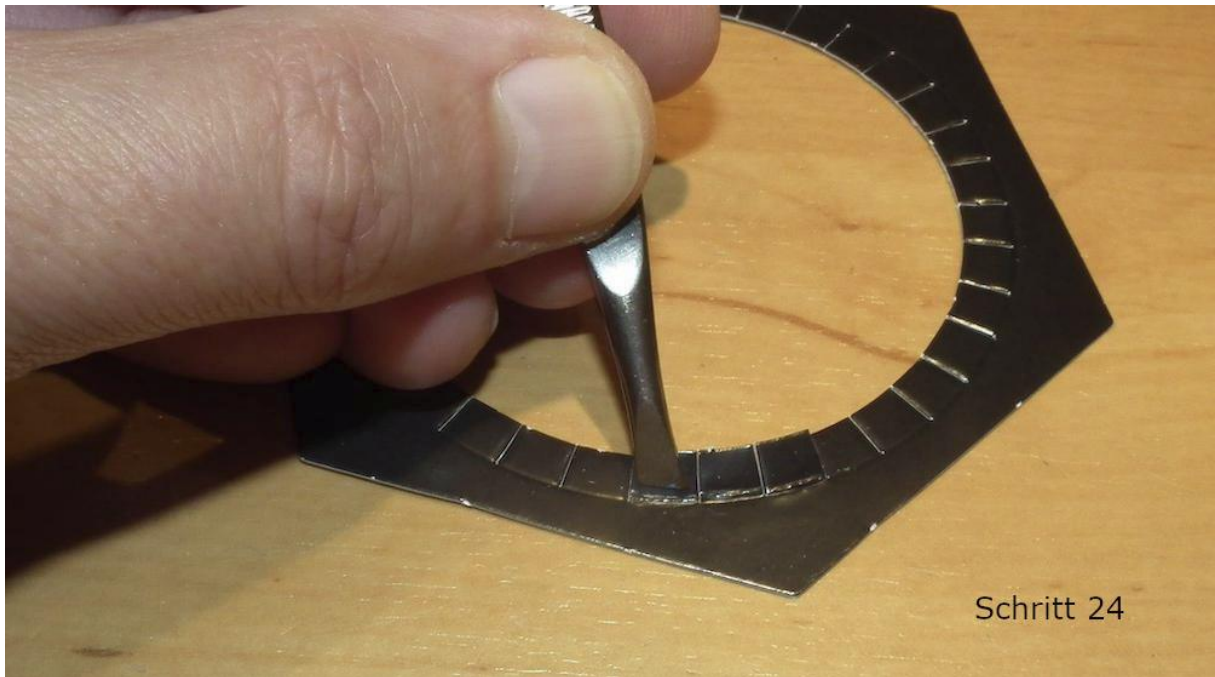
Step 18: One of the axle bearings mounted on the tube.

Steps 19 - 22: The secondary mirror. On the left the pre-folded holding device, on the right the pre-assembled component.



Step 21: The secondary mirror in the tube under the eyepiece tube - do not glue it in yet!

Step 22: Checking the alignment of the secondary. When looking into the eyepiece tube, the image must be round. Readjust the secondary mirror if necessary.



Steps 23 - 27: The main mirror and its holder.

Step 24: A pair of tweezers with flat jaws facilitates the exact folding of the small flaps.

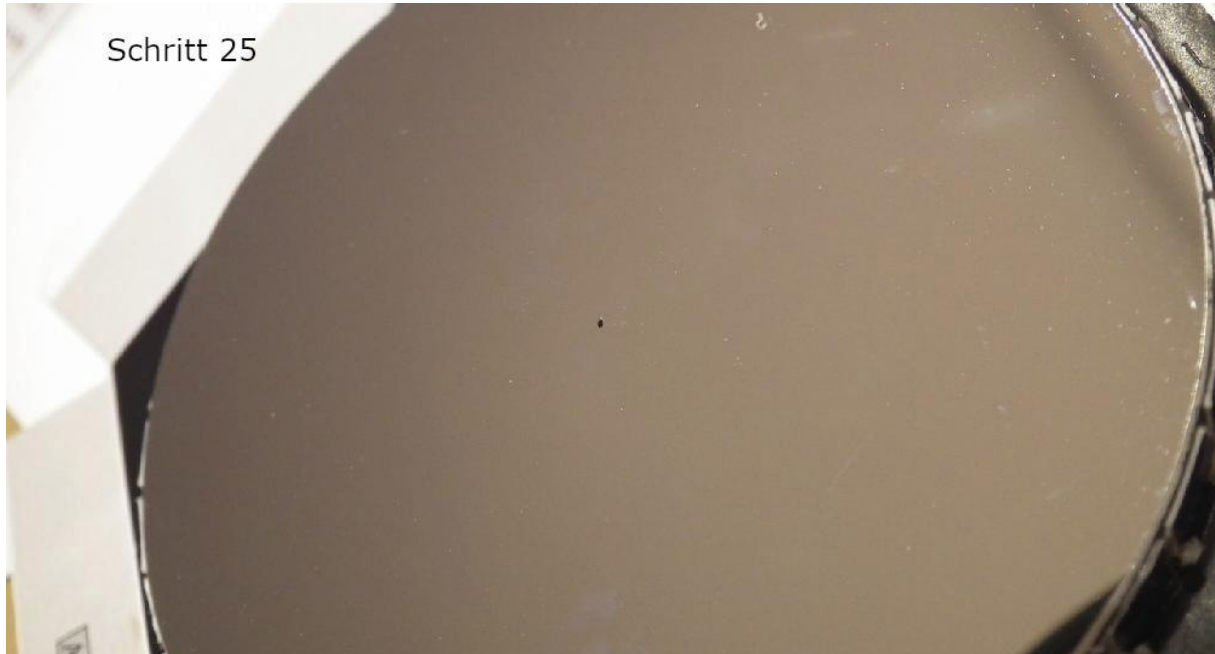


Step 24: Base plate and holder of the main mirror. Contrary to the instructions, the tabs of the base



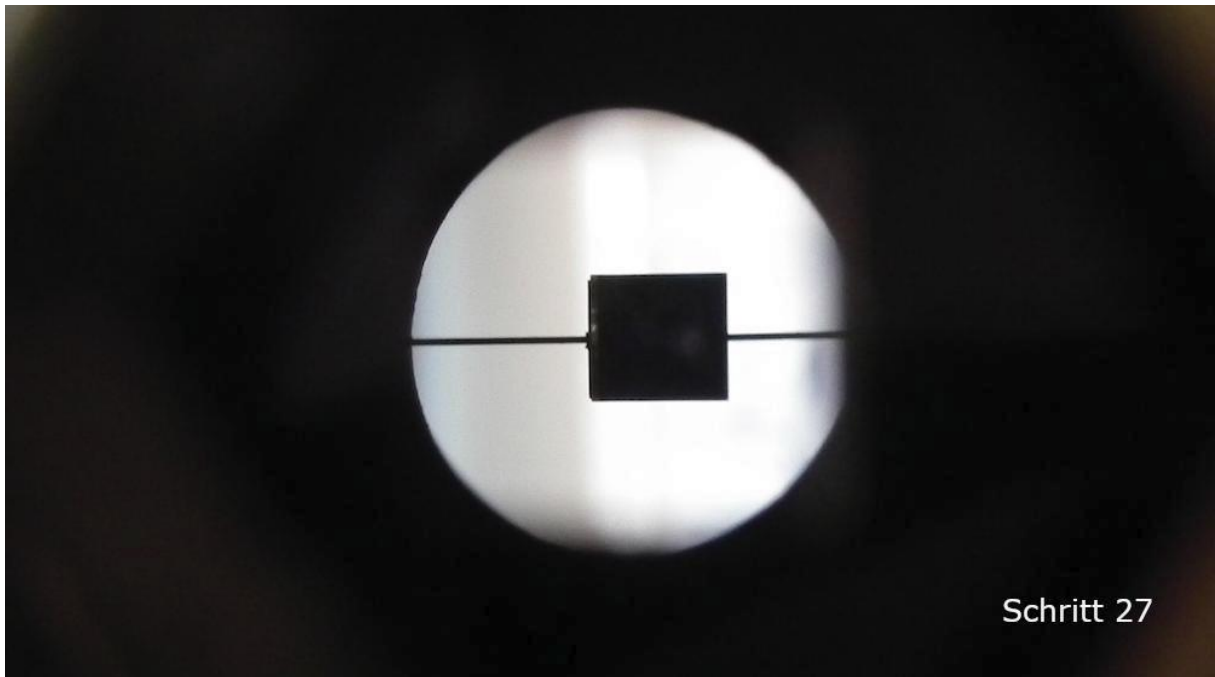
plate are not folded back until after the mirror has been glued in place, which facilitates the creation of this component.

Step 24: A rubber ring holds the tabs in place while the glue dries.



Step 25: No dirt in the middle of the mirror - it is the mark needed for exact alignment.

Step 26: The main mirror has been inserted into the tube, but not yet glued. The (still) overhanging tabs are for later adjustment.



Schritt 27



Schritte 31-36

Step 27: When looking into the eyepiece tube, the secondary mirror must appear square in the centre of a round image. If necessary, correct the position of one or both mirrors.

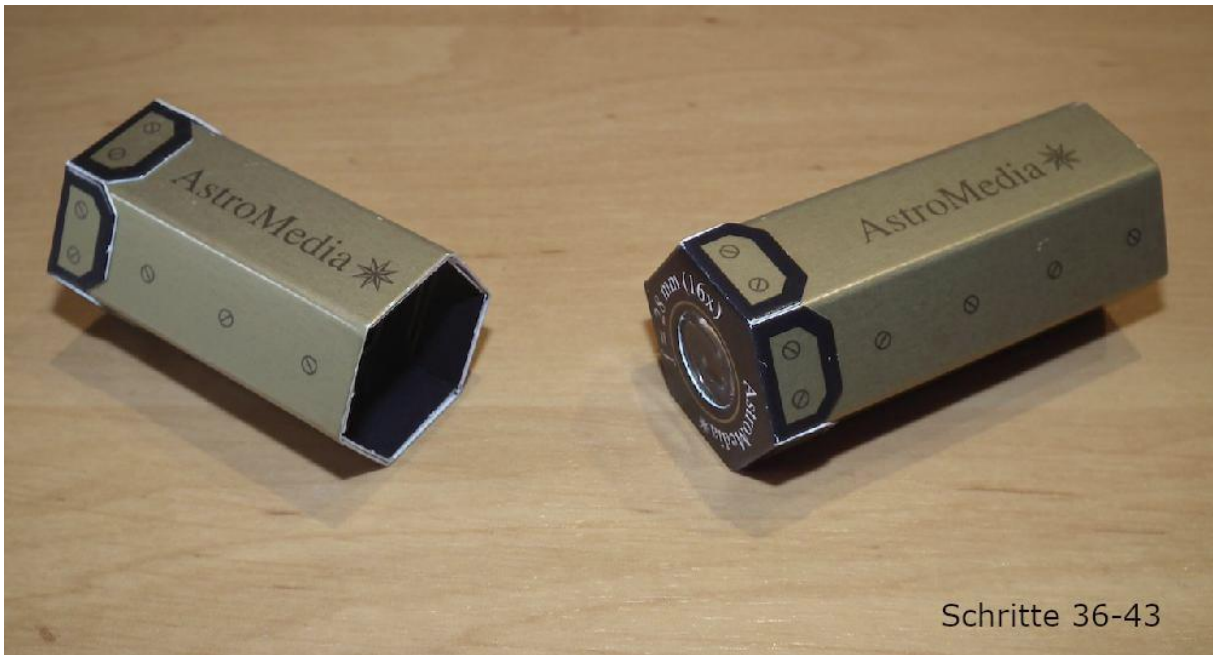
Steps 31 – 36: The parts required for the Ramsden eyepiece.



Steps 31 – 35: Partially assembled Ramsden eyepiece. The still loose lens is placed on the lens already glued to the ocular lens holder by means of the hexagonal collar and glued there. The diaphragm on the left of the picture finds its place at the other end of the eyepiece tube.



Step 36: The completed Ramsden eyepiece. We will not document the assembly of the Steinheil eyepiece, as the assembly is virtually identical to the principle of the Ramsden eyepiece.



Schritte 36-43



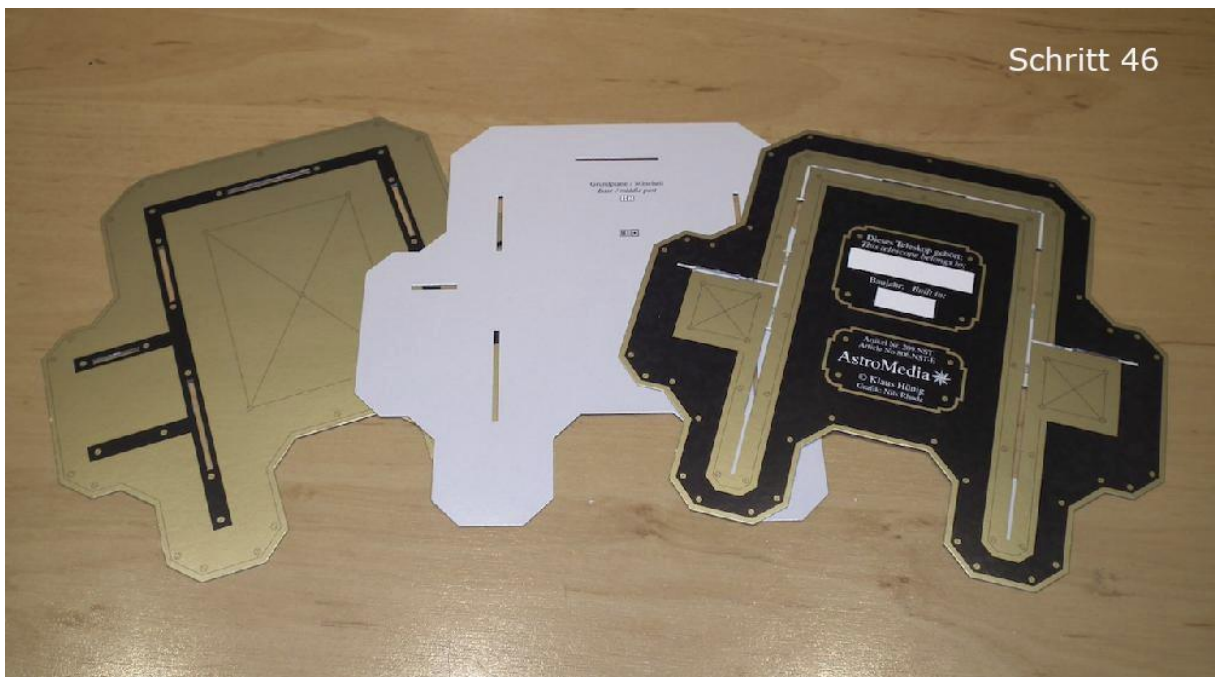
Schritte 44 & 45

Steps 36 - 43: The Ramsden and Steinheil eyepieces ready for use.

Steps 44 & 45: To complete the tube, the two sights are still missing, which consist of 2 parts each.



Steps 44 & 45: After the sights have been glued onto the tube, it is complete.

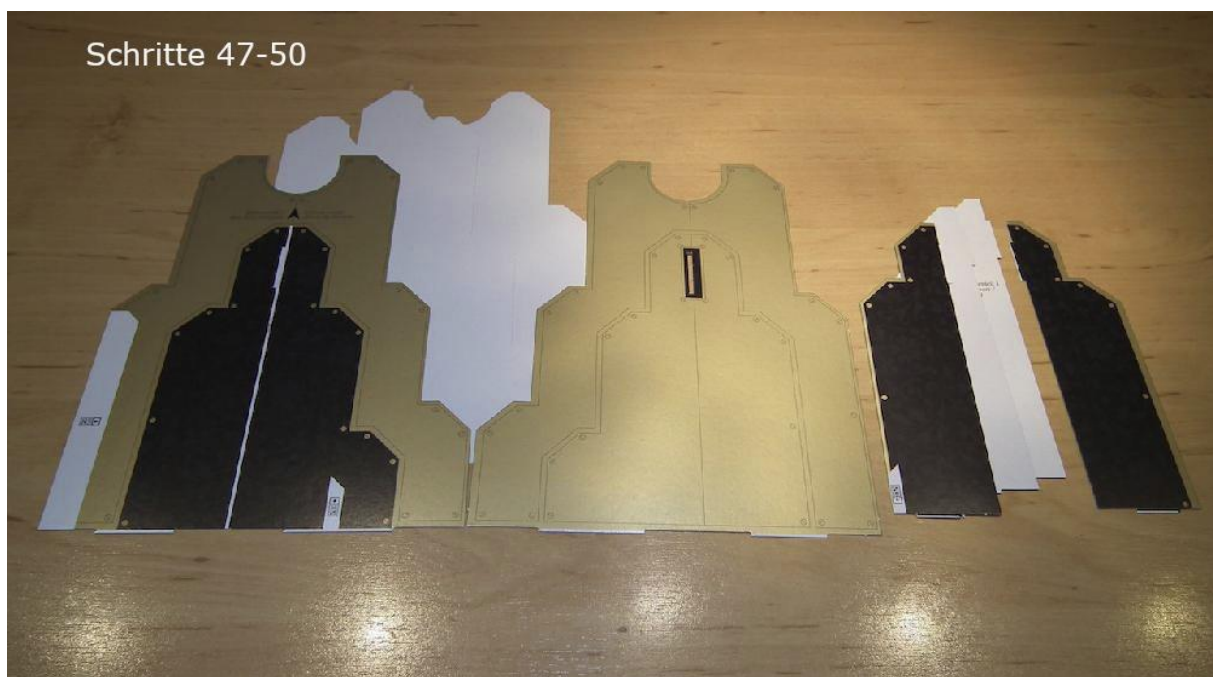


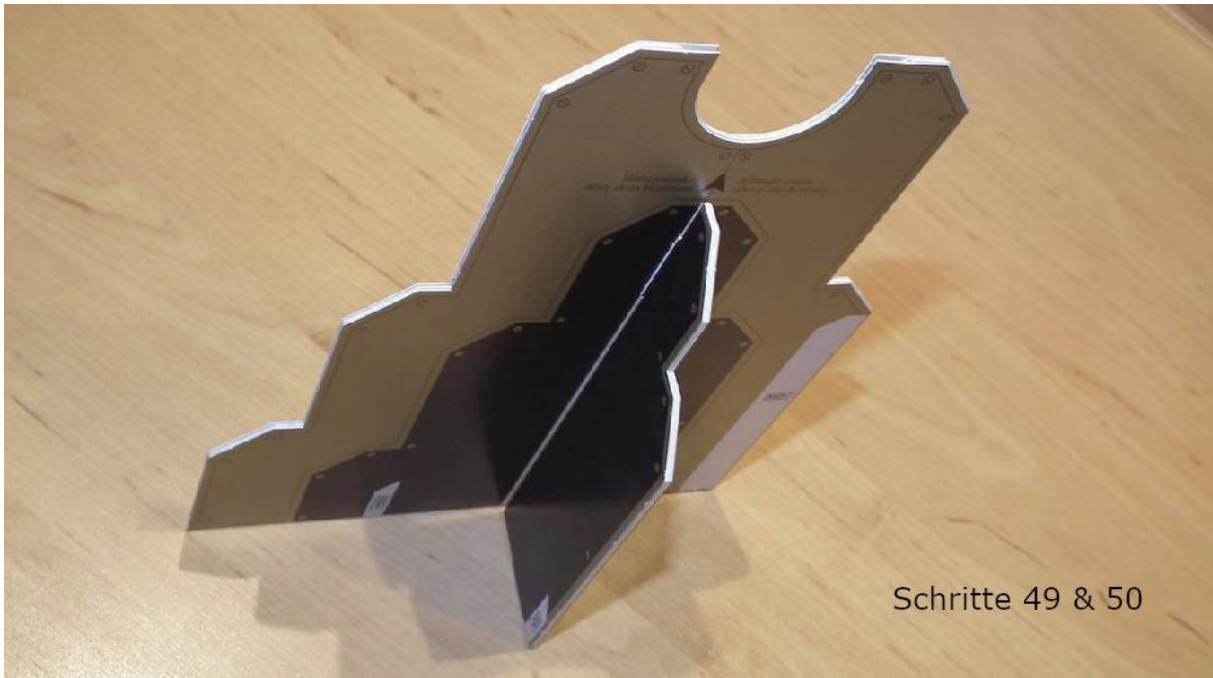
Step 46: The base plate of the mount consists of three layers that are glued together.



Step 46: But be careful! Allow the glue to dry before pressing the parts during the drying process - otherwise there is a risk that - see picture - the glue will bleed through and spoil the print.

Steps 47 – 50: The left-hand support as well as the left-hand beam consist of four layers each.





Steps 49 & 50: Left support and left bracket put together as a test.

Steps 55 – 57: The partly prefolded parts of the three-layer bridge.





Steps 47 – 57: Trial assembly of the installation parts.

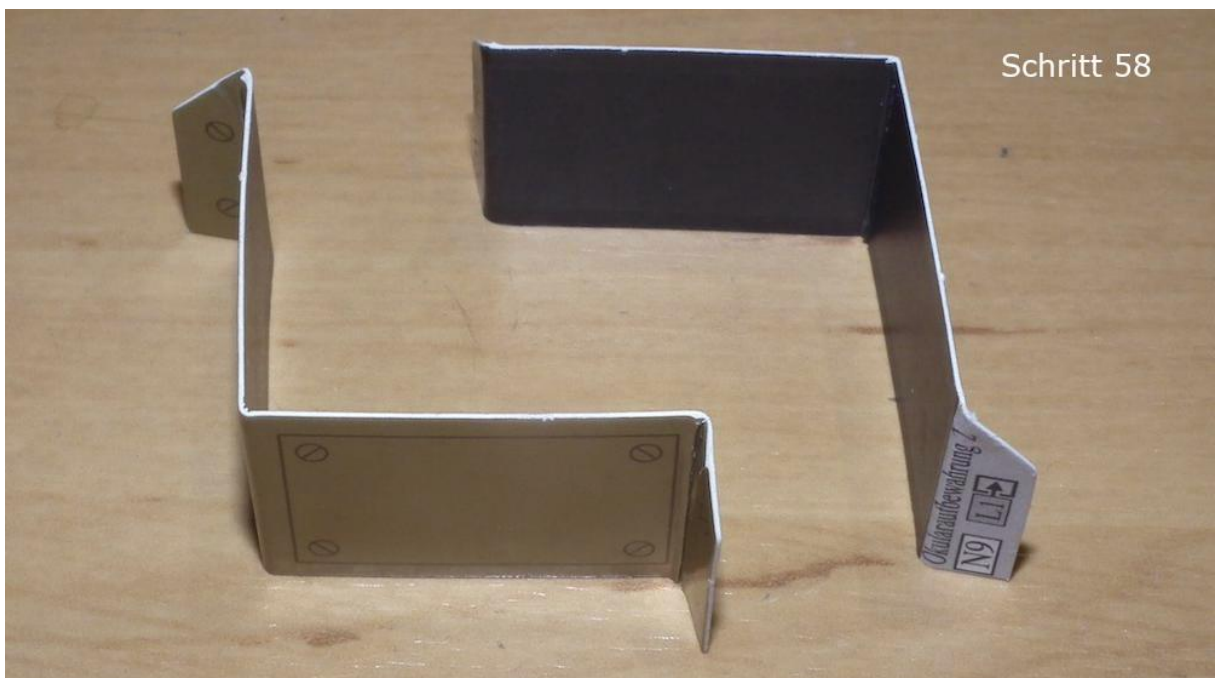
Steps 47 – 57: The parts of the assembly in the overview.





Step 57: The finished assembly.

Step 58: The two eyepiece holders ready to be glued to the mount.





Steps 63 & 65: Prefolded tube aperture and end cap.

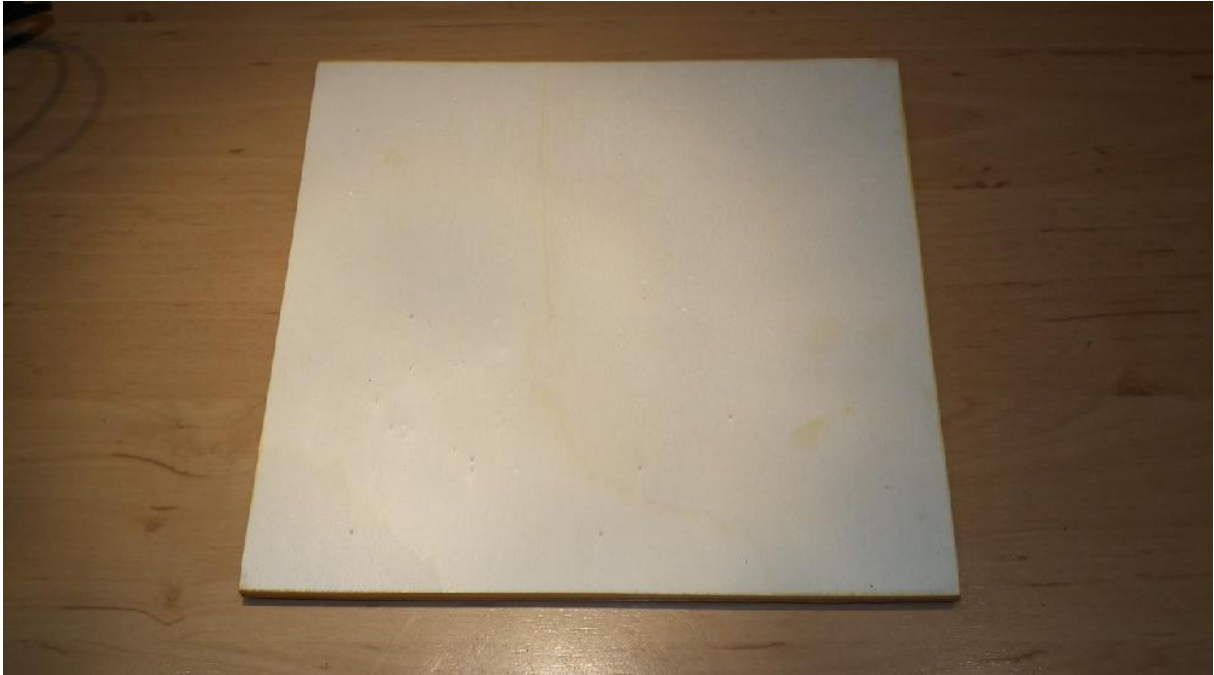
Step 65: And again, a rubber band helps to hold tabs in place as they dry.



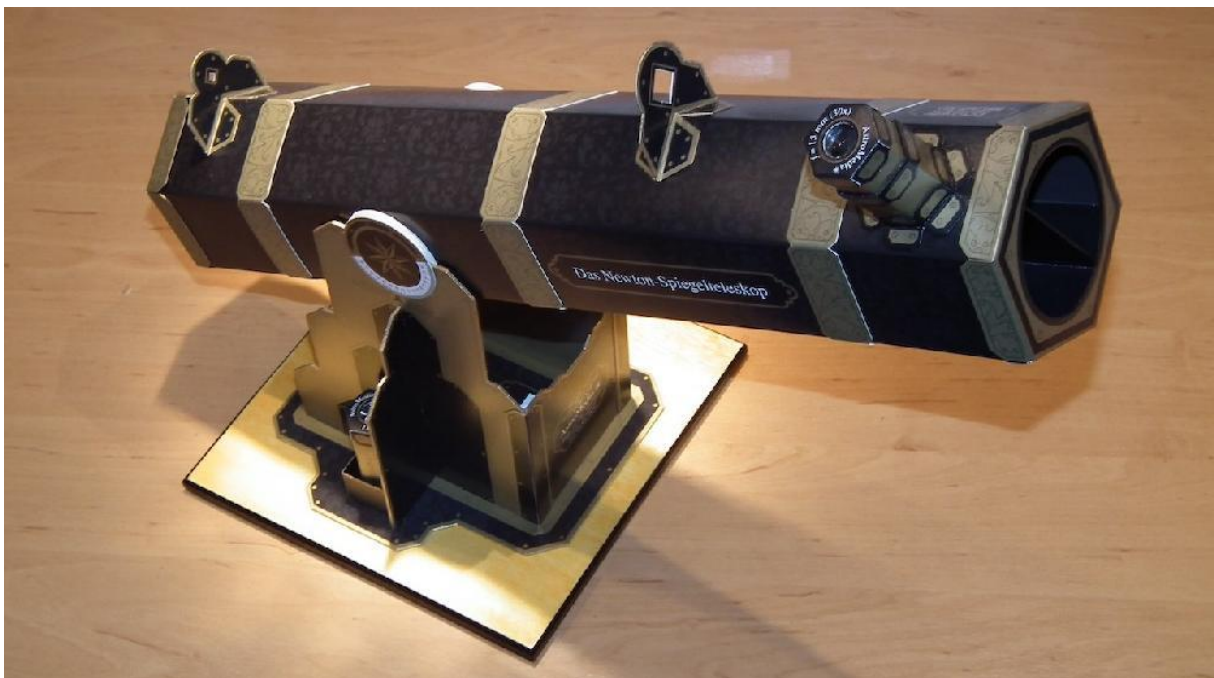


Ta-daa! Done!

And not only beautiful to look at - also useful and expanding the horizon in every sense.



A plywood panel of 200 x 200 x 4mm ...



... chamfered, shellac-treated and with final sharpened edges... gives a little more stability with rubber pads attached to the underside.