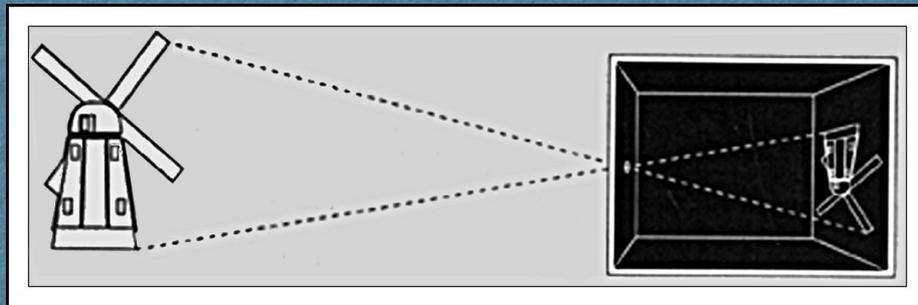




Tips for the construction of a
PINHOLE CAMERA

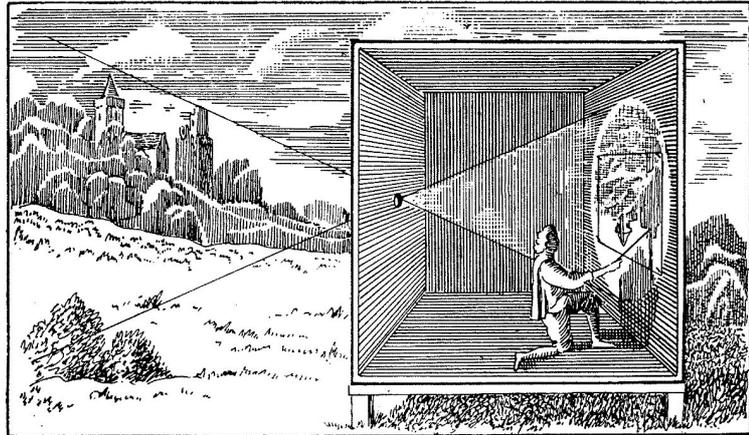


CAMERA OBSCURA.

A couple of centuries before photography, the principles related to the pinhole were already well known, and used as an assistance in drawing, under the name of “camera obscura”.

People noticed indeed that when light from an external scene passes through a small hole and strikes a surface

inside a dark room, it is reproduced upside-down. During the seventeenth century, painters took advantage of this to produce highly accurate representations of scenes projected onto paper or canvas on a wall, and traced from there.



The same principles are used in photography to reproduce reality, with a light sensitive surface (film or paper) placed in front of the hole. For obvious practical reasons, the tents used by the early painters have been abandoned since long; pinhole photography resorts to various light-tight containers, such as metallic cans or other boxes.

A very simple pinhole camera can be made from a cardboard box: just make a tiny hole on one side and put a photographic paper inside, on the opposite face. The proportion between the hole/paper distance and the diameter of the hole is well known, and the corresponding formulae described everywhere on the web. This makes it easy to calculate the opening for your specific pinhole camera, and I therefore will not go deeper into this.

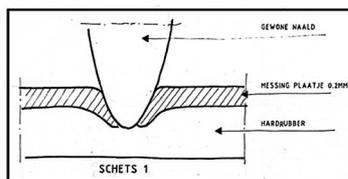
I am building pinhole cameras for several years now, and have to confess that I wasn't always trying to do it in the simplest way: for my first camera I started from an old view camera. Since then, I developed a dozen of different models, all of my own design.



THE HOLE

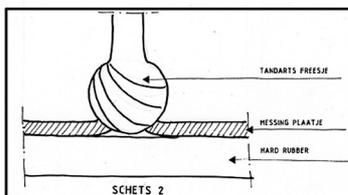
The main part is the hole, which has to be perfectly circular, and shouldn't have the shape of a tunnel. There shouldn't be any trimmings left. The hole therefore has to be made in a material that is extremely thin, yet completely opaque. Personally, I'm using sheets of brass with a thickness of 0,2mm; you can see them on this picture.

To drill the hole, I am using self-made needles, the diameters of which do correspond to the holes I'm needing. I take bicycle spokes for this, and shape them to model with a very fine grindstone. I made punches of 0,2-0,3-0,4 and 0,5 mm, corresponding to the diameters needed for the focal lengths I am mostly using. Putting heat shrinks on their shaft allows me to show exactly where the needle has the required diameter, which is checked with a micrometer (see picture on the right and sketch #4).

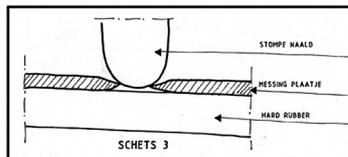


DRILLING THE HOLE

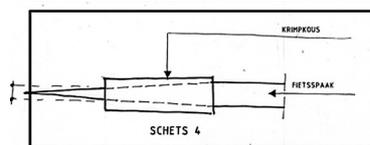
I start drilling the tiniest possible hole in a 2x2cm sheet of brass, which is about 0,2 mm thick. I do this with an ordinary needle after putting the sheet on a hard rubber surface (see sketch 1).



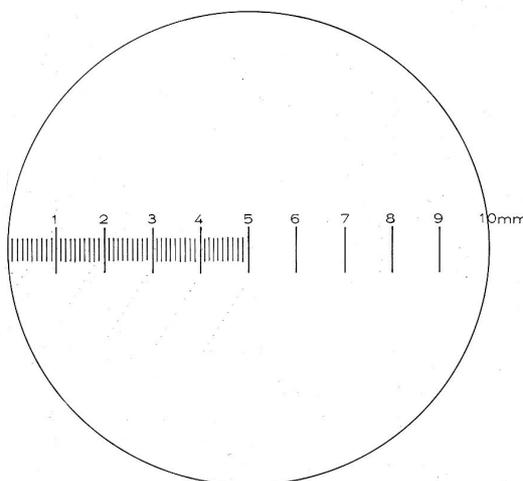
Next, I use a dentist's drill to eliminate the hump on the backside of the sheet, paying constantly attention to not enlarge the hole (see sketch 2).



I then smoothen the sheet with a super fine grit sandpaper (P1200), making sure not to leave any trimming, and checking this with the hand microscope pictured on the first image above. I continue flattening out the edges of the hole with a 2mm round-tip needle (see sketch 3).



I continue widening progressively the hole with a needle having the adequate diameter, and smoothening the edges after each pass.



CHECKING AND MEASURING THE HOLE

As said previously, the hole has to be perfectly round and clean. To check this, I use an old slide projector, giving me a crisp image on a flat surface placed at 1,3 m. from it. (see picture on the right).



I put a black pvc sheet with a 10mm hole (checked with a micrometer) in a slide mount. This mount is then put in the projector which is aimed at a sheet of drawing paper fixed on a vertical support. This allows me to draw the precise diameter of the projected circle, and finally the circle itself. I part the diameter in 10 divisions, and each of them in 10 subdivisions (*see above*).

As a final check, I made a second slide with a 1mm hole that I project on the ink-drawn circle with its graduated diameter. When measuring a new hole, I make sure first that the projector is installed in such a way that, when the edge of the drawn circle and the projected 1mm hole coincide, the latter covers exactly 10 subdivisions.

Finally, I put the sheet with the new pinhole in a slide mount and project it on the drawn circle; in doing so, I can see whether the hole is perfectly round, clean, and what is its diameter.

For the final touch, I glue the pinhole on a brass sheet with a 5 mm hole and label each pinhole with its exact size.

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translation: J. Kevers

Picto Benelux

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