

Illustrated construction manual: The Eddy Current Tube

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<https://michelswunderland.de/solderiron/wirbelstrom.html>

The Astomedia kit follows Astromedia's motto "hands-on science" once again in the best possible way and illustrates, for example, the principle of the eddy current brake used in trains.

About the physics of it all...

If an electrically conductive object moves in a magnetic field or a magnet moves in an electrical conductor, currents are induced in it (induction voltage/current). A conductor in the form of a long wire or a coil clearly determines the direction of the induced current. However, turbulent changes in the direction of the current are generated in extended electrical conductors such as aluminium pipes. These currents are not subject to any orientation and are therefore referred to as eddy currents. If a permanent magnet falls in a straight line through an electrical conductor that runs perpendicular to it (e.g. an aluminium tube), this induces eddy currents in the conductor, which in turn generate two opposing magnetic fields and slow down the fall of the magnet.

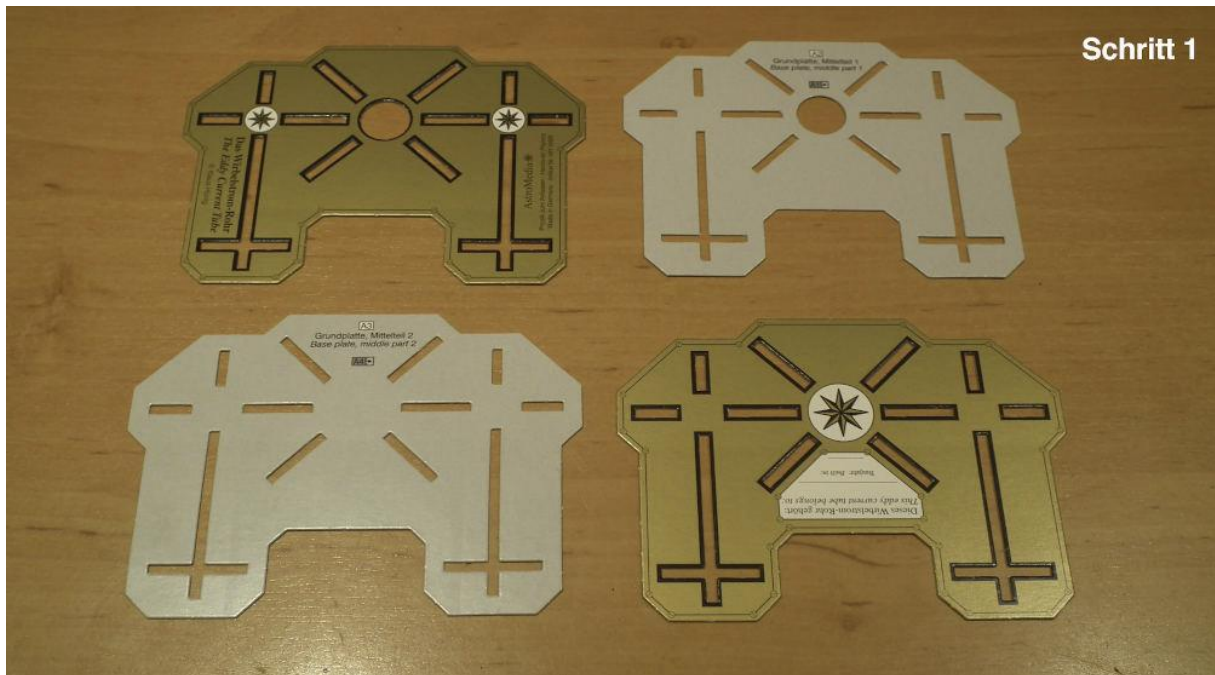
Pictures of the assembly kit

The instructions describe the building process clearly step by step and the construction is easy. The following pictures show the construction of the model. The construction time is about 3 hours, taking into account sufficient precision as well as resting and waiting times.



Freshly unpacked - cardboard sheets, instructions and balls and tubes (in tissue paper). The number of tools for assembly is manageable:

- Solvent-based adhesive and solvent-based superglue
- Toothpicks and/or needles for spreading the glue
- Scissors and cutting knife
- Flat and round hand file
- Golden and black paint and a brush
- Plywood board or similar and a weight for pressing parts after gluing



The components required for step 1: Upper, middle and lower parts of the base plate.



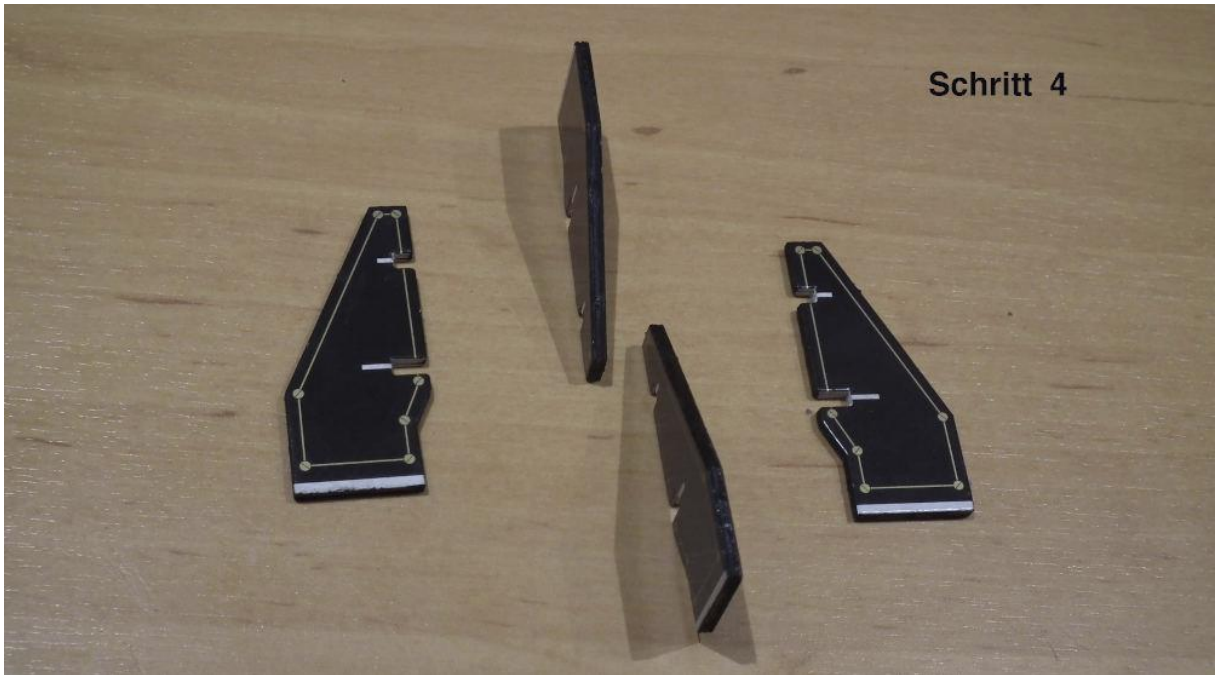
The four parts of the base plate are glued together and pressed during the drying process to prevent the base plate from warping during drying. A plywood board and a weight (e.g. a large piece of metal or books) are helpful for this.



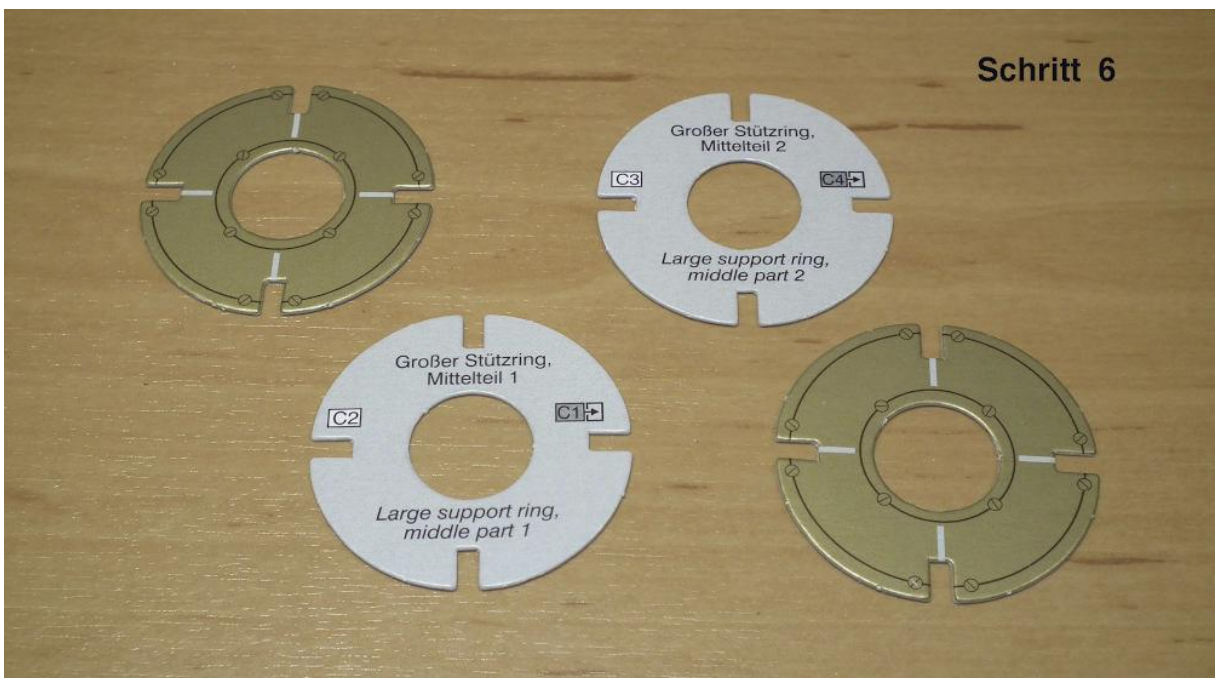
The washer is glued into the hole in the top two layers. We recommend using superglue for this. The outer edges of the base plate and the washer are coloured gold.



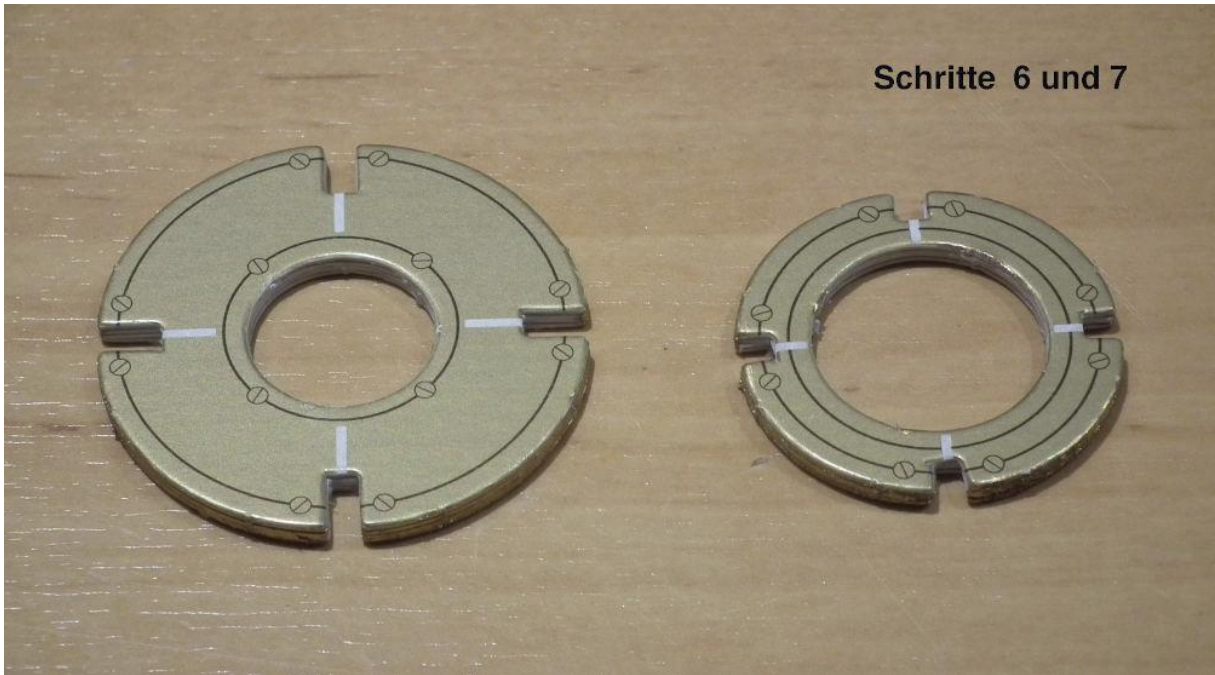
The parts required for step 4.



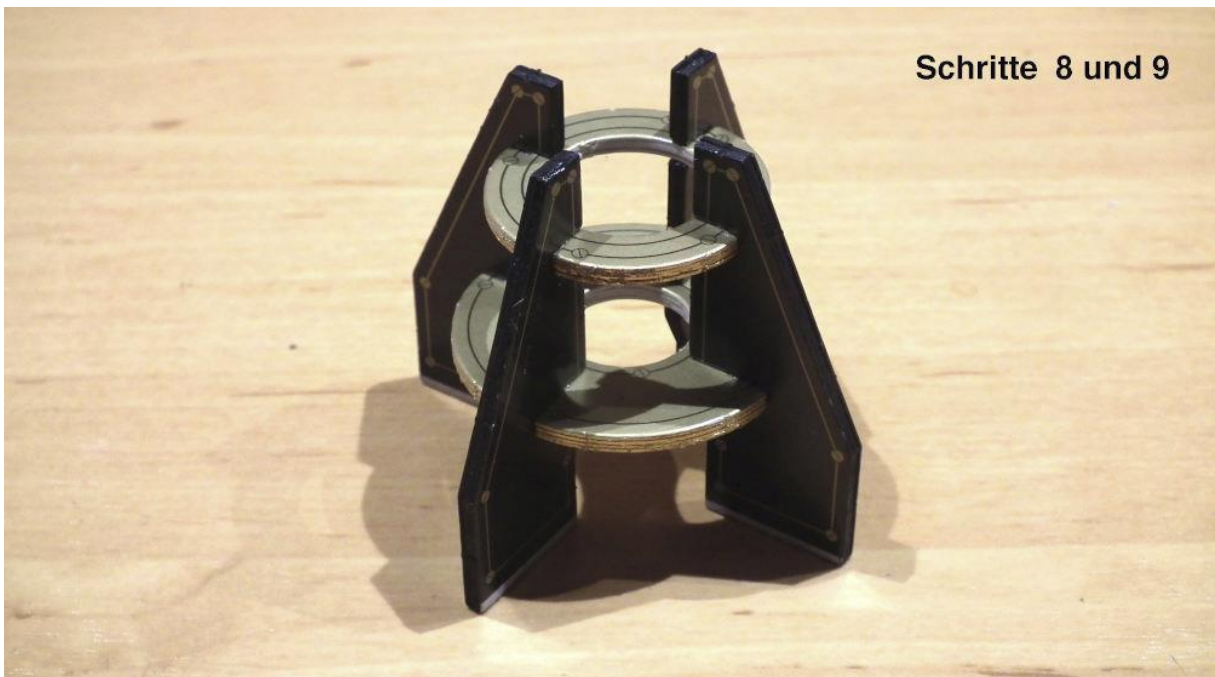
The 4 pipe supports, again consisting of 4 layers, with edges already coloured in black.



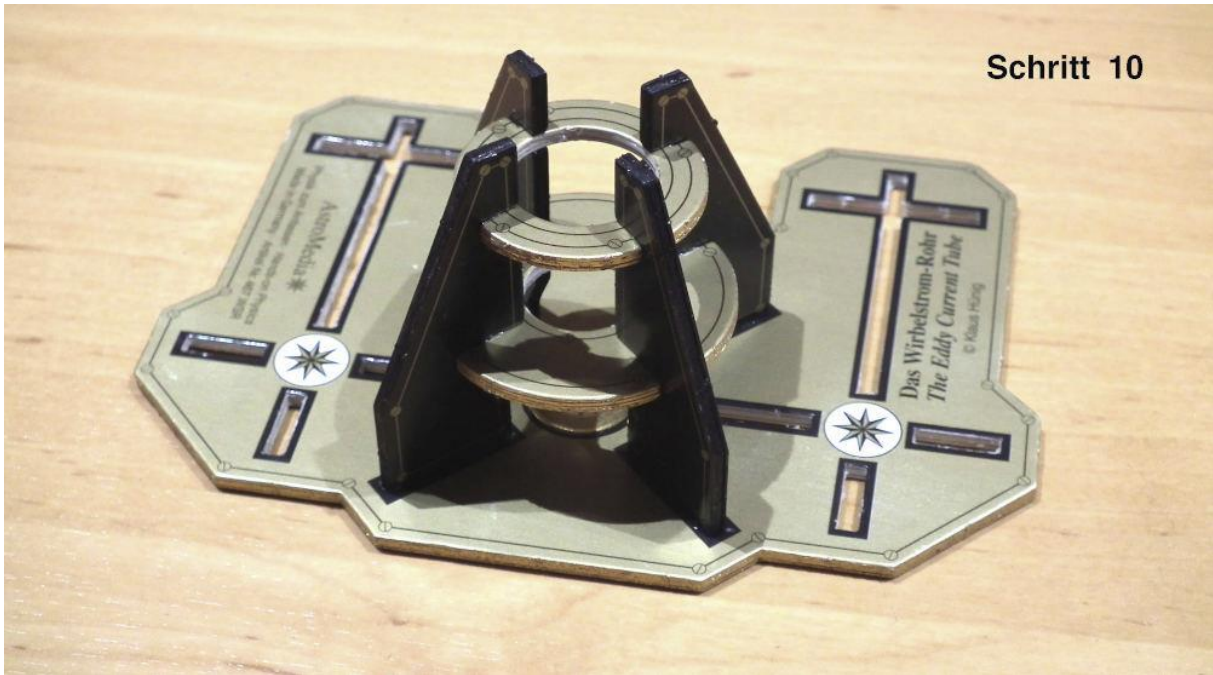
The parts required for step 6.



The support rings completed according to steps 6 and 7 with edges painted in gold.

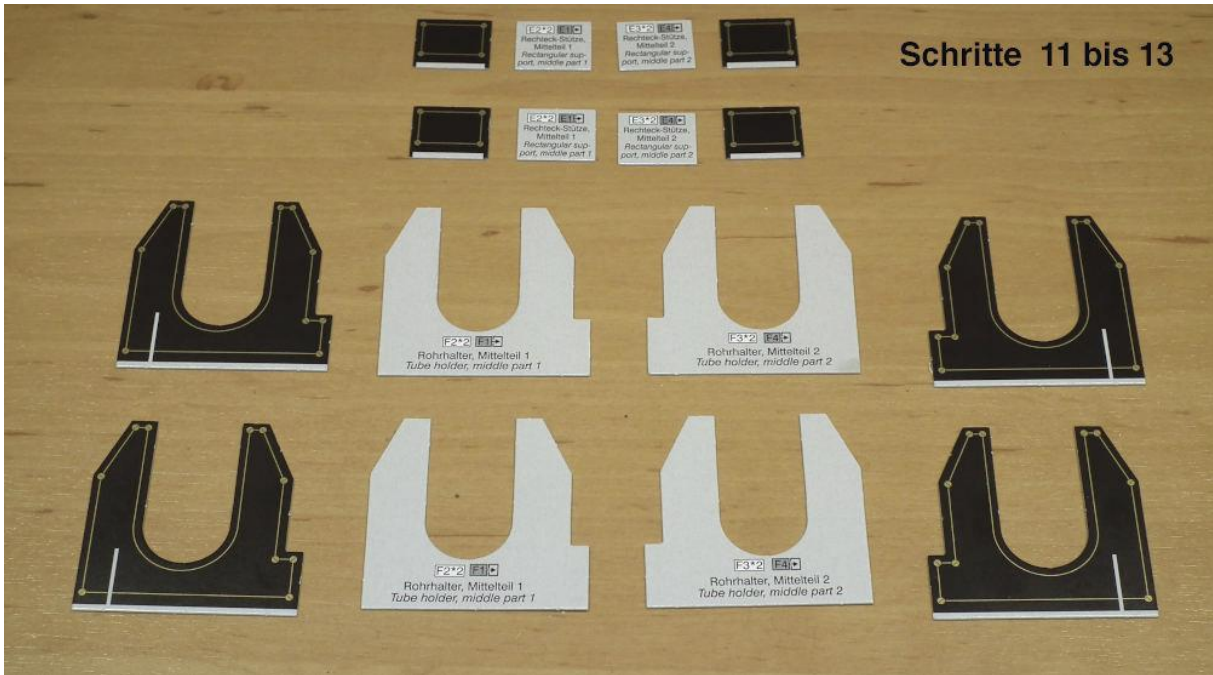


The pipe supports and support rings assembled according to steps 8 and 9.



Schritt 10

Mounting the pipe supports on the base plate.



Schritte 11 bis 13

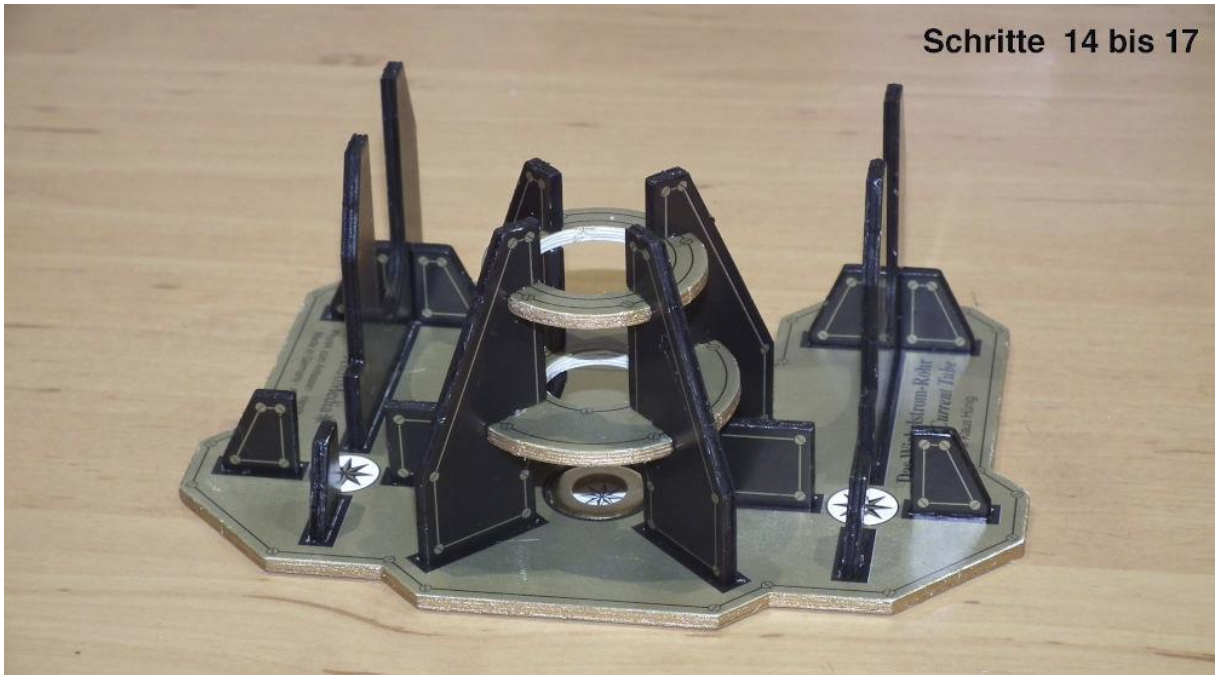
The parts required for steps 11 to 13.



The rectangular ball holders, again consisting of four layers, and the tube holders after creation according to steps 11 to 13 with edges already coloured in black.



Lots of parts for step 15
 These are again glued in 4 layers to form 8 small supports, the edges of which are coloured black.



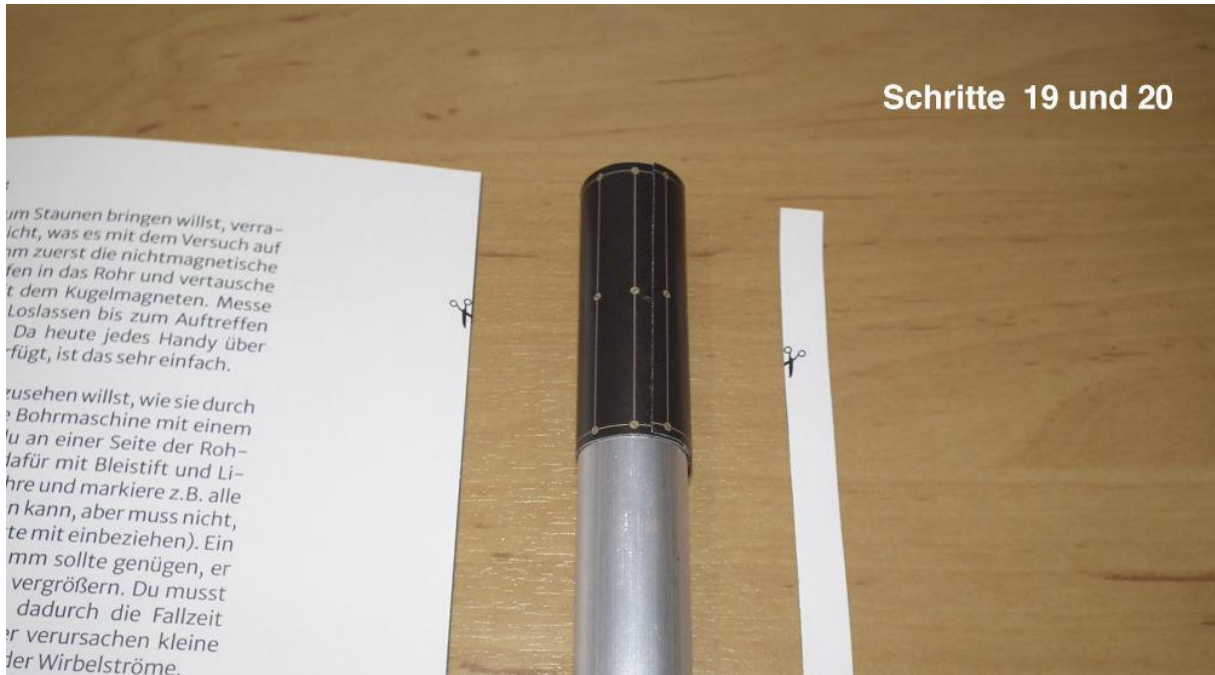
Almost finished...

Base plate with now glued-in tube holders as well as small and rectangular supports.



On the underside of the base plate, colour the open edges of the supports in black again and, if necessary, immortalise the builder and the year of construction.

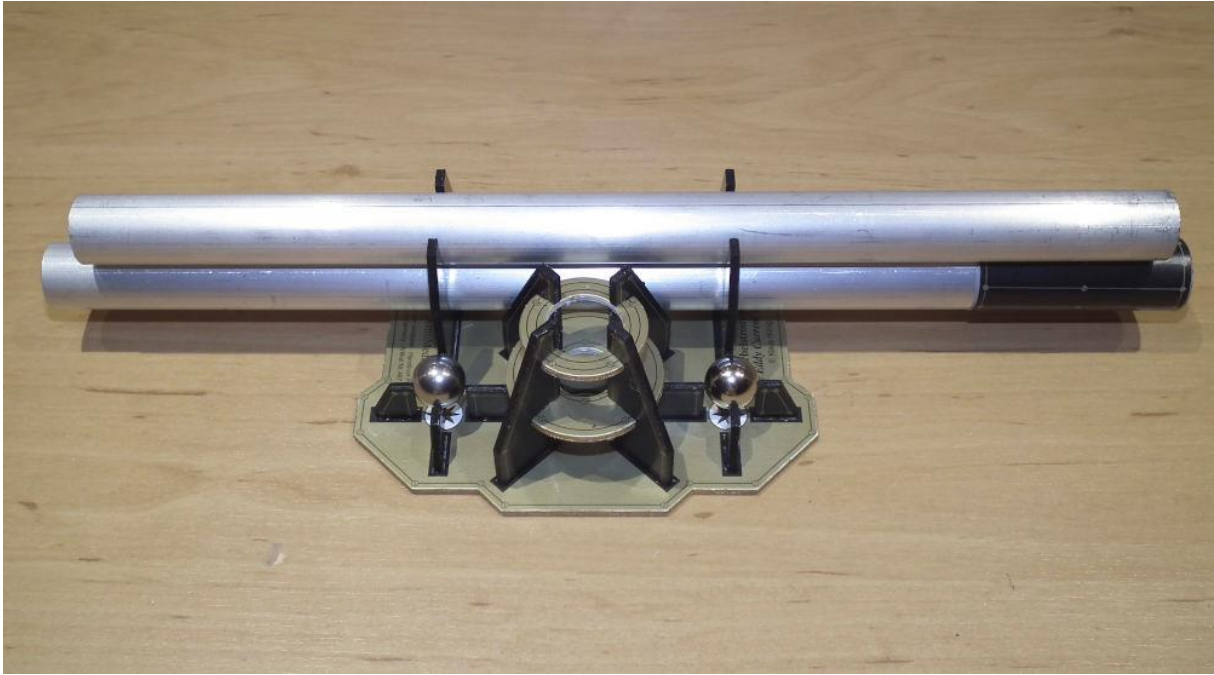
Schritte 19 und 20



Cut out the paper strips, roll them into the raw sleeve and glue them together.



The finished model in the variant with short tube...



... and in the " parking position".

And now have fun with the drop tests and with the bafflement of spectators and their explanations, no, assumptions regarding the balls falling at different speeds.