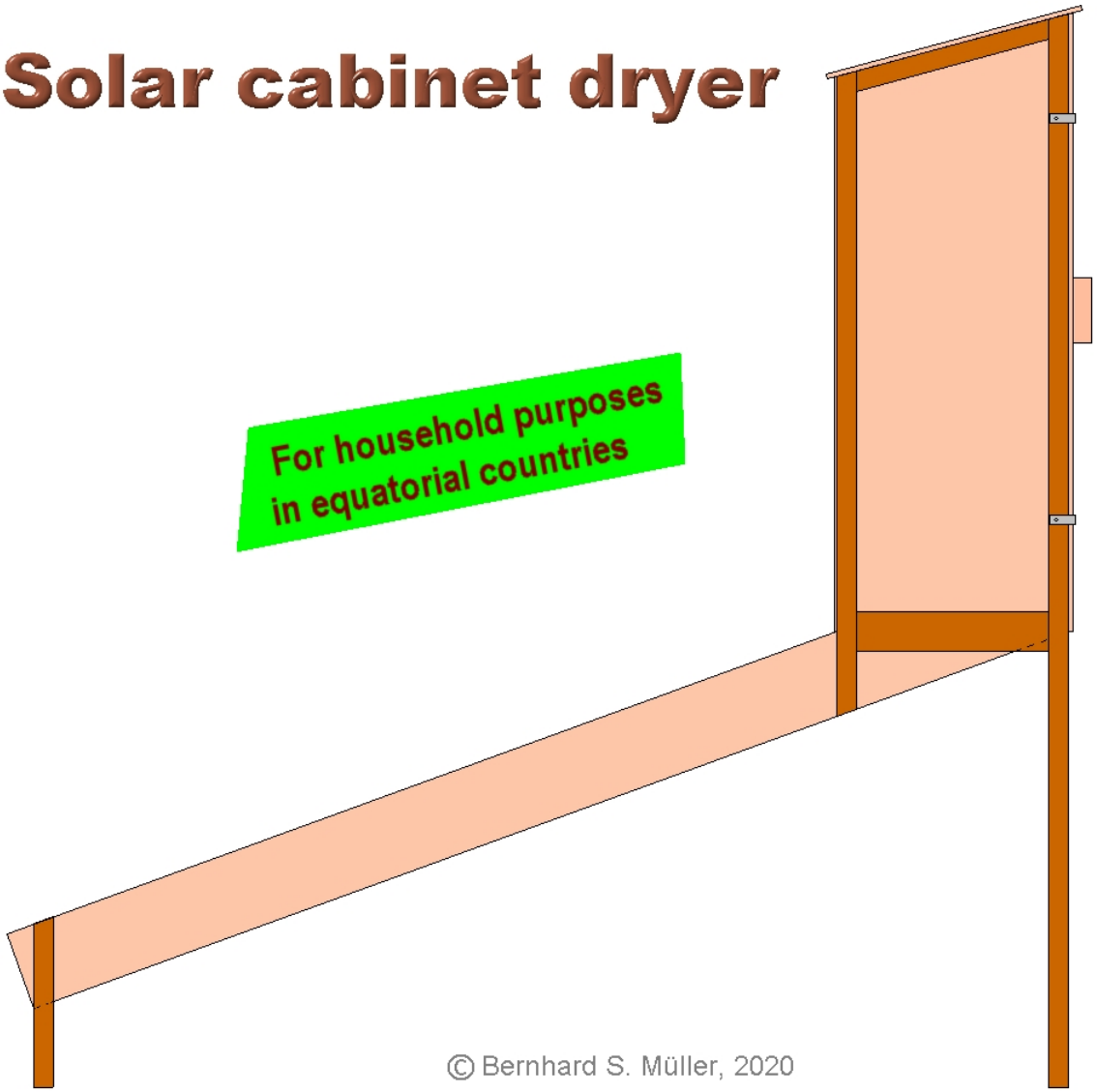
Solar cabinet dryer



This ND (natural draught) solar dryer was constructed for use in **equatorial** countries. This applies especially to the slope of the collector compartment.

It is as simple as possible. Everybody should be in the position to build it. All you need is 6mm plywood, 2.5 by 2.5 cm wooden strips, glue, varnish, black paint, two hinges, transparent foil and screws. The skeleton construction grants utmost stability.

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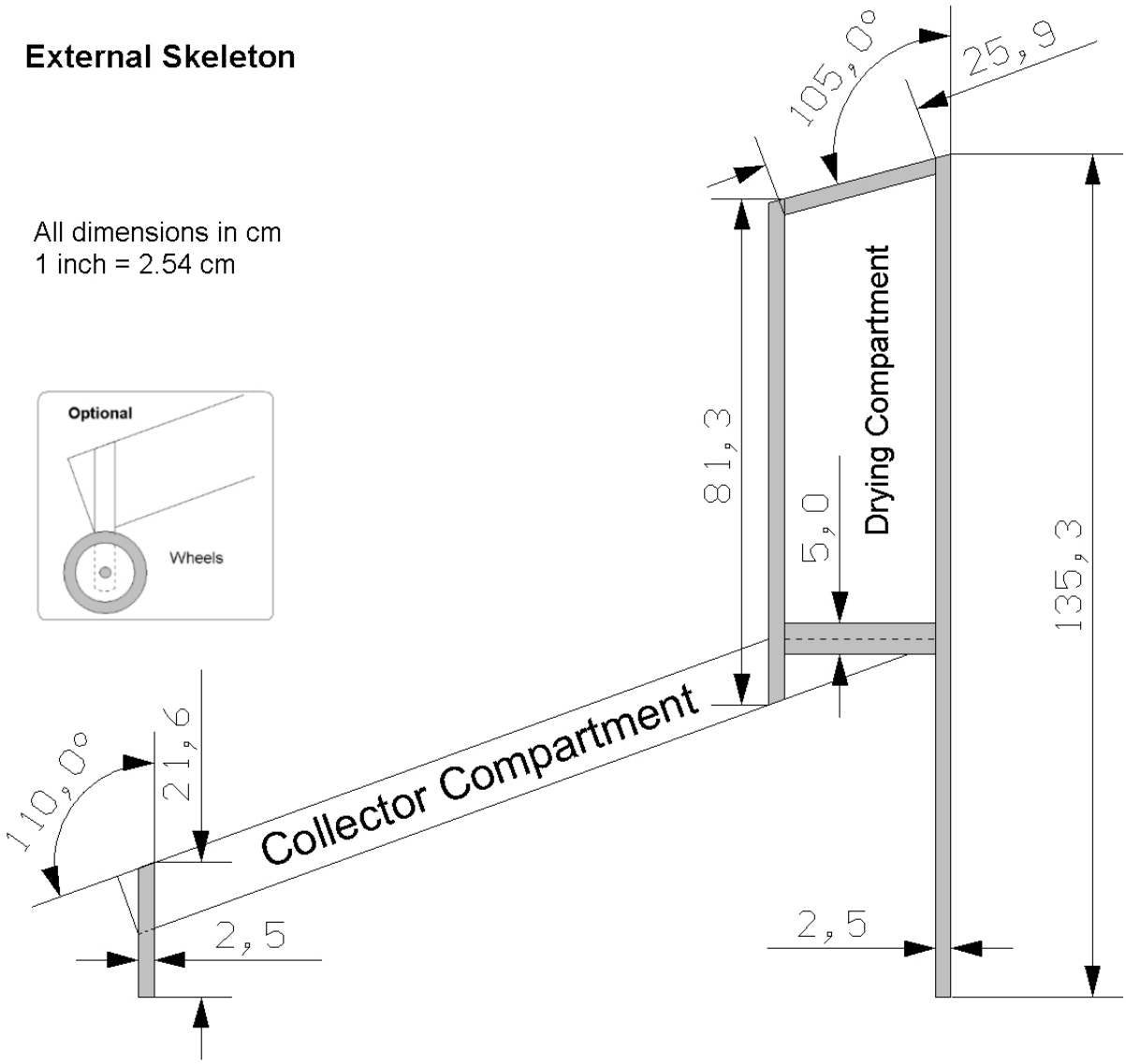
Let's start .....



Picture 1: Dimensions of the external skeleton made of 2.5 by 2.5 cm wooden strips. You will need 2 sets; one for the left and one for the right side. The picture shows the left side.

For convenient manoeuvering, mount 2 wheels outside the **front** support bars. Draw the holes for the axle first. Then put the wheel aside, cut the wooden strip a little bit shorter and mount the shortened support strips onto the sides of the collector. Then fit the wheels. Don't mount wheels on all 4 support posts to avoid that the dryer will be pushed away by wind gusts.

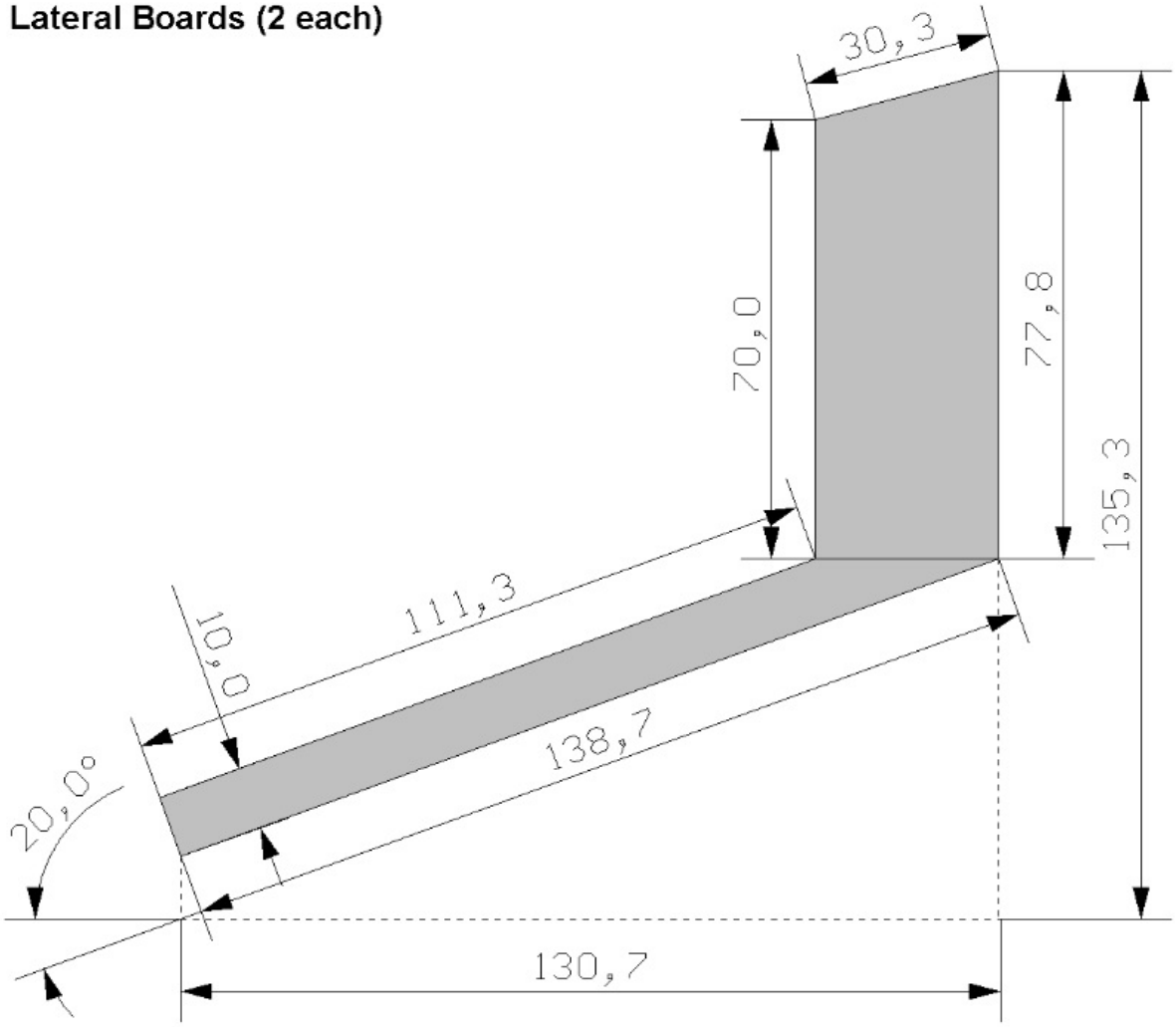
Fix the wooden support strips onto the precisely cut plywood sheets with water resistant wood glue first. Then drive 3 cm long wood screws in there. Take into consideration that you have a left side and a right side. At this stage the left and right lateral parts of your solar food dryer are **already finished.**

Cut all pieces first. Then paint all wooden pieces with an anti-termite and moisture resistant varnish on both sides and on all edges. Then continue working on the dryer.

The drawings have been held as simple as possible. If you miss a certain dimension, just look at the other drawings in this manual. It's all there.

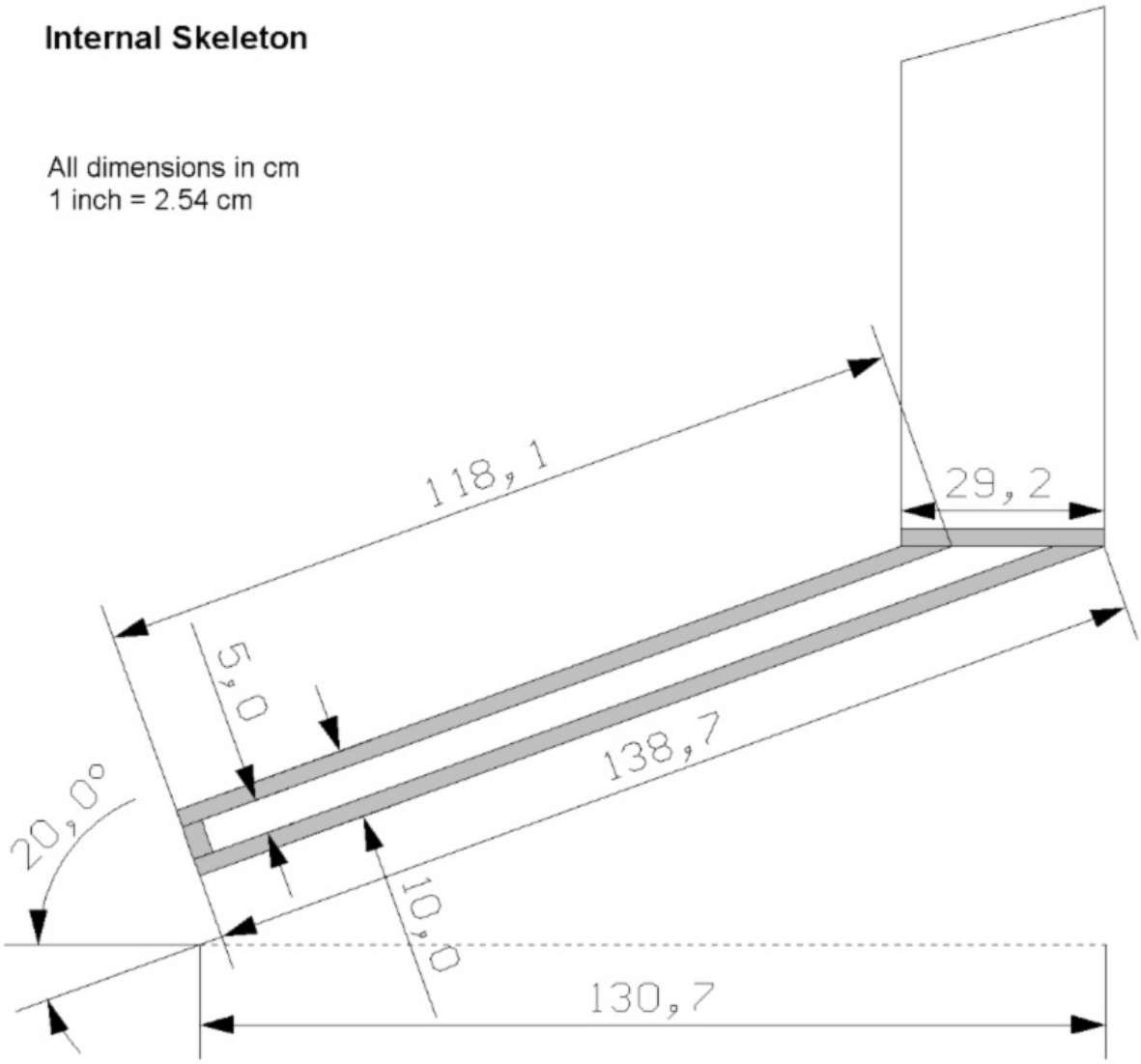
Solar Cabinet Dryer

Lateral Boards (2 each)



Picture 2: The lateral plywood panels. The depth of the drying compartment is 29.2 cm. All plywood used to construct this solar dryer is of 6 mm thickness.

This manual has been compiled with the aid of Prof. Ajay Chandak (India), Ingelore Kahrens (Germany), Natalie Clausson (USA), Iris Florence (USA) as well as Esther Nattabi (Uganda) and Penina Nzioka (Kenya). Thanks so much!

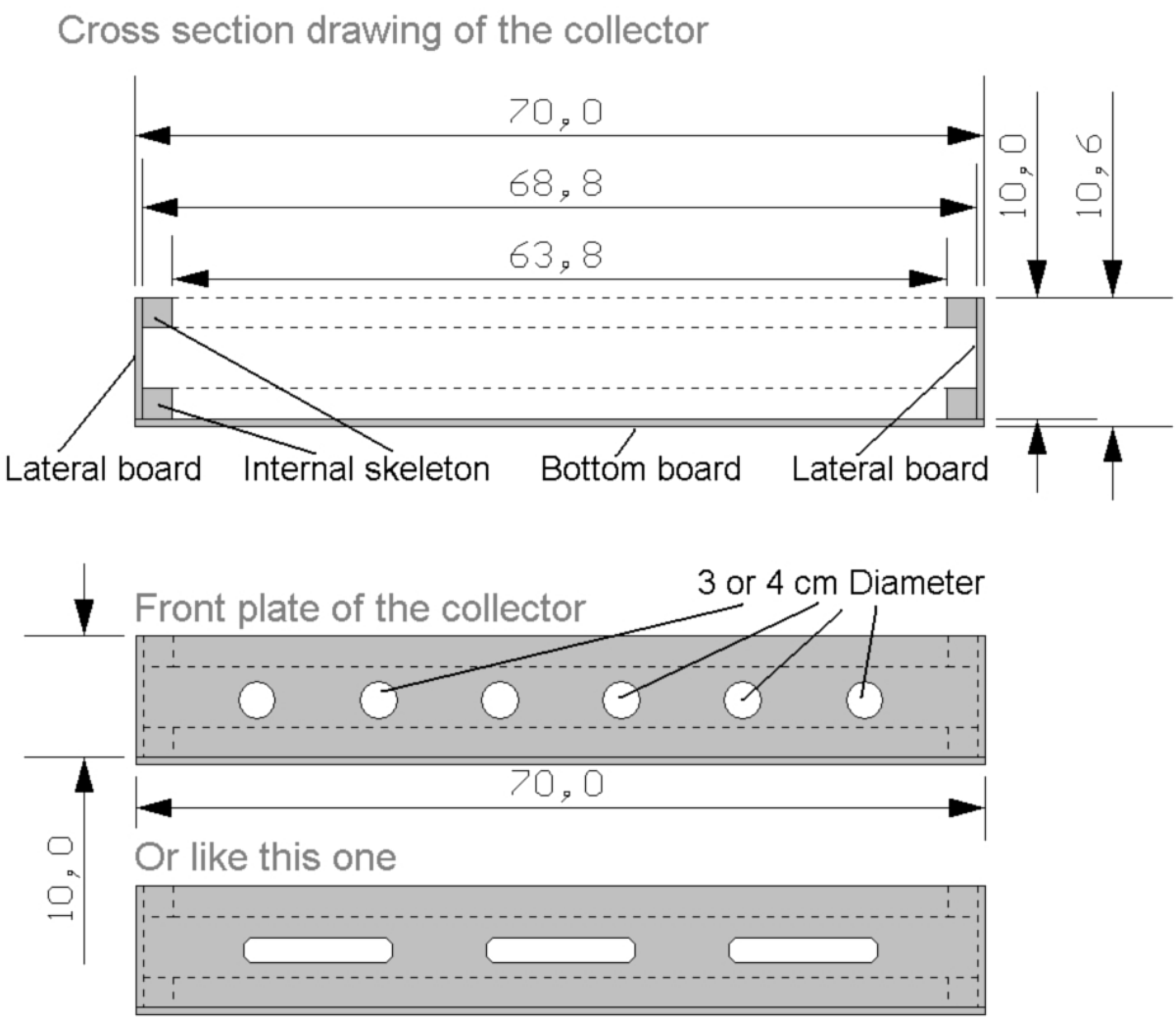


Picture 3: This indicates how the internal skeleton is mounted to provide utmost stability.

Why should I use a solar dryer instead of drying my food in the sun?

- The food remains clean as the mosquito mesh at the air inlet and air outlet does not allow insects, rodents and dirt to get in contact with the food. The food is protected from bird droppings as well.
- The dryer creates a draught of warmed air, which is most effective to remove the moisture.
- The closed cabinet dryer avoids that the fruits and vegetables get bleached by the sun.
- The air draught guarantees fast drying, much faster than in plain sunlight.
- The solar food dryer is well suited to dry any other matter, e.g. briquettes.

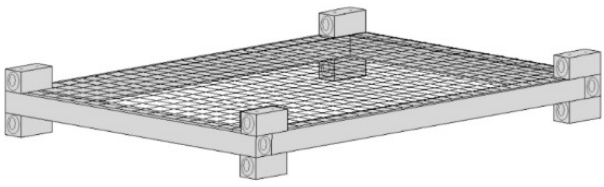
Collector



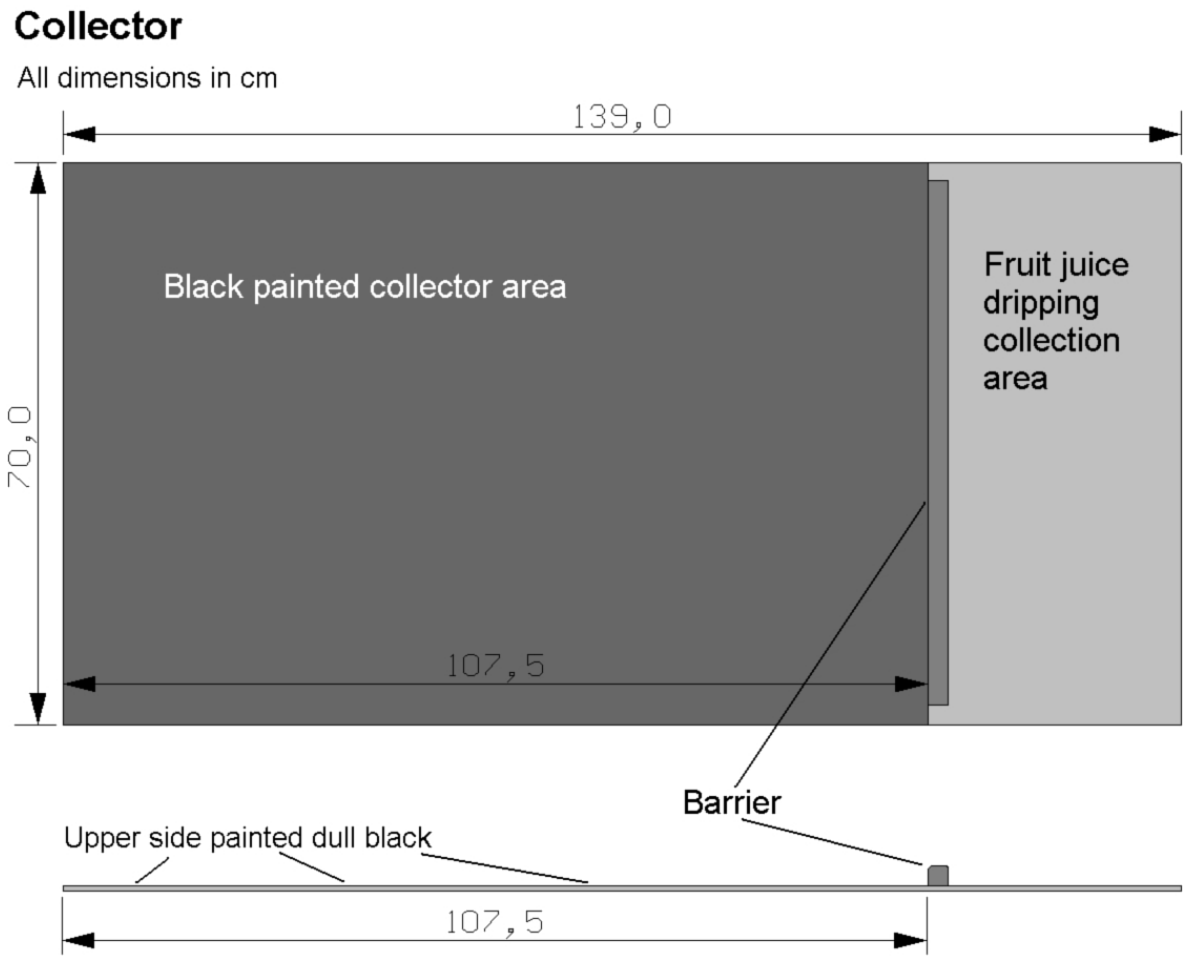
Picture 4: The front panel of the collector with holes for the air inlet. These holes must have a mosquito mesh fixed on the **inside** to guarantee that the air draught remains clean throughout operation.

Dotted lines indicate that something is **underneath** (or not directly connected). Straight lines indicate edges.

The trays are constructed as sketched in picture 5. For this solar dryer, the tray dimensions are 68 by 28 cm. The blocks on the corners serve as stabilisers and spacers. You need 7 mesh trays. This constructions allows you to stack them without guiding rails.



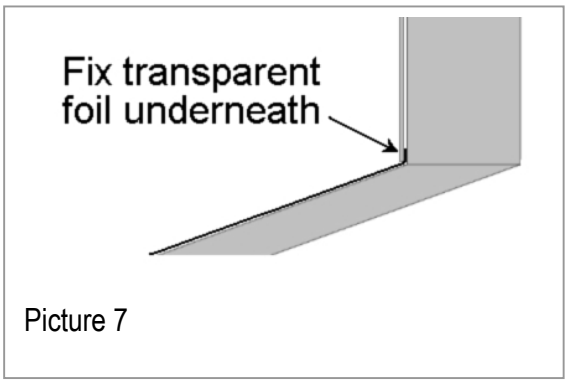
Picture 5: Construction of the trays.



Picture 6: The bottom plate of the collector is devided by a 63.8 cm long wooden strip which separates the sun radiation's absorbing collector and the dripping collector.

The collector's bottom panel, which is painted with varnish already, should be painted dull black as indicated in picture 6. The separation barrier and the bottom of the fruit juice dripping area should be painted with another layer of moisture resistant varnish. If you want it to be perfect, paint it two more times since it needs to be cleaned frequently.

The transparent foil will be mounted on the upper side of the collector either with double-sided adhesive tape or with small bullen-nails. These are small nails with a big head which are used by upholsterers. Thumbtacks or staples can be used as well.

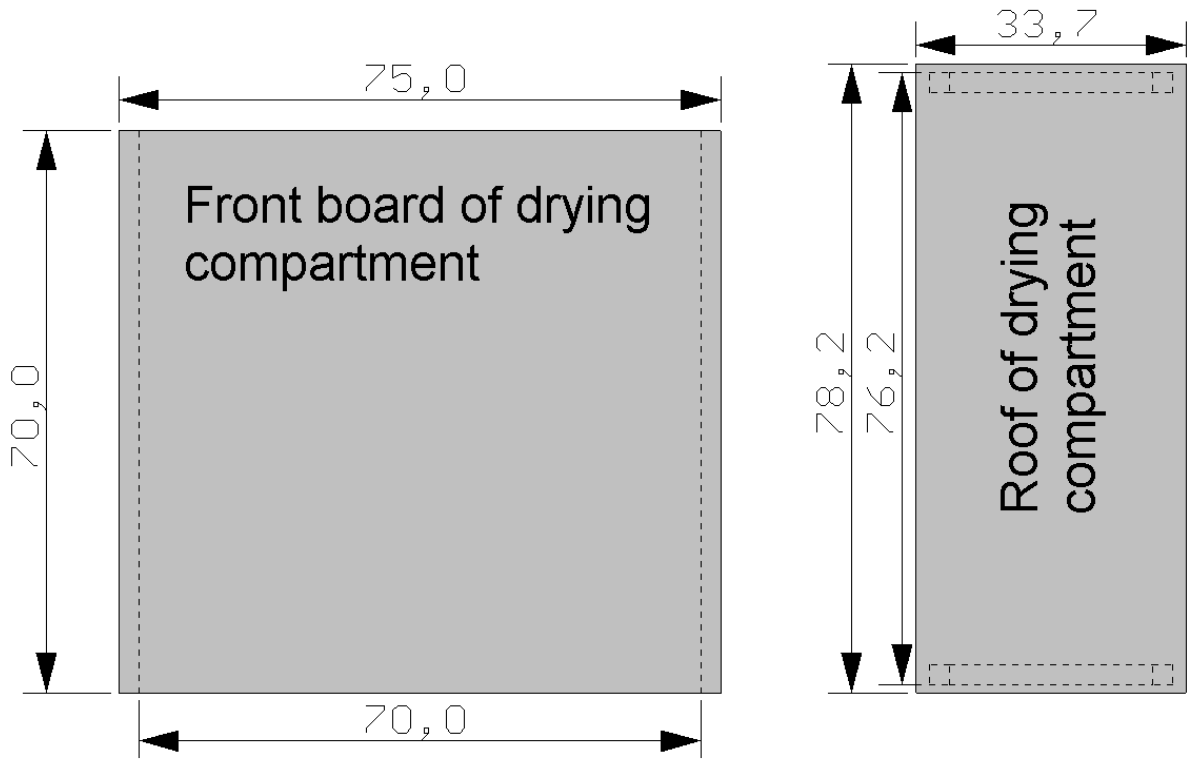


Picture 7

The rear end of the foil should be fixed **underneath** the wall of the front board of the drying compartment as shown in picture 7. After this is done, screw the front wall tightly onto the vertical wood strips.

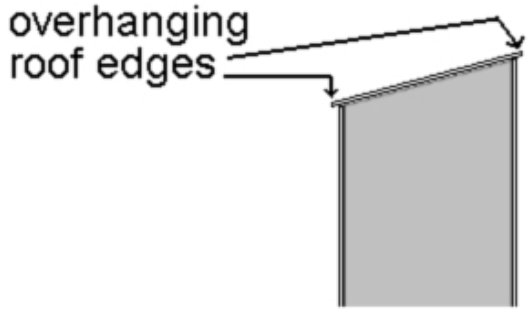
Please use strong adhesive tape to fix the transparent foil on the lower inner side of the front board of the drying compartment as the plywood is just 6 mm thick.

All dimensions in cm



Picture 8: Front board and roof of the drying compartment

Before fixing the front board of the drying compartment tightly, fix the transparent foil of the collector on the lower inner side as shown in picture 7. Then continue fixing the front board onto the vertical wooden strips.



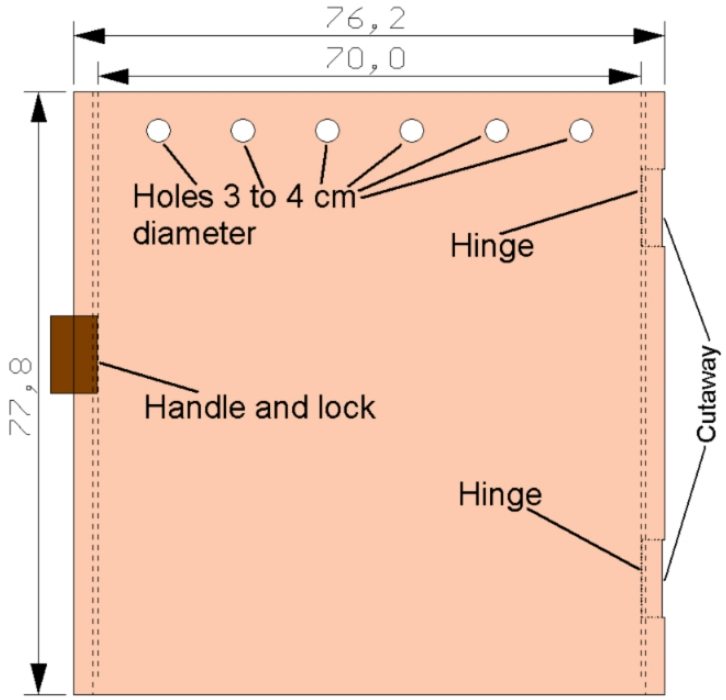
Picture 9: The overhanging roof

The roof board is mounted - overhanging equally on all sides - on top of the drying compartment, with wood screws. The overhanging roof and the mounting of the collector foil underneath the front board of the drying compartment prevent water from entering into the system during a sudden rain shower.

Positioning of the dryer in equatorial countries

- Let the collector face towards the sun (eastwards) in the morning and forenoon. **Turn it westwards** at solar noon. **Never forget to turn the dryer at noon!**
- Solar noon is half of the time between sunrise and sunset, when the shade of the dryer is underneath the device.
- Example: if the sun at your place rises at 7 am and sets at 7 pm, solar noon is at 1 pm (13:00 h). If the sun rises at 6 am and sets at 6 pm, solar noon is at 12:00 h.

The Door



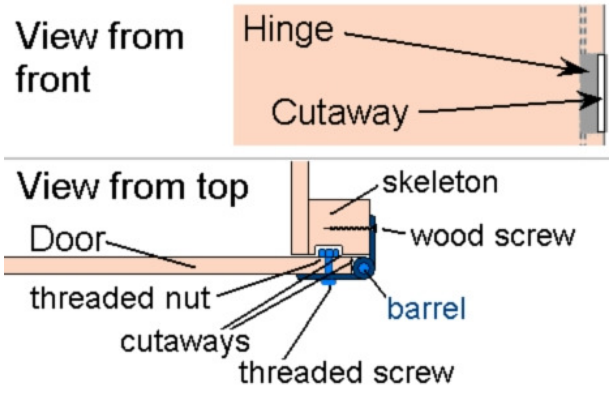
Picture 10 indicates the door's version for right-handers. For left-handers' please move the hinges to the left and the handle/lock to the right.

A mosquito mesh should be mounted **on the inside** of the door's air outlet holes to prevent insects, rodents and dirt from entering into the drying compartment.

Please construct the handle and the lock according to your inspiration and available materials. It is recommended to make it of scrap wire or rubber strips. Be creative! A magnetic lock inside the door is not recommended as it reduces the space for the drying trays.

The hinges are mounted on the outside of the door. For this purpose you should cut out a little of the door's edge to allow the barrels of the hinges to smoothly fit in. The cutaways should have the size of the hinge's barrel. Dimensions cannot be given in this manual since the size of the available hinges may vary.

Further cutaways should be made at the vertical skeleton where the threaded nuts are located. Please select threaded screws as short as possible to avoid too deep cutaways and collisions with the wood screws.



Picture 11: Mounting of the hinges.

Go ahead! Have fun with your own efficient and clean solar food dryer.