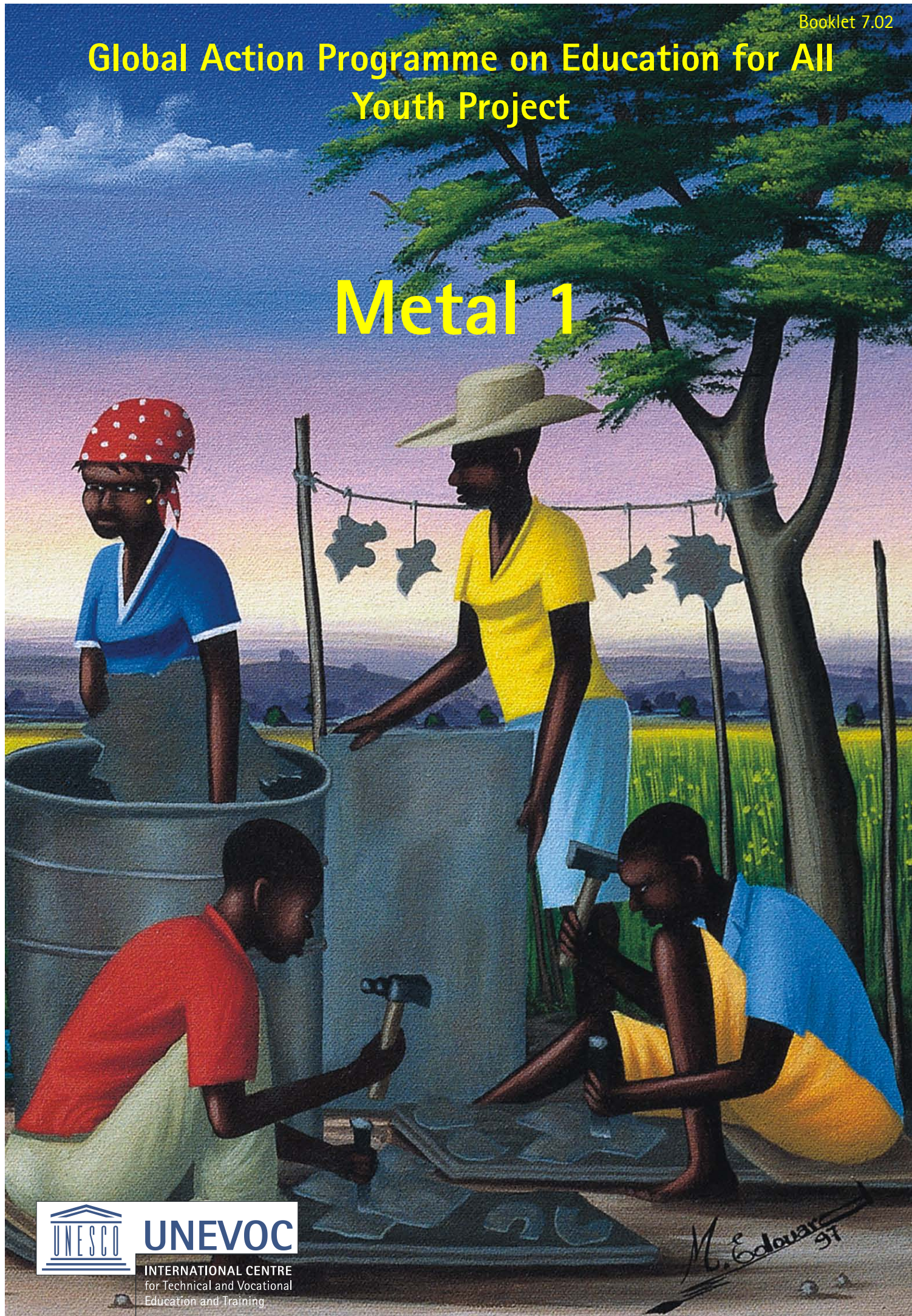


Global Action Programme on Education for All Youth Project

Metal 1



UNEVOC

INTERNATIONAL CENTRE
for Technical and Vocational
Education and Training

*M. e. Golovare
97*

Learning and Working

Motivating for Skills Development: A Campaign Package

Version February 2006

- 1 Campaign Package Overview
- 2 Campaign Flyer
- 3 Information for Stakeholders
- 4 Guide to being a Successful Facilitator
- 5 Activity Check List
- 6 Videos 'Learning and Working'
- 7 Booklets for each of the Videos**
- 8 CD-ROM with print files of above documents

Booklet 7.02 – METAL 1

This booklet complements the video clip on “Metal 1” on DVD 1. It gives a short summary of the content of the video and contains illustrations followed by technical texts, which will make it easier to understand and recall the activities shown in the video. The booklet can be copied and handed out to participants, so that they can make notes on them or use them as a reference for later.

A transcript of the soundtrack of the video is included at the back of the booklet. Whenever the locally spoken language is different from the language used in the video, the facilitator may wish to use this text transcript as a basis for comments and explanations in the local language.

Comments and Observations

In principle, the making of stoves is a good idea, since they are used in every household. In many regions, however, there already exists a competitive market for all types of stoves, which might make it difficult for the target group to take up stove making as a self-employment activity. Therefore, the facilitator has to check in advance whether or not this activity promises to be gainful for the target group.

Please note that the gas stove is not easy to make.

Occupational Health and Safety Issues

While the recycling of materials is generally a good idea, it should be pointed out that not all recycled materials are safe.

Some scenes in the video show unsafe working methods and conditions. It is not advisable to use one's feet for holding metal or to walk around barefoot when rusty nails are lying on the floor. Also, some of the hand tools shown in the video are not in a good condition.

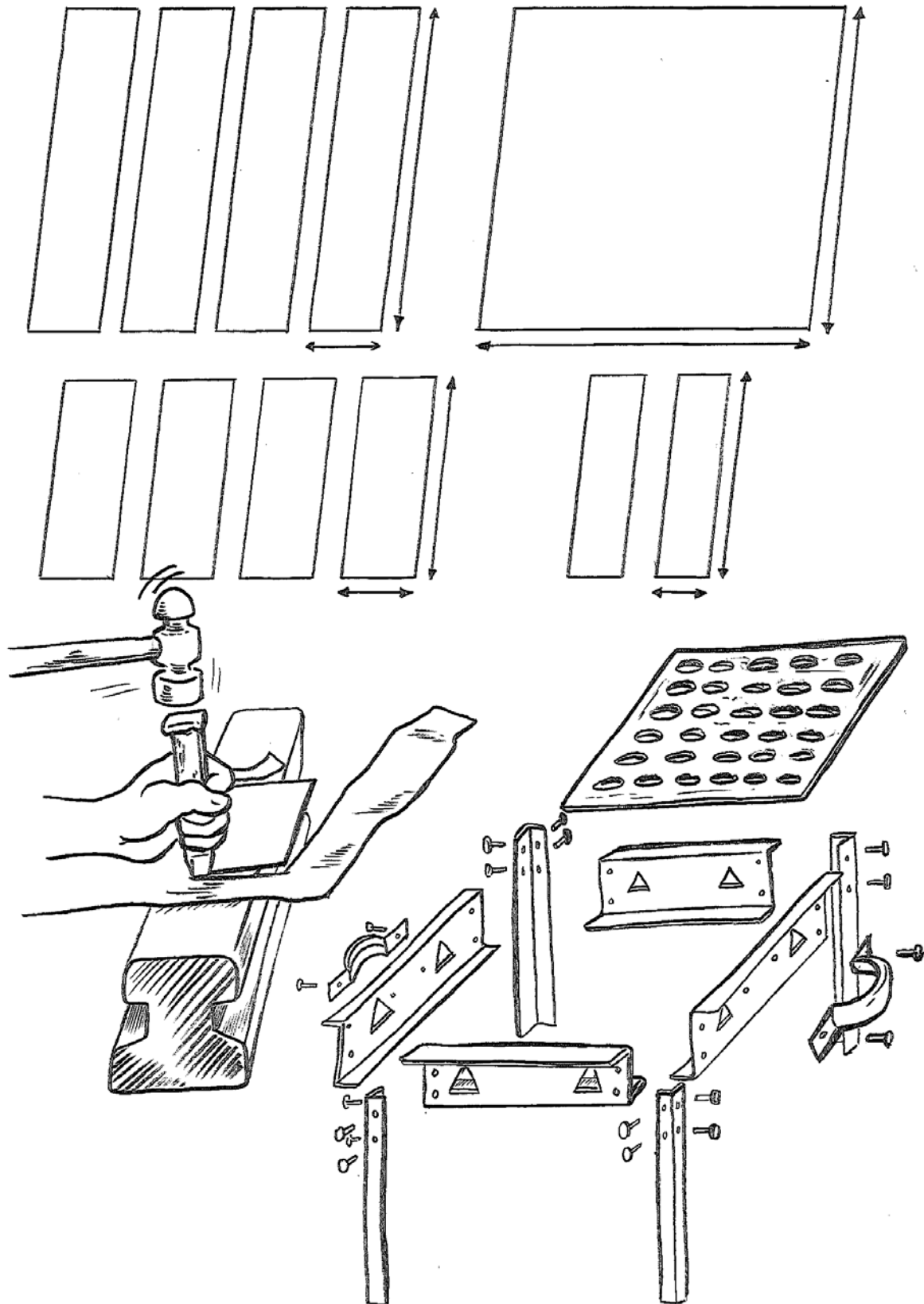
It is the facilitator's task to draw the participants' attention to these potentially dangerous situations and provide them with information on how to “be safe” when working with metal, e.g. by keeping the work place tidy, by wearing protective clothes and shoes, and by maintaining the tools in a good condition.

Video METAL 1: Summary

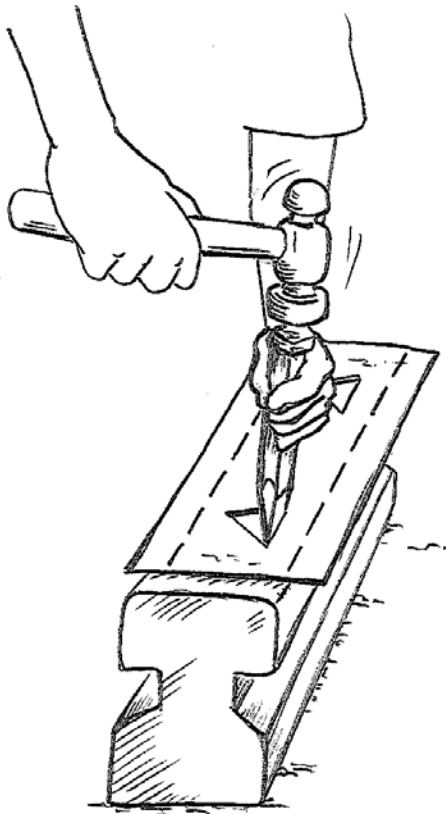
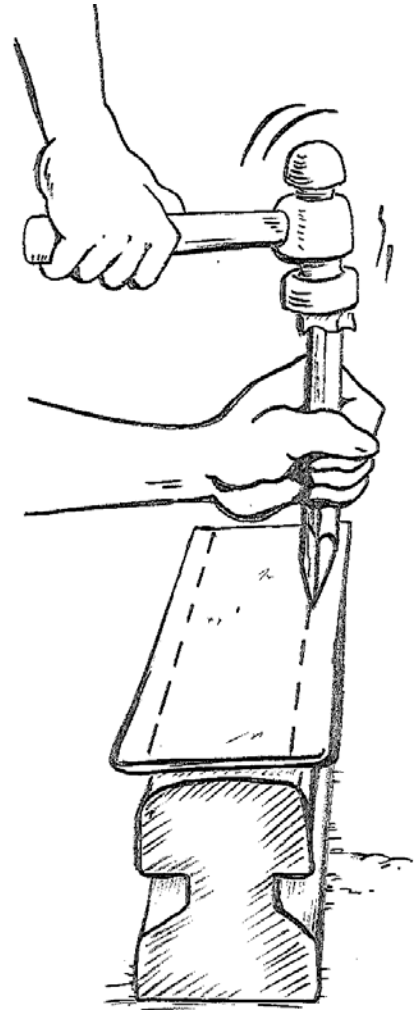
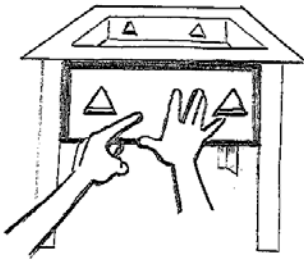
This video presents three stoves that can be made with recovered metals and each has its specific assets:

- Saliba Stove: a square-shaped stove with charcoal, very cheap in manufacturing and with multipurpose utility; it is for families of every size.
- Improved Stove: it is more economical than the Saliba Stove. It consumes between 20 and 30 % less charcoal. To make this stove, also made of old metals, you do not need many tools.
- Stove with white gas: this stove works with oil that is gassed by a heater. It offers an alternative solution in areas without wood and where charcoal is very expensive.

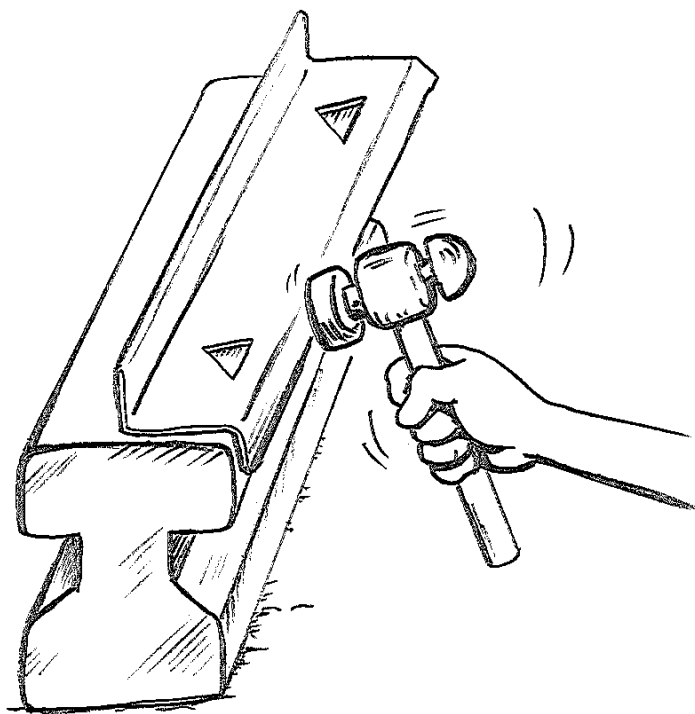
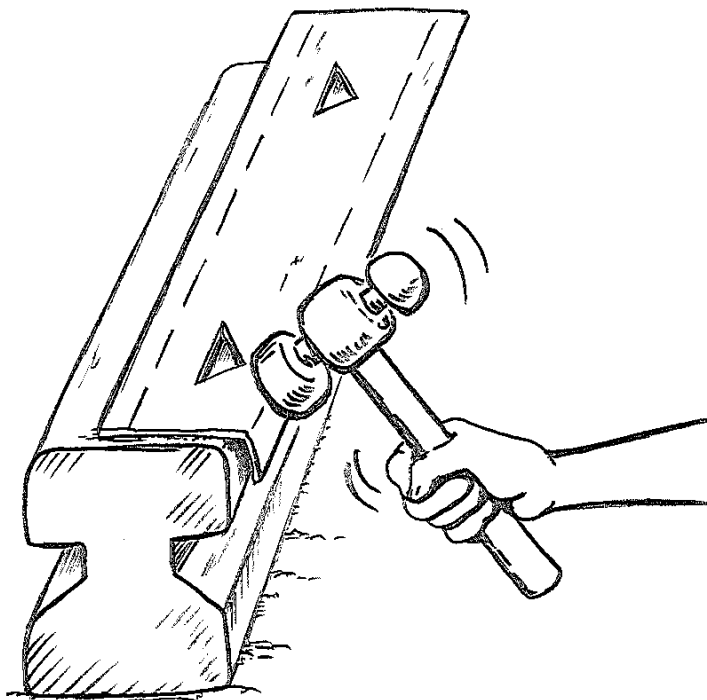
The video does not only give all the practical advice that are necessary to build the stoves, it also transmits a good basic knowledge about working with metal and sheet metal.



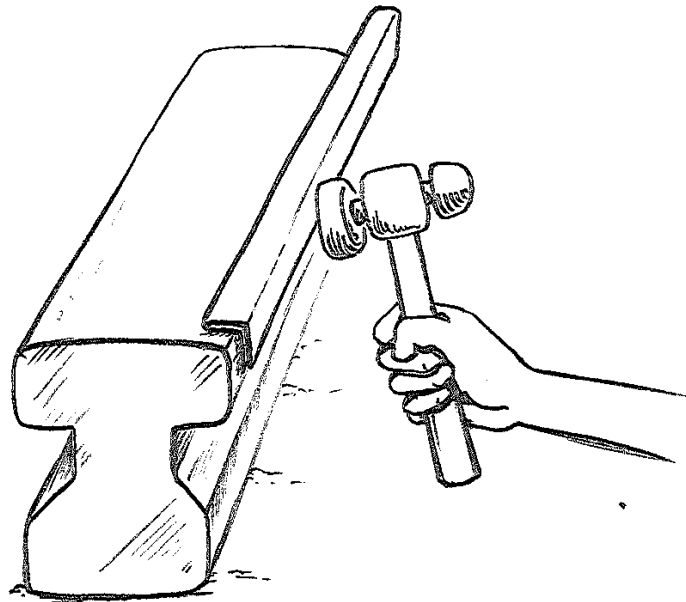
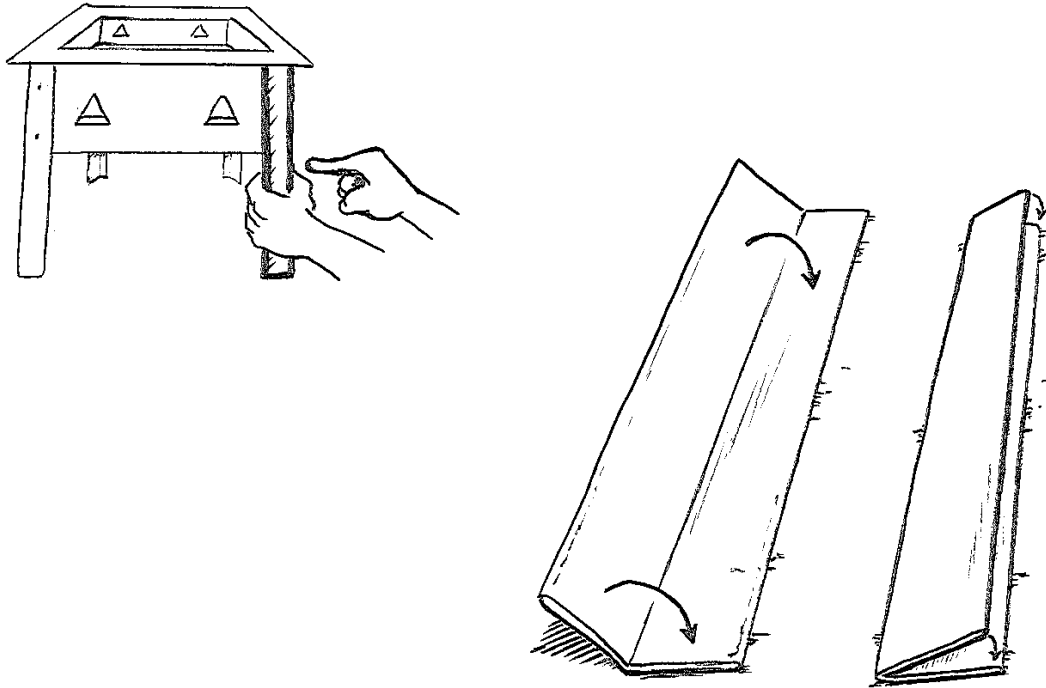
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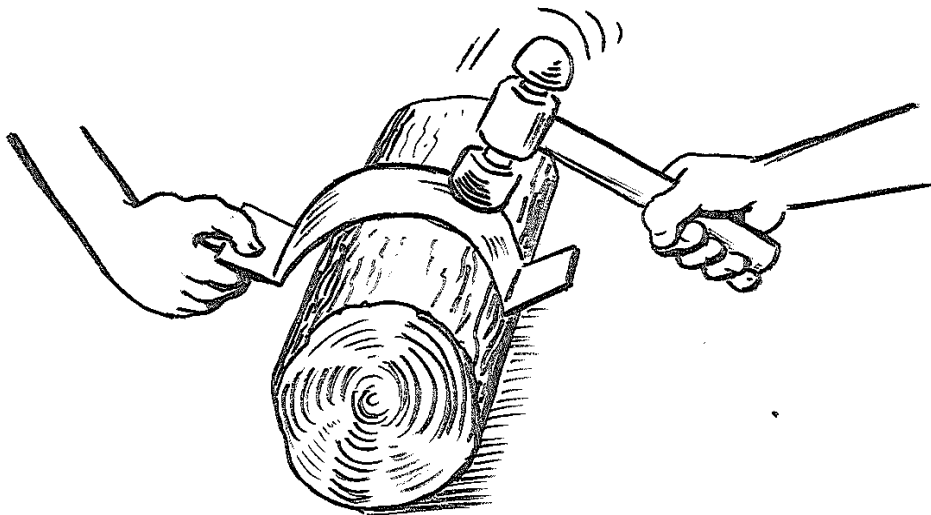
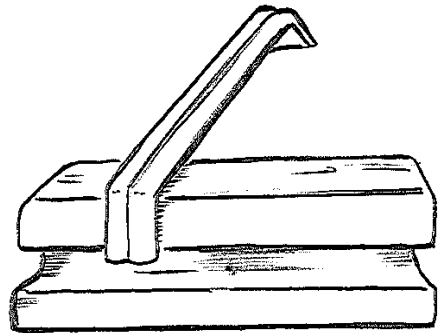
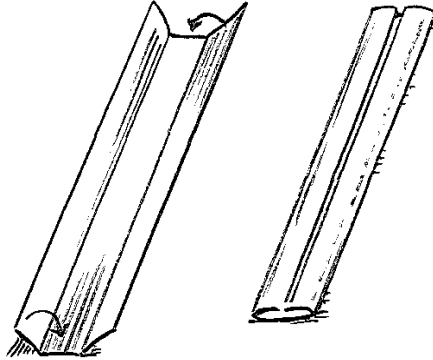
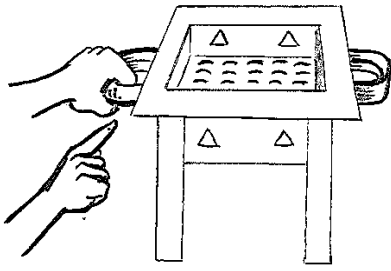
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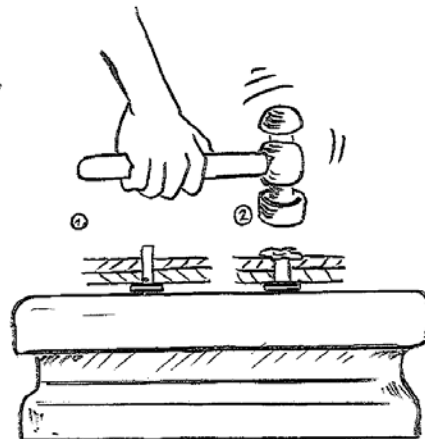
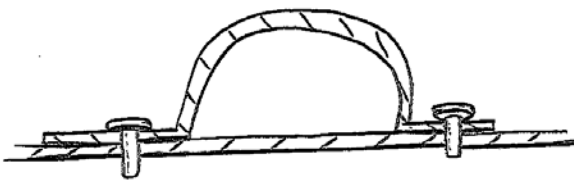
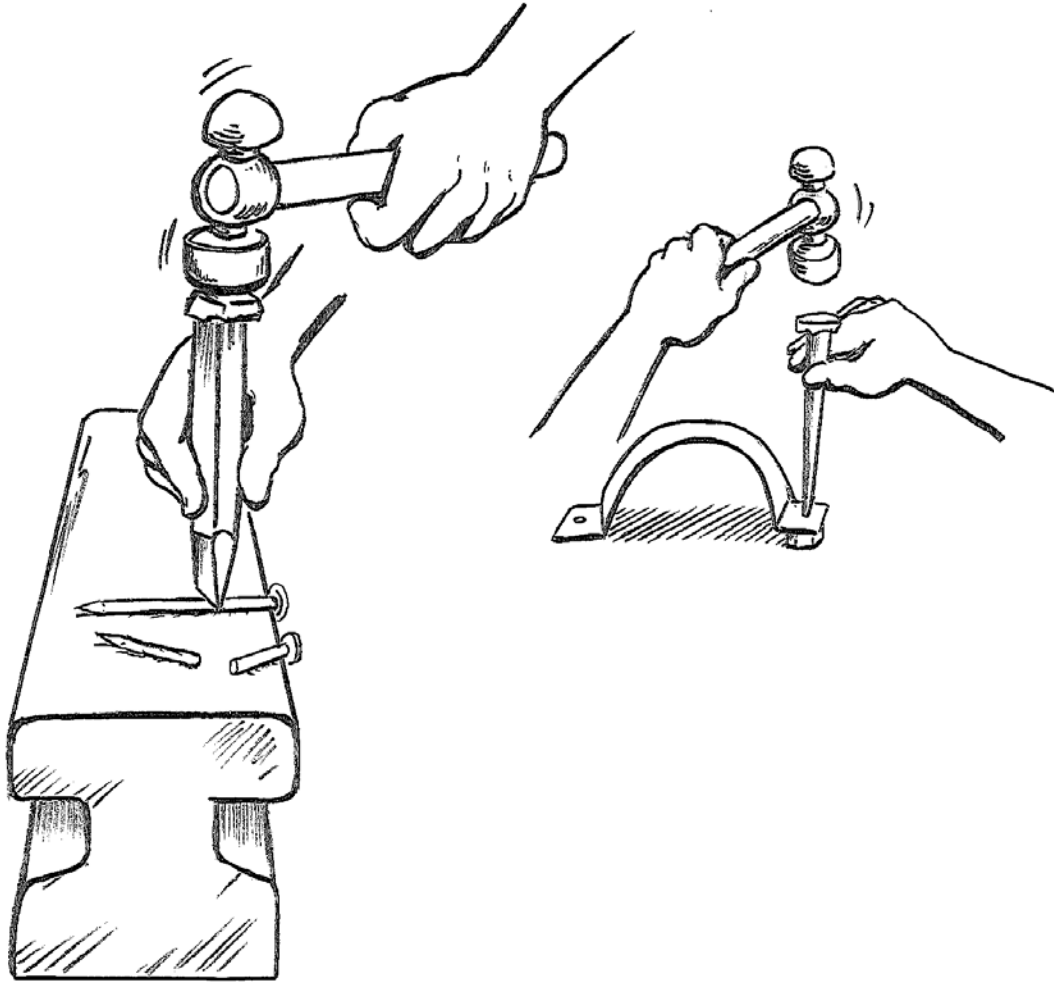
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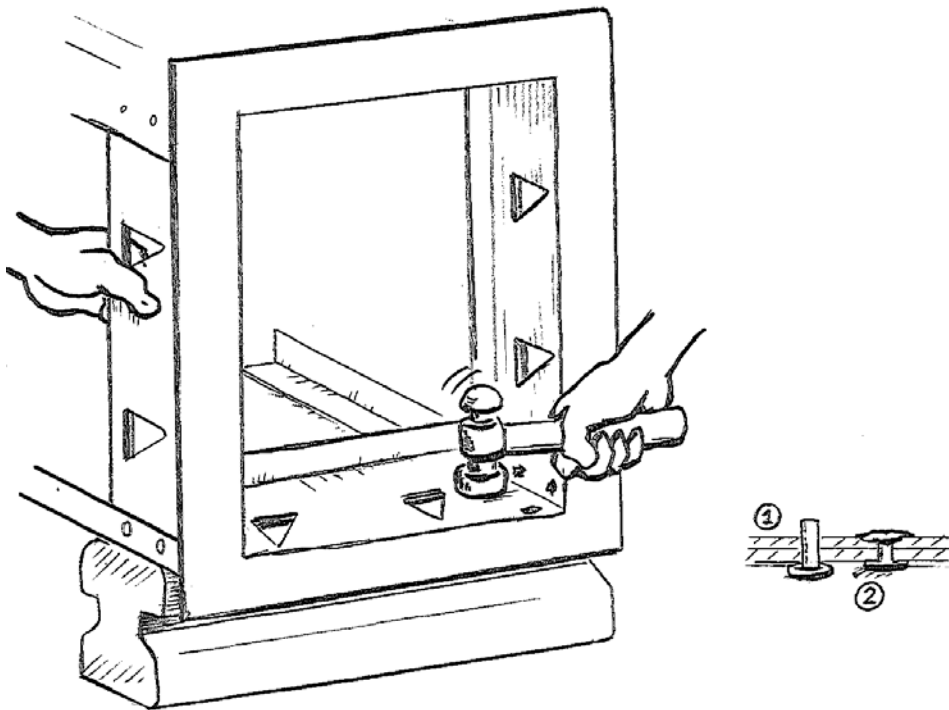
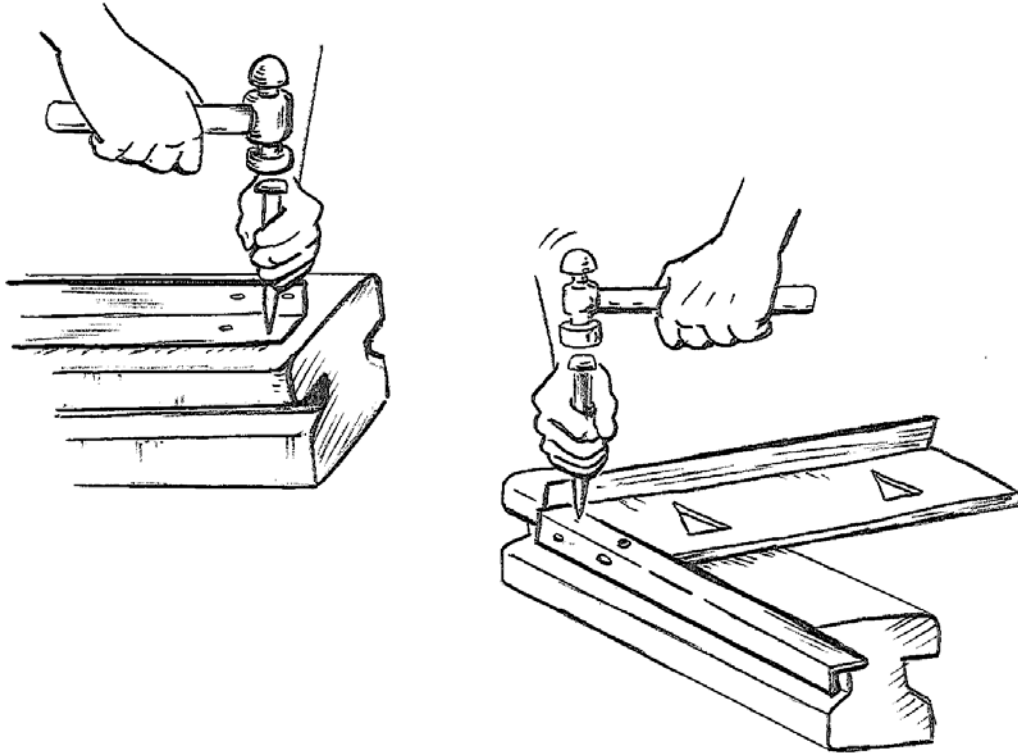
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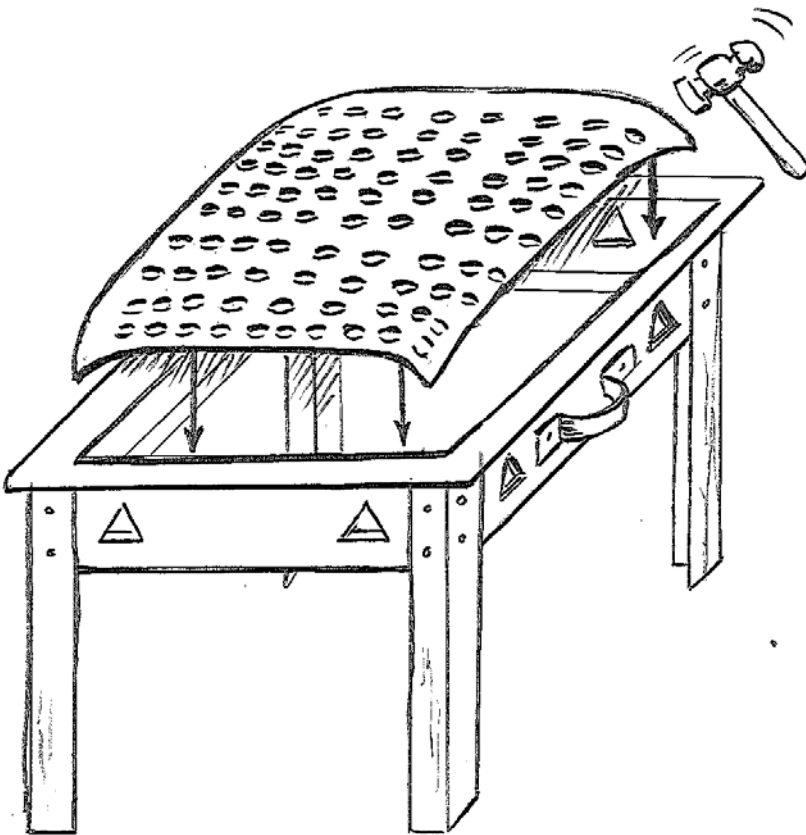
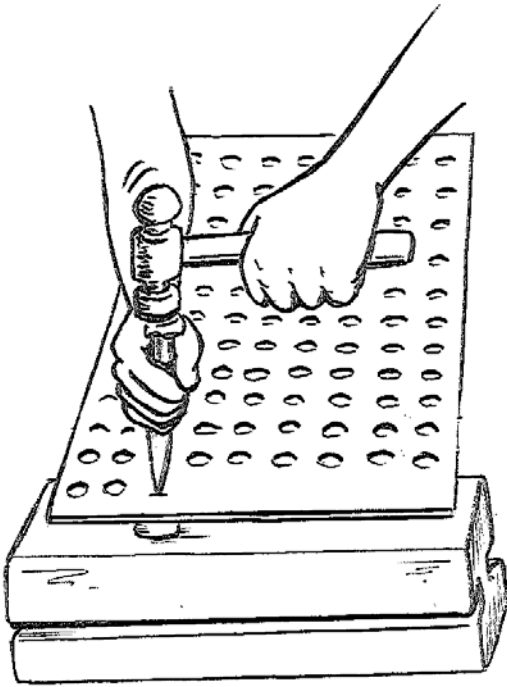
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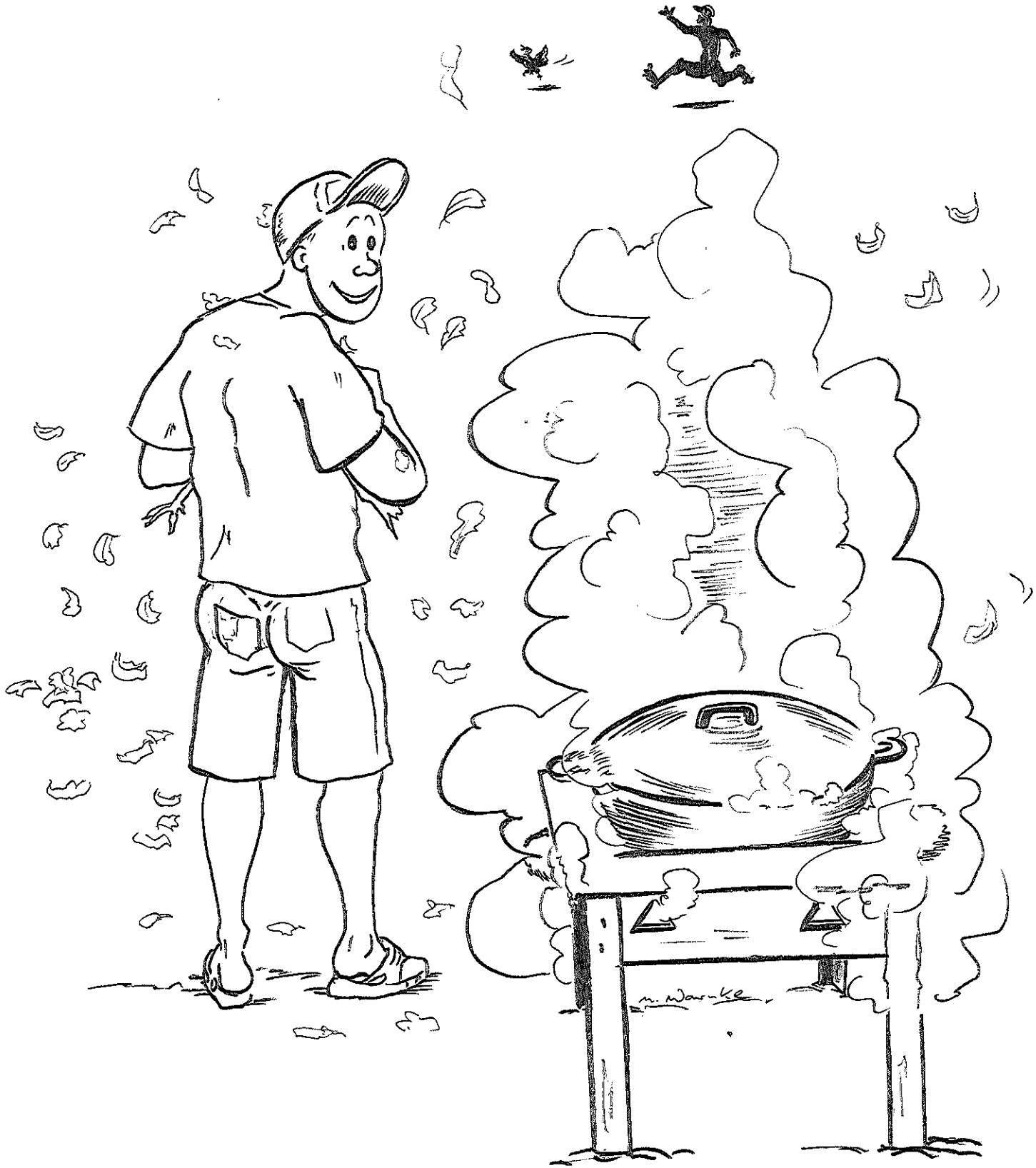
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Making a square stove

Tools

A hammer, a u-shaped chisel, a flat chisel

Materials

Sheet metal (preferably recycled)

Means

It is advisable to use a strong metallic stand with regular, smooth and sharp edges. It is shown to do this type of work with an anvil, but you can also use a piece of an old rail or a t-shaped iron.

1. The required sheets of iron have to be cut with a steel chisel and a hammer. Flatten it down if necessary.
2. To build a stove you need sheets of iron of different forms:
 - 4 rectangular-shaped lateral panels
 - 1 square-shaped bottom sheet
 - 4 iron strips that will be folded later and will be used as stove feet
 - 2 iron strips for the handles.

Making the iron sheets

The lateral panels

3. With the flat chisel, you cut the metal of each lateral panel, allowing ventilation.
4. Then, on its side panels, draw lengthways a slight line parallel to the edges.
5. Now, along this mark, bend the sheet metal with the hammer to form an angle of 90°.
6. Hammer the upper border to push it outside and the lower one inside. On the inside one you will put the bottom sheet later, which will be used as firebox.

The feet

7. To get more stability, you fold the sheet metal in half and draw a lengthways line with the chisel.
8. Along the mark, the sheet metal has then to be bent to form an angle of 90°.

The handles

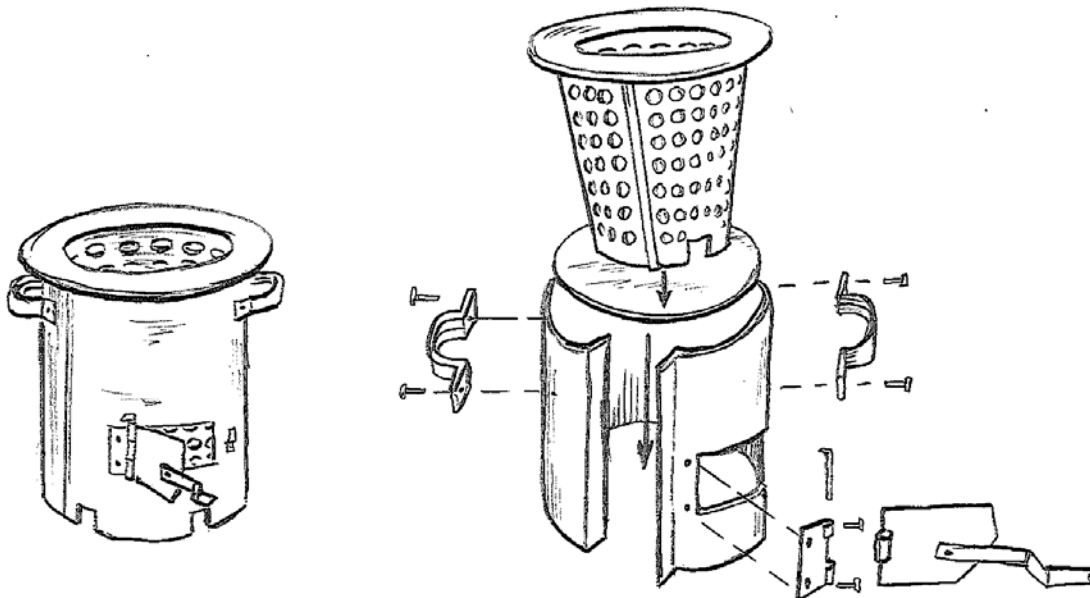
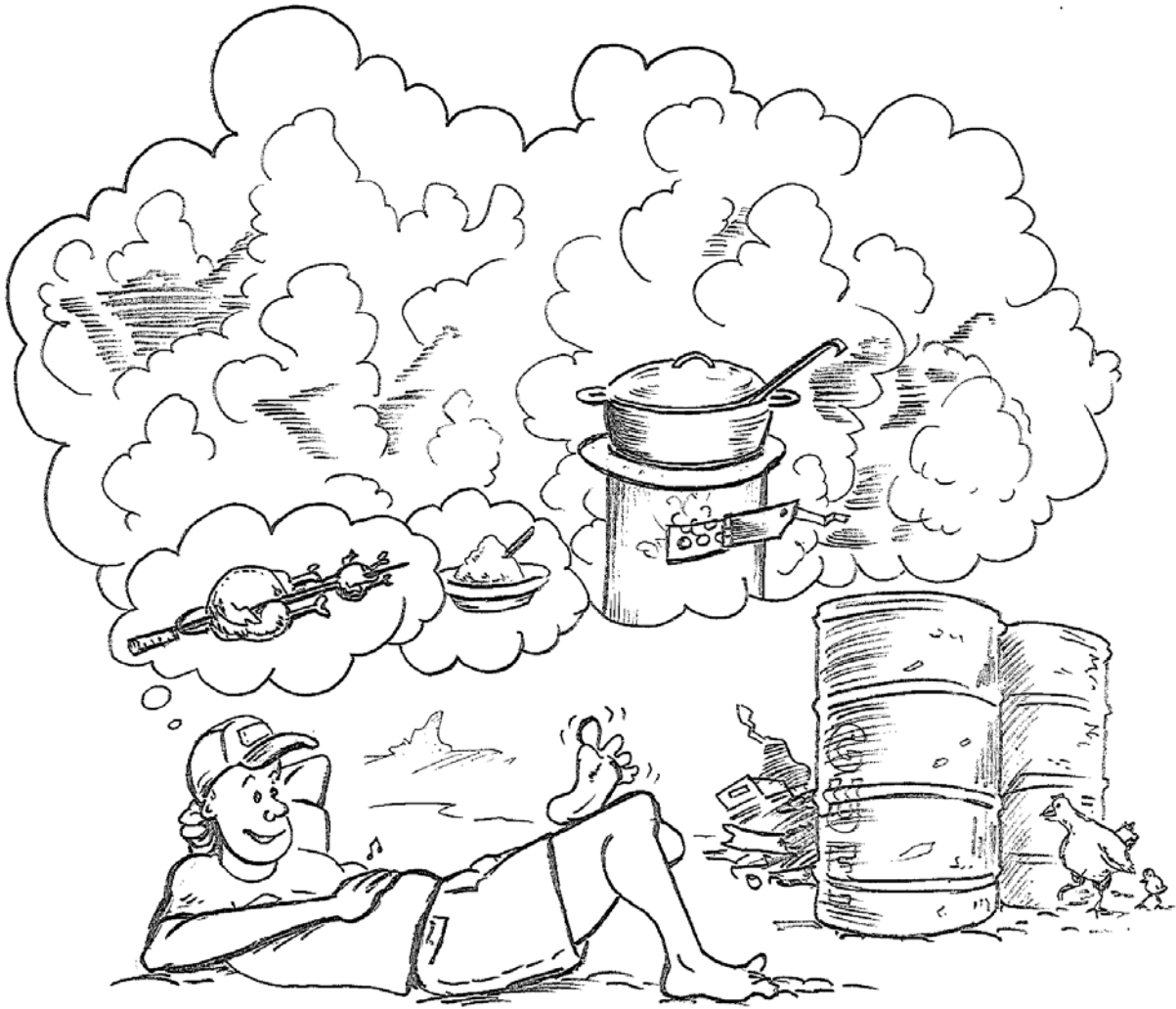
9. The vertical sides of the handles are hammered to the inside so that they are not too sharp.
10. With a support, you hammer to round off the middle part of the handle; on the left and right side you leave some flat space of 5 cm for the screw holes.
11. You can round the handles off in a better way when you use a tube as support, or a part of a tree trunk.

The technique how to make the holes

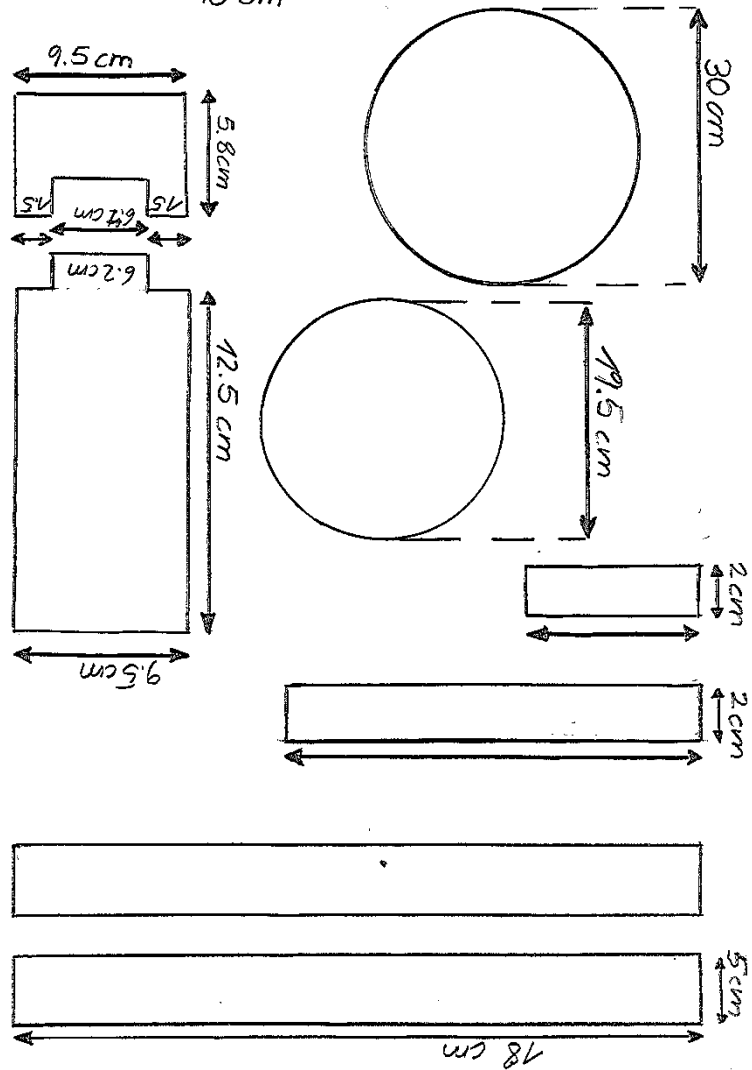
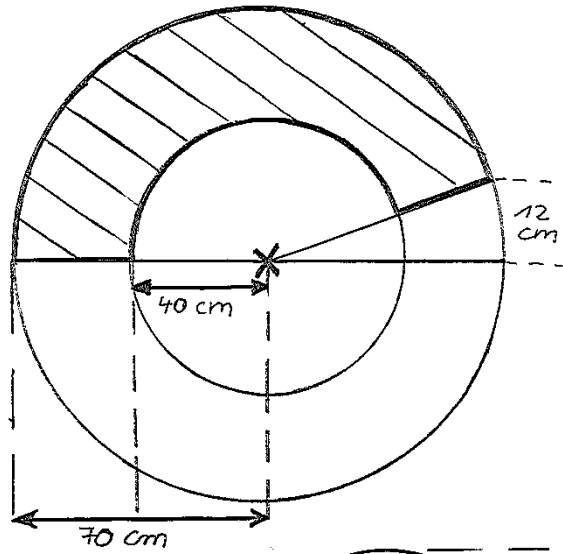
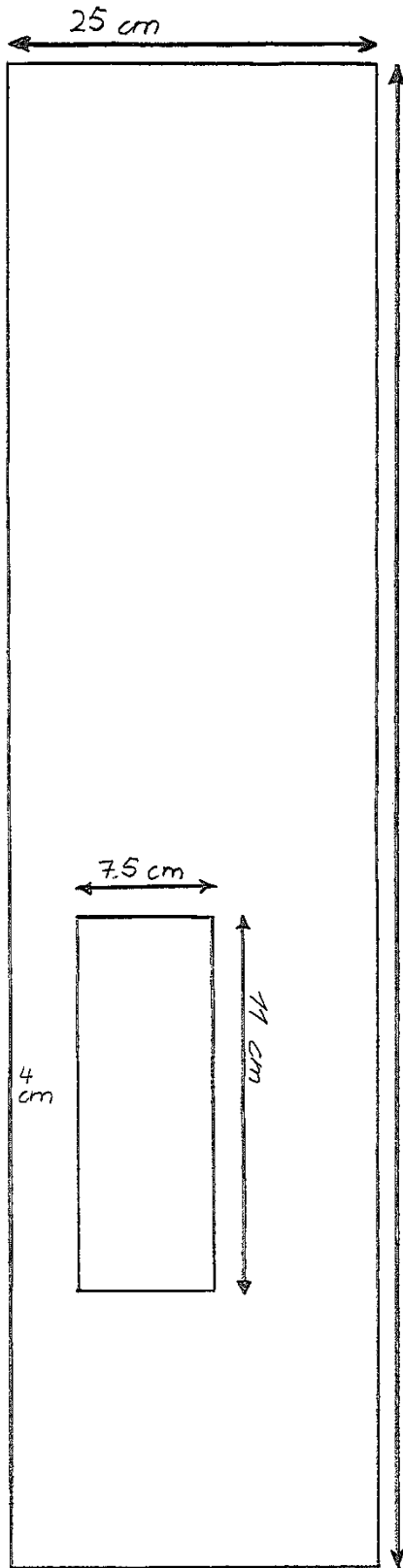
12. Beneath the place in which you want to make the hole, put a nut or a ring. There, from above, make a hole in the sheet metal with the u-shaped chisel.
13. Put the handles with holes into the place where they should be fixed, i.e. on the lateral panels. Make two holes on the sides in the same way as explained above.

The fixing

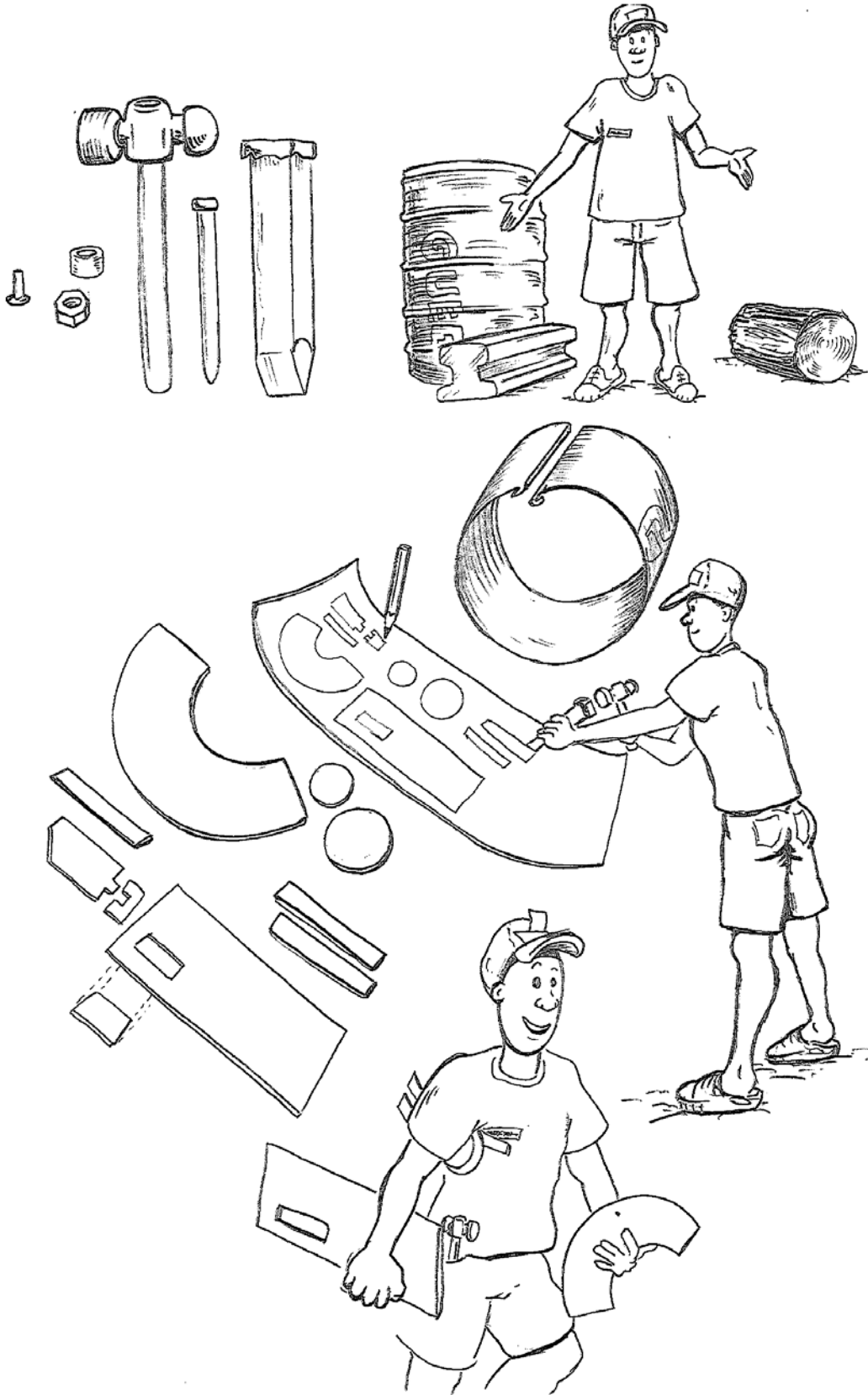
14. Through the holes in the parts that have to get together, you must now put a rivet from below (a shortcut nail or a screw).
15. On a firm support flatten the part of the rivet that stands out with a hammer.
16. Now, at the top of the feet, make the same holes again for the rivets.
17. Put the feet that already have holes on the lateral panels to make holes into the panels with the chisel and the hammer.
18. When the feet have been fitted to the sides, as it was shown, the frame of the stove is ready.
19. The bottom sheet that is used as firebox, and where you will put the charcoal, will now get holes on its whole surface – the holes are always made with a nut from below.
20. Finally, you just have to fit the firebox into the frame and ... it is ready!



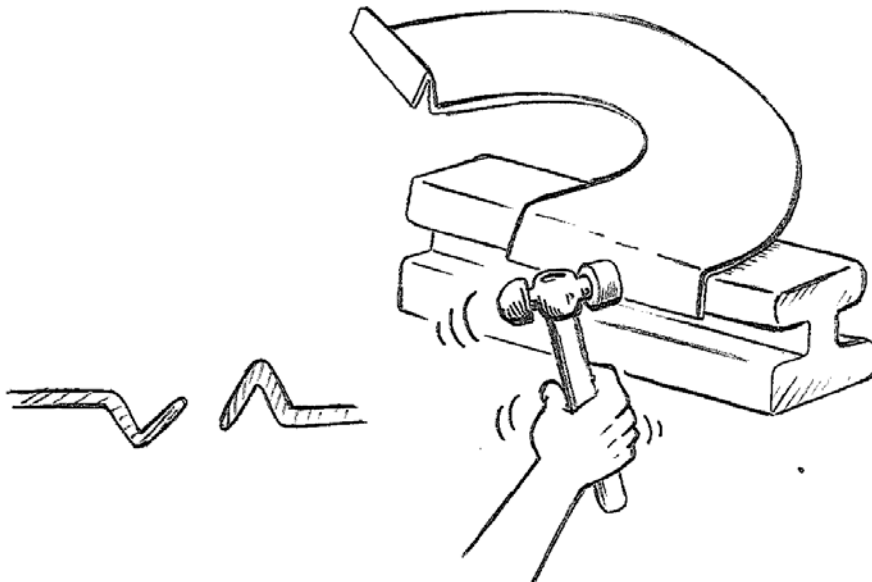
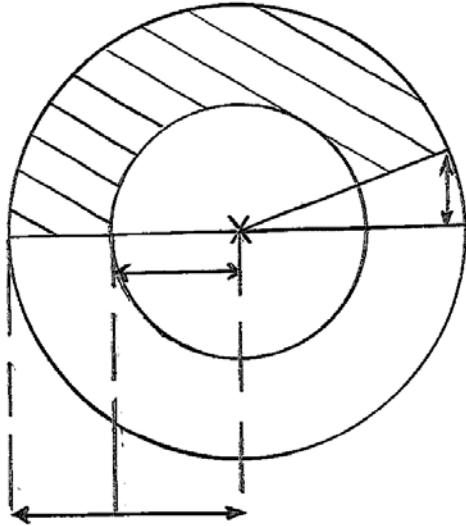
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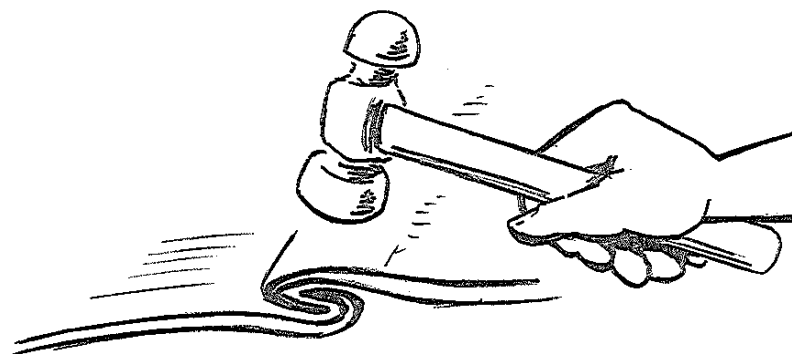
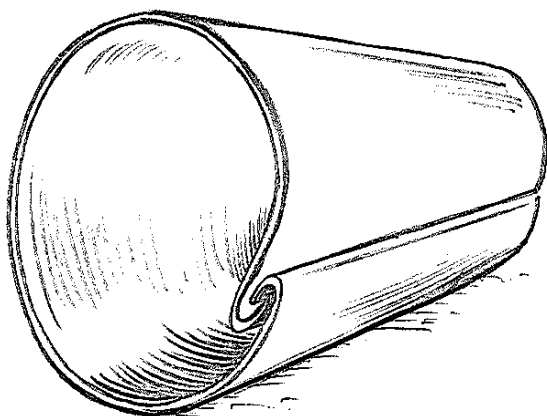
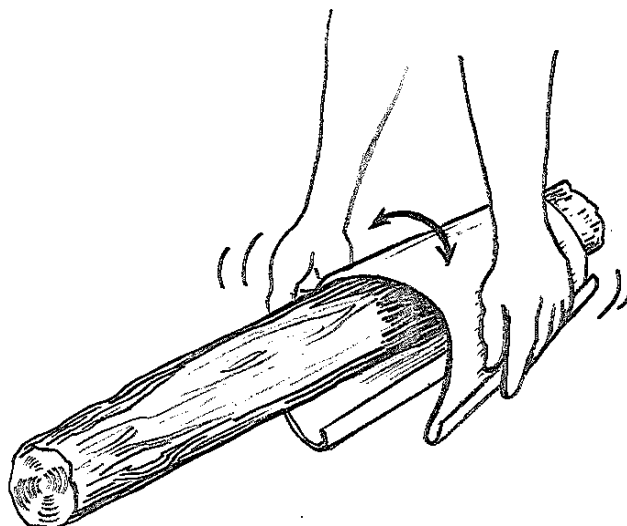
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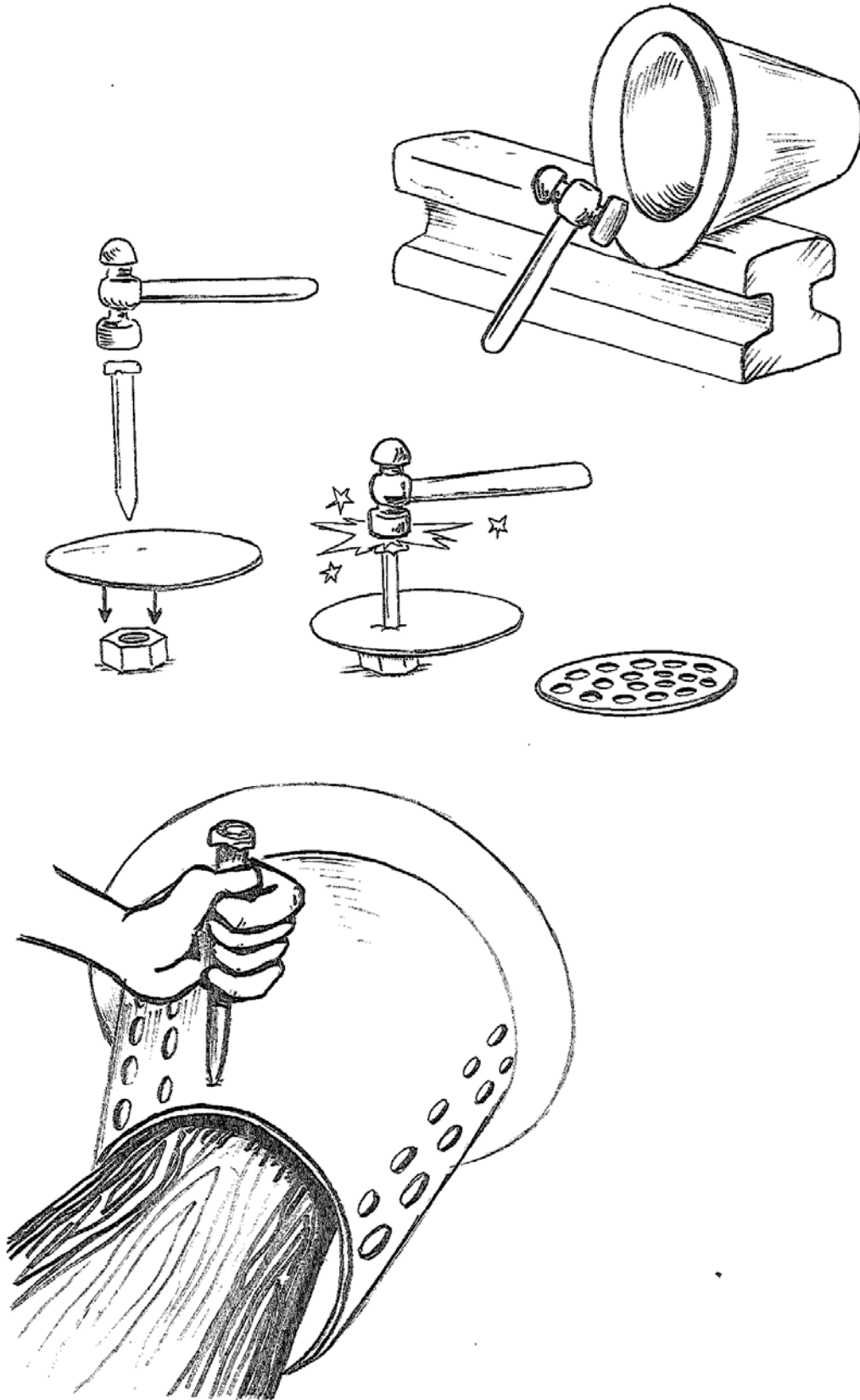
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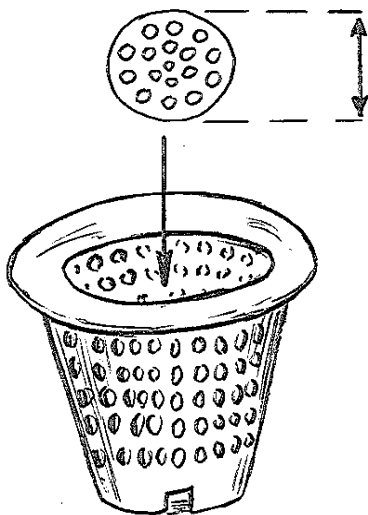
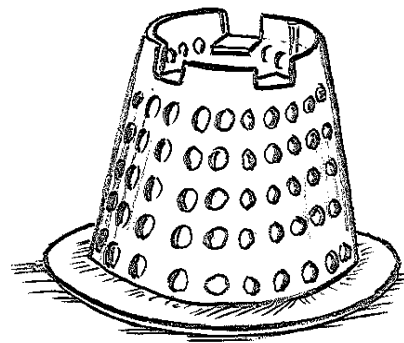
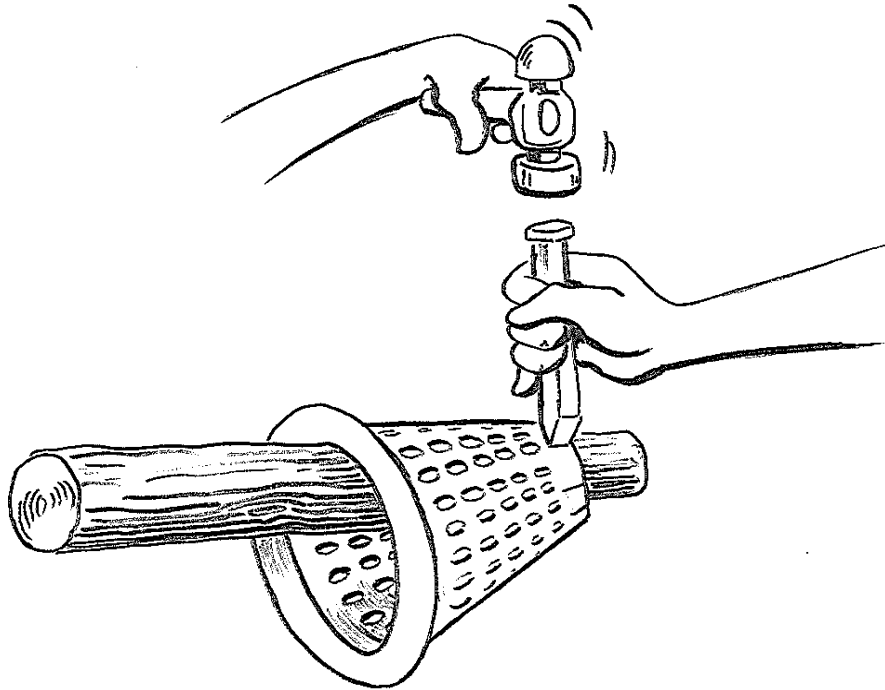
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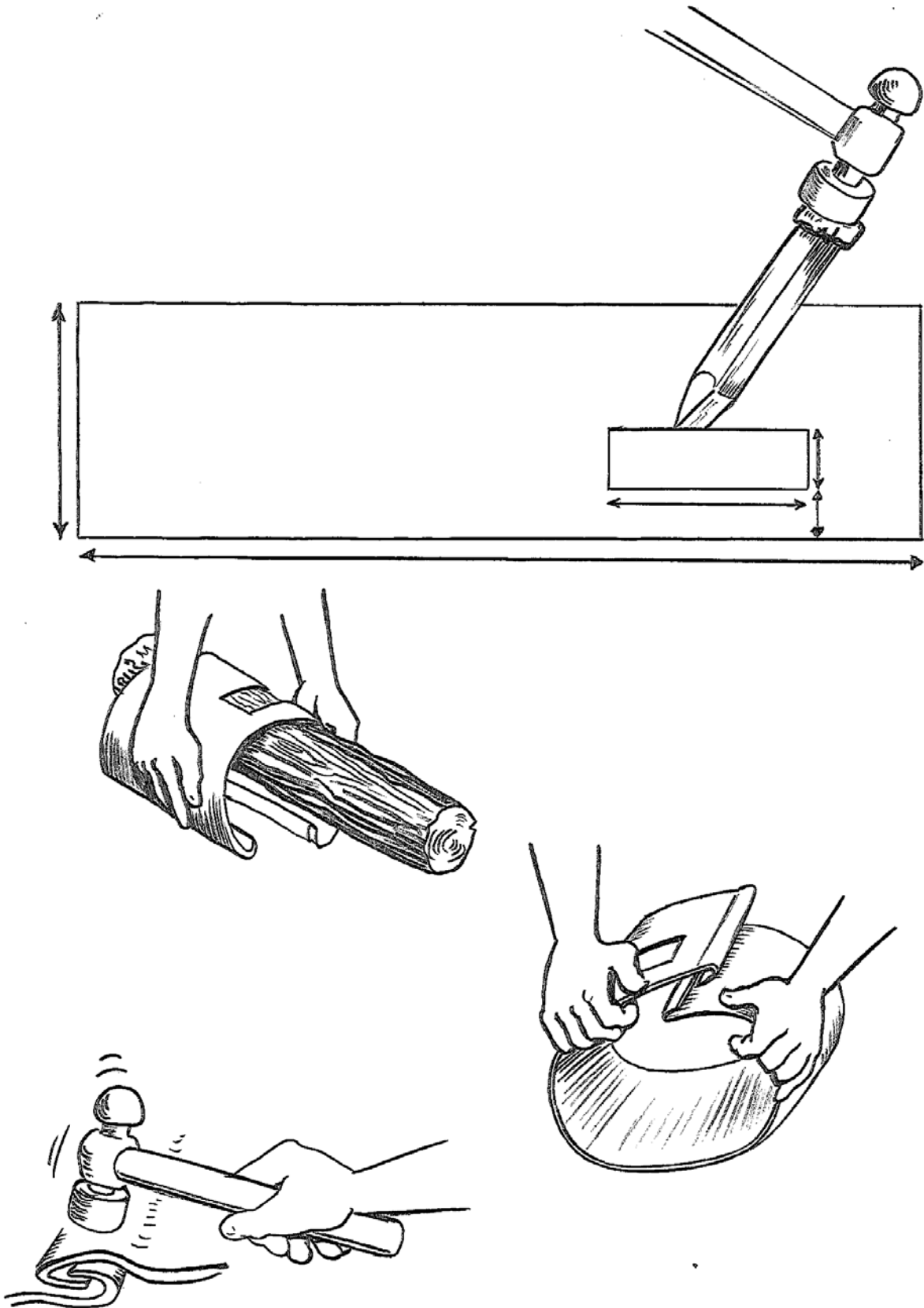
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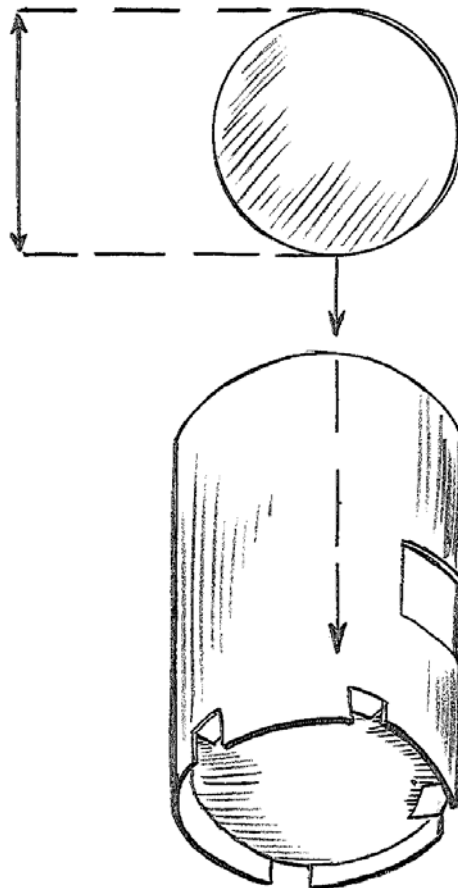
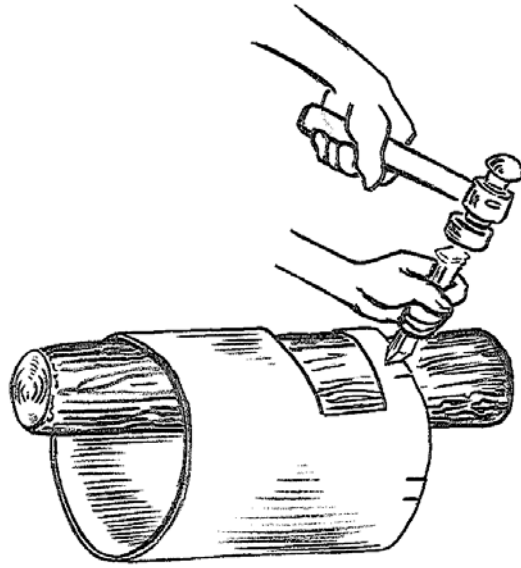
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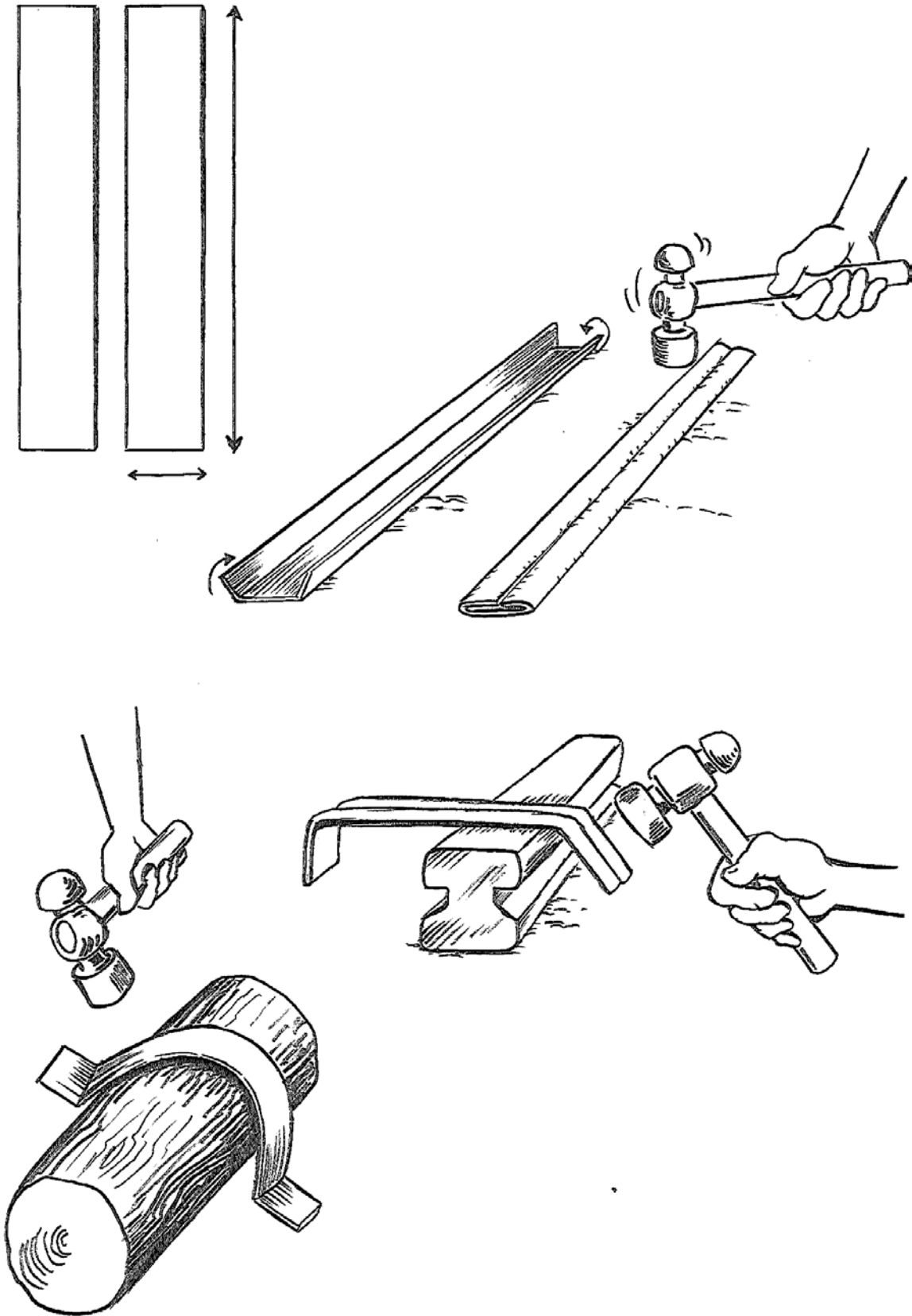
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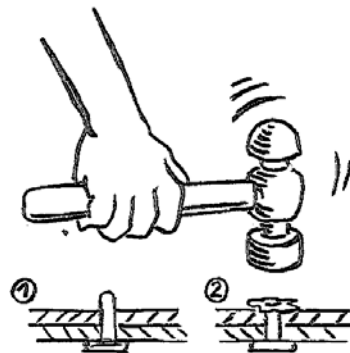
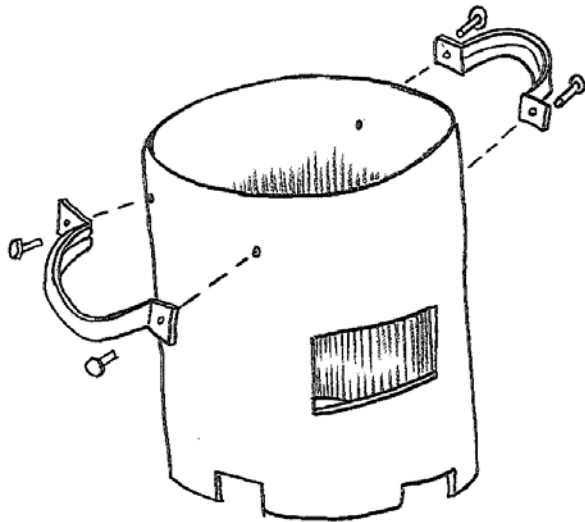
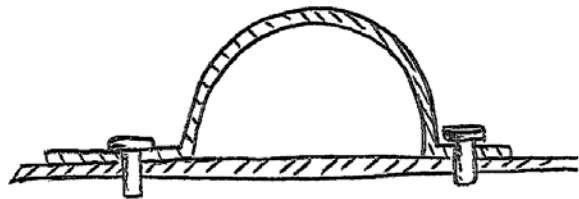
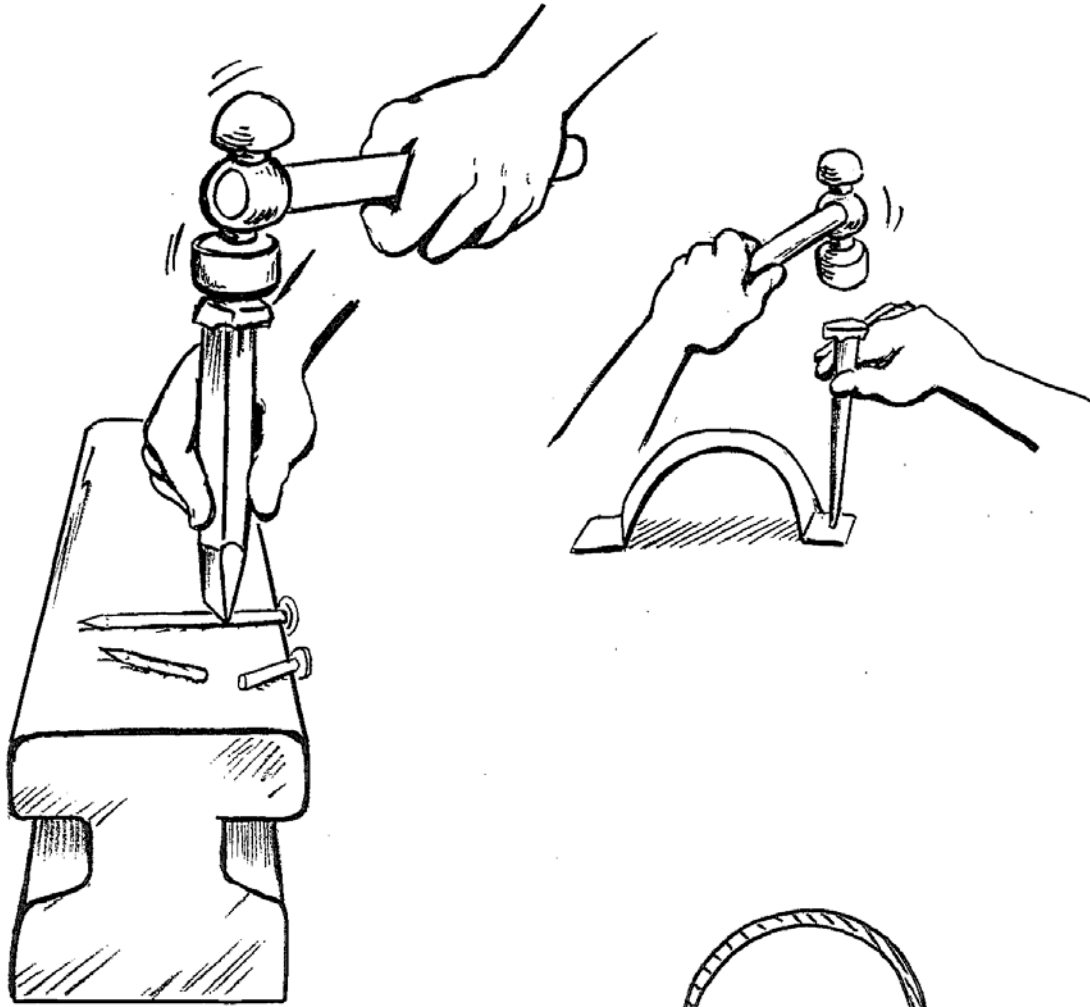
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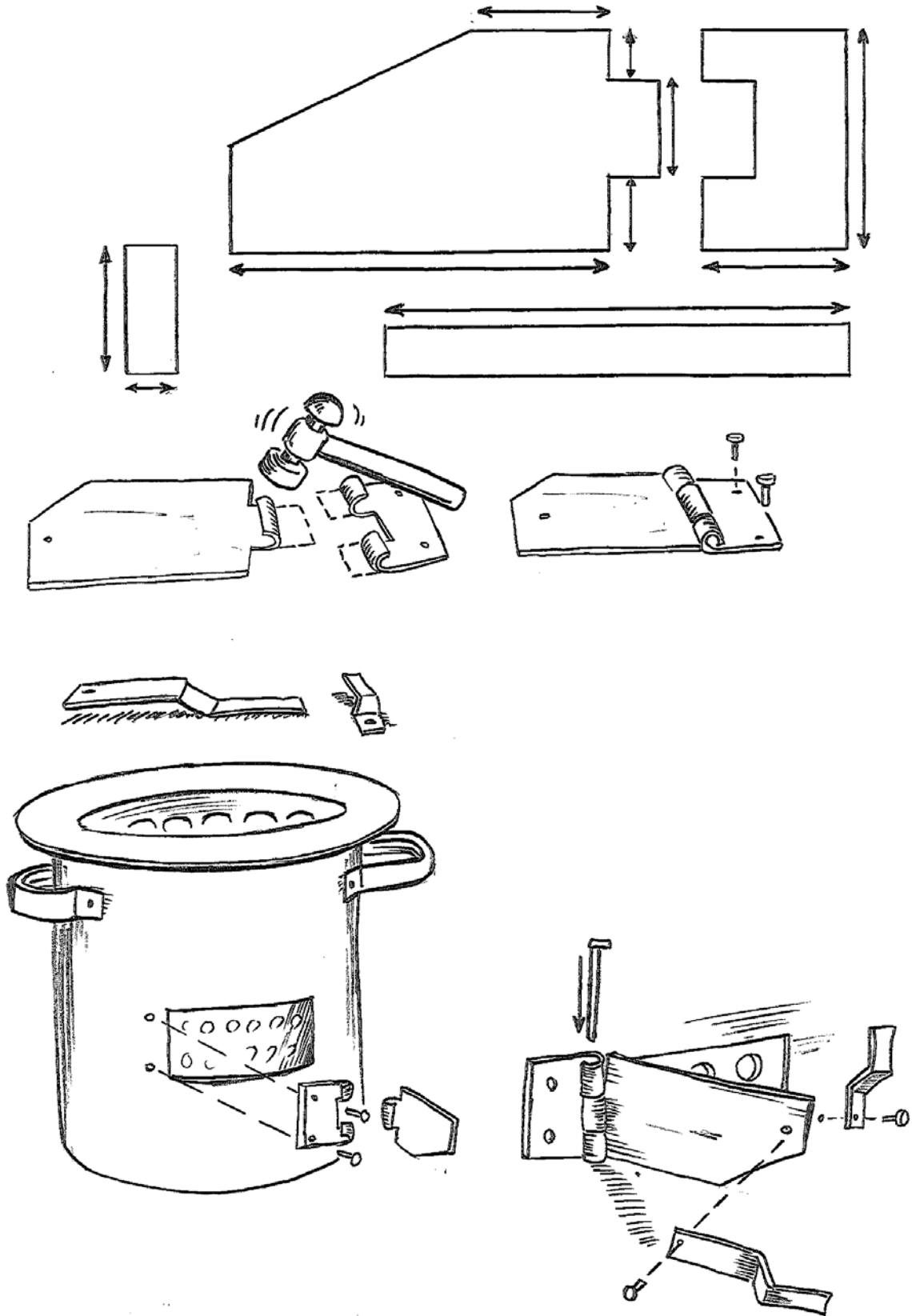
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Manufacturing an improved stove, cylindrical form, diameter 20 to 30cm

This cylindrical stove is quite small (20 to 30 cm of diameter) but it can be used for any cooking utensil in the household (boiler, bombe, saucepan). This stove has a reasonable heat output.

Potential users

The model of an improved stove of 20cm is made for families of five or six persons. The model of 26cm is thought for families with more than ten members, and the one which measures 30cm is useful for more important consumers like restaurants, of "manje kwit" (street restaurants) or small hostels.

Tools

To produce the improved stove you need a hammer, a chisel, an awl, a nut (for the holes), a nail (to draw the marks of the measurement on the metal) and eight rivets.

Material

You will need metal sheets, preferably scrap metal.

Means of work

As user surface take an anvil or a T-shaped iron and to round off the edges and the cylinder; you can use a piece of a pipe or a tree trunk.

Components of the improved stove

You need a cylinder with a window and an ash-tray that makes up the bottom of the cylinder. Make holes into the whole surface of the cone. You need two handles to carry the stove, a door and a fixing for it, a lock, a latch and a sturdy string to fix the door.

Manufacturing the stove

1. With a chisel and a hammer, cut a form out of the metal that will become the cone.
2. Fold the edge of the bottom to the outside in a distance of about 1cm, and the other side has to be turned into the inside, also about 1cm.
3. On a pipe or a tree trunk you will now form a funnel out of the metal.
4. Put the funnel onto the folded edges.
5. Then, hammer along the flap until the edges are completely fixed together.
6. Fold the upper edge of the funnel around 2cm to get a rim.
7. Now, pierce the cone in which you will put the charcoal by placing a nut or a ring in its inside. Then, from above, knock the metal with the hammer; this technique is helpful for getting regular holes.
8. To be able to support the wire netting of the cone, cut up four strips in the lower edge of the cone and fold them to the inside.
9. The wire netting of the cone, that is also pierced on its whole surface so that the ash can pass through, is now being fitted in and fixed sturdily with the strips.
10. With the chisel, cut out the window in which you will later put the door.
11. The thin edges are folded, one to the inside and the other to the outside, the same way you did it with the cone (n°2).
12. Round off with caution the metal on a pipe or a tree trunk to form a cylinder.
13. The folded edges are linked with one another and strongly fixed together with the hammer.
14. Then, you carve four strips into the lower edge of the cylinder that are folded to the inside, so that they can be fixed on the bottom of the cylinder. This bottom prevents the ash from falling directly on to the ground.
15. Now, cut up two metallic handles.
16. The vertical edges of the handles have to be folded to the inside so that they are not too sharp.
17. On a T-shaped iron, an anvil or a piece of a pipe, you now round off the middle of the handles. On both sides leave a few centimetres flat to make the holes for the rivets later.

18. The handles have to be pierced on their whole surface with a u-shaped chisel; always put a nut underneath.
19. When you have cut the holes into the corresponding places and also into the cylinder, fix the handles on the cylinder with the rivets.
20. For the door of the ashtray, cut forms out of metal sheet to prepare the fixing, the door and the latch.
21. Fold the thin strip of the door scratched with a nail or a bar. Cut a hole into the door to be able to fix the lock with the rivets later.
22. The strips that are also scratched and required for the fixing are rounded off to join the fixing and the door with a nail. For the fixing you also need two holes for the rivets.
23. Now, fix the lock on the door with the rivets.
24. Then, adapt the fixation, the door and the lock to the round form of the oven with the rivets; fix them with a bolt for the oven's lock.
25. Finally, just put the bottom of the ashtray into the cylinder and the stove is now ready for use.

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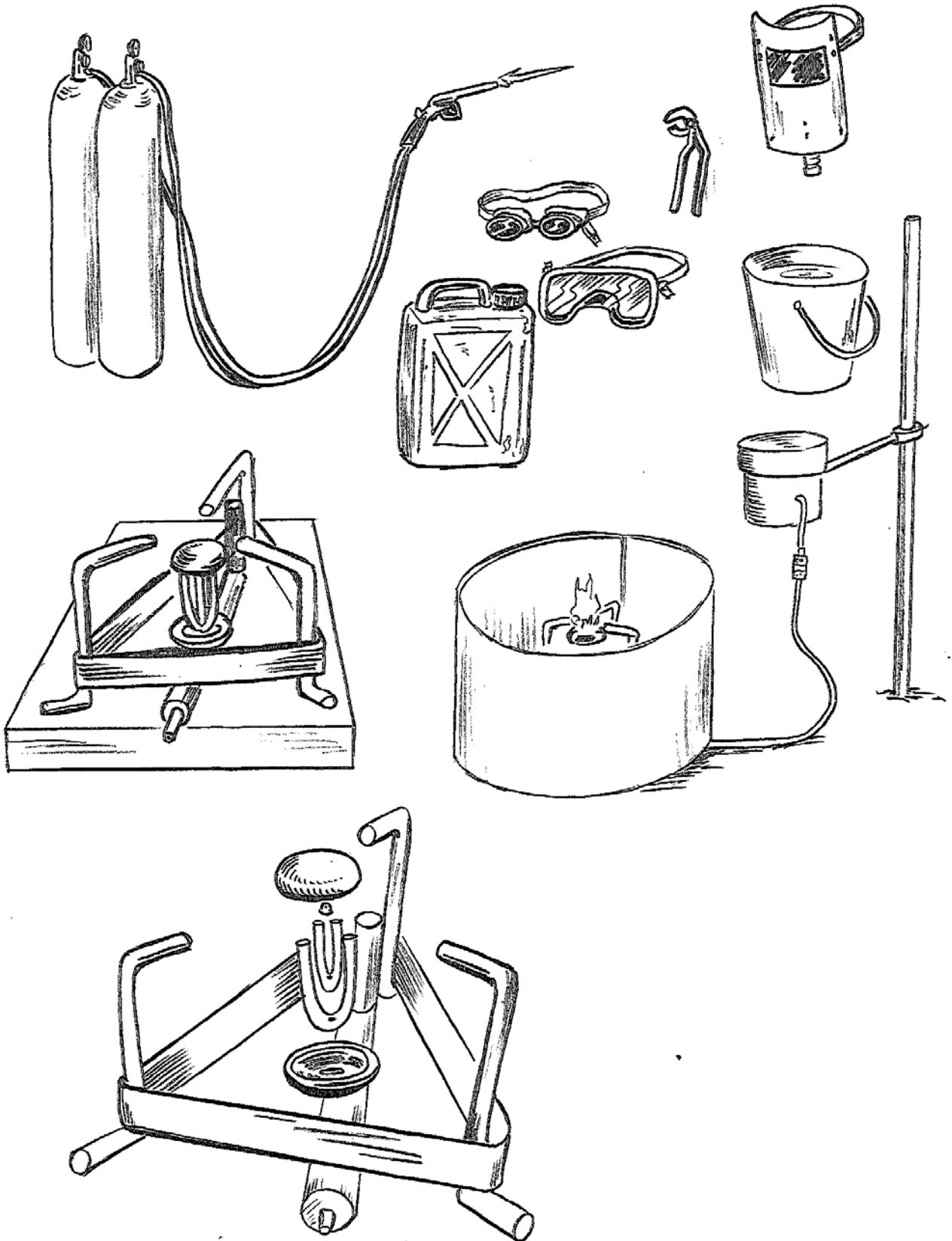
Designer and Information

Jean-Marie Rigaud

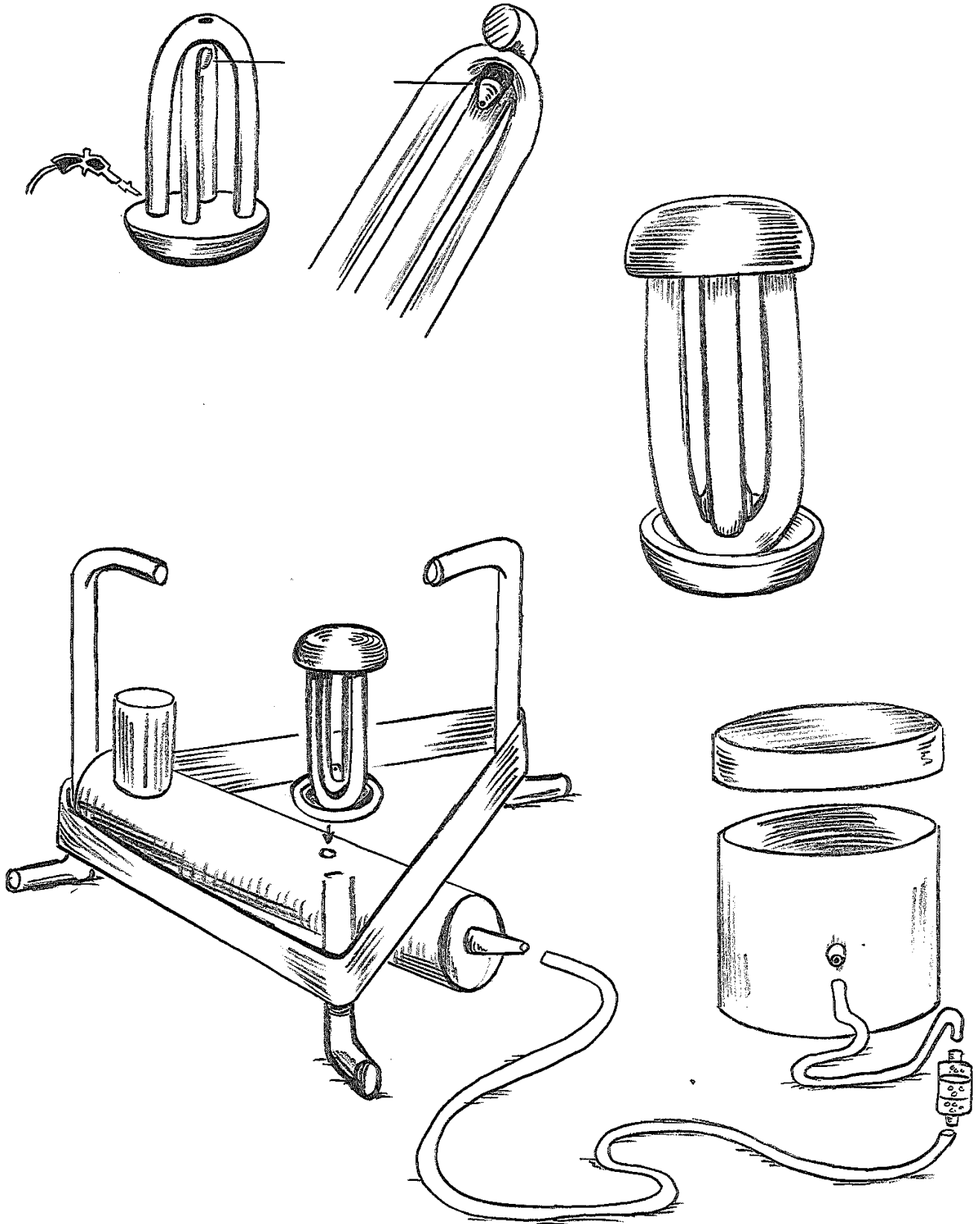
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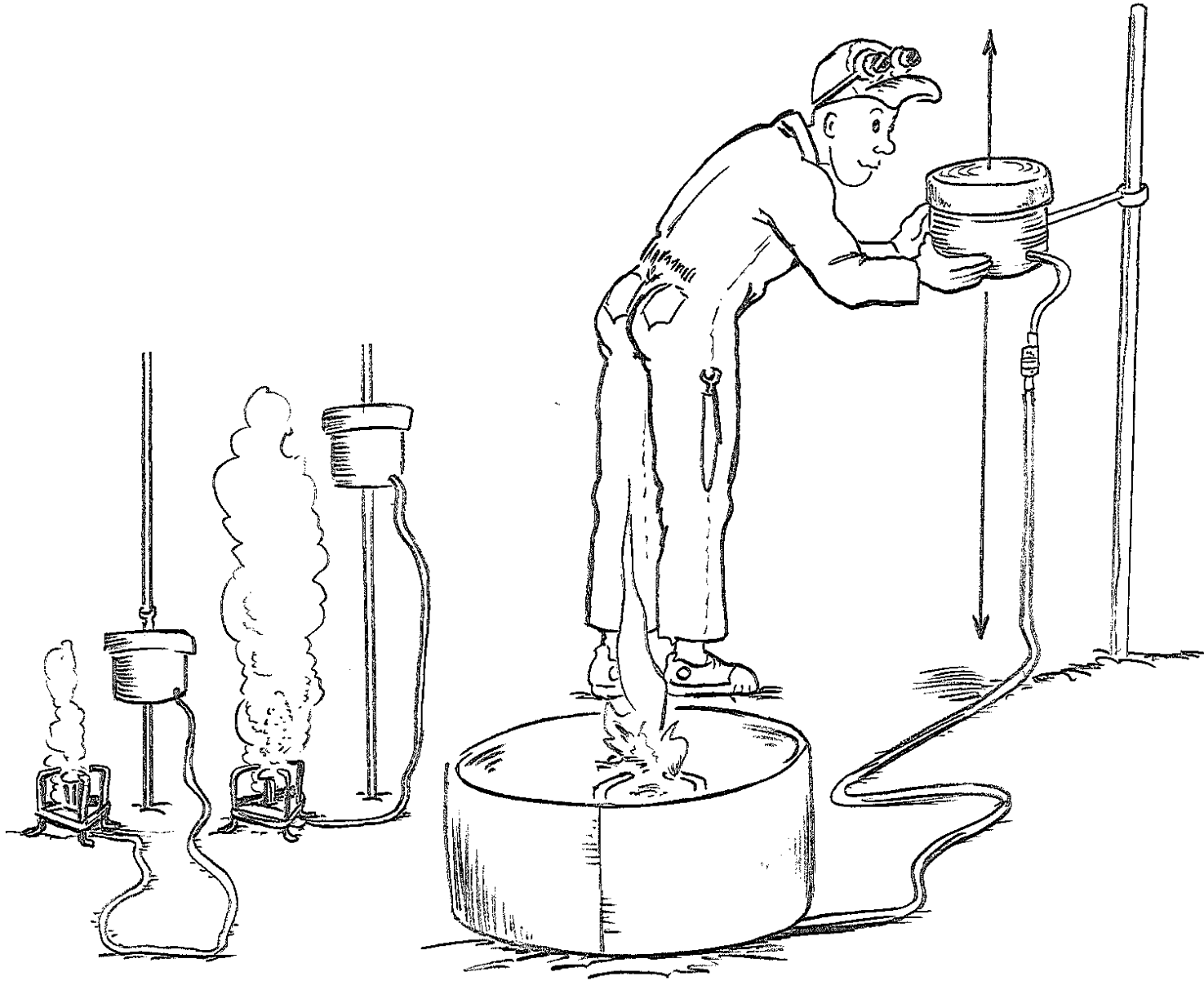
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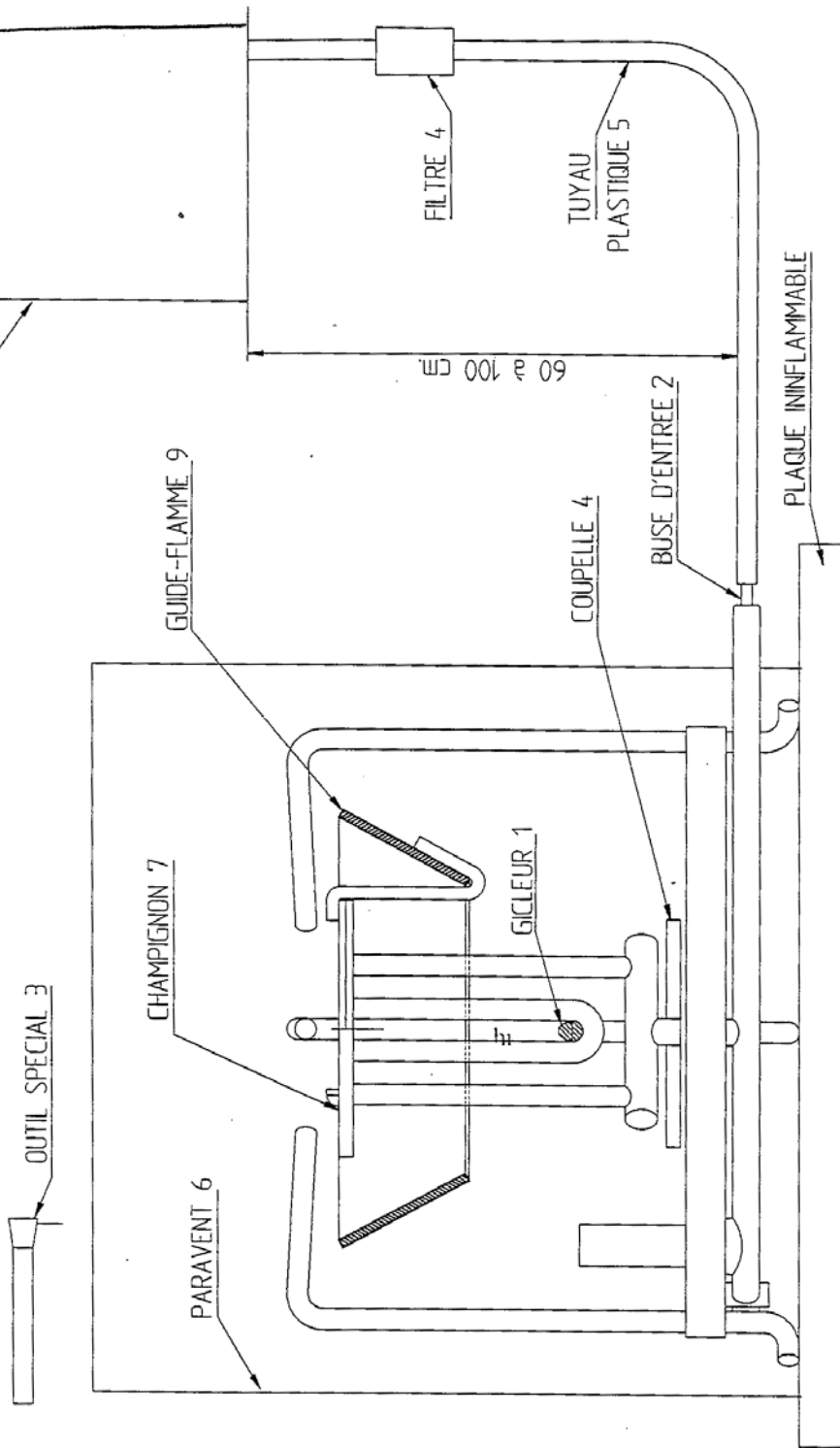
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RECHAUD A PETROLE REDI

TYPE P 60, P 105, P 135



VA AVEC LE MODE D'EMPLOI DES RECHAUDS A PETROLE REDI !

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REDI oil stove

For the directions for using the REDI oil stoves:

- | | | |
|---------------------|--------------------|-------------------|
| 1 ... jet | 4 ... filter | 7 ... accelerator |
| 2 ... duct to enter | 5 ... plastic pipe | 8 ... tank |
| 3 ... special tool | 6 ... screen | 9 .. flame guide |

Stove with white gas (REDI)

This stove can only be used with lamp oil, aviation kerosene, heating oil or diesel.

1. Place the stove on a horizontal surface that does not dislike the heat.
2. Put the tank (8) beneath the bottom of the stove.
3. Connect the tank and the stove with the plastic tube (5).
4. Fill two thirds of the tank (8) with fuel, filtering it through a fine rag.
5. Now raise the fuel tank very slowly until there are no more air bubbles in the plastic tube. From then on, raise the tank (8) an additional 8–10 cm, but not more than that!

Very important! Never rise the burner up to the level of the accelerator (7)!

6. Open the jet (1) with the a special tool (3).
7. Pour the alcohol or the available fuel into the dish 4 (around 6cl).
8. Place the screen 6 around the stove. First, the screen will have to be adapted to the diameter of the saucepan, but leave about 2 cm on each side.
9. Put the cooking pot on the stove inside the screen.
10. Light the alcohol or the available fuel in the dish to preheat the stove. You can use a small piece of a rag that you soak into the fuel to facilitate the lighting.
11. Before the alcohol sheet or the available fuel in the dish is completely consumed, a small flame must appear that comes out of the jet (1). Only at that moment, raise slowly the tank (8) up to a height of around 60cm above the bottom of the stove and wait until the

flame gets stabilized. After one or two minutes, raise the tank (8) up to a height of around 100cm above the bottom of the stove. Now, your stove will work correctly with its maximum power.

12. To stop the stove you only need to take down the kerosene tank (8) beneath the bottom of the stove, and wait until the flame extinguishes.

Remark: To avoid that the duct (2) gets blocked, it is advisable to place a filter (4) in the plastic pipe (5). In case the entrance of the duct gets blocked, clean it with the tool (3).

Important: When you use the stove outdoor, use the metal sheet screen (6)!

•••

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<http://www.hulmann.org/ateliers-ecole.html>

Video METAL 1: Text of Soundtrack

Ever since the first humans came to master fire, they have used it to cook food. The oldest kind of stove and the most simple is made up of just three stones with a fire in the middle. This simple form can still be found in many parts of the world. With recycled material it is possible to make much more economical stoves, such as this one made by Monsieur Saliba at the Salino market in Port-au-Prince. On a piece of rail, which serves as an anvil, he cuts up an old sheet of metal with a hammer and a chisel, according to a precise pattern. He makes air holes, hammers back the edges, rounds off the handles.

With old bits of metal rod he makes rivets. He also uses old screws and nails. To make holes, he places a nut on the metal and pierces it. The rivets serve to fix the handles and the four legs of the stove without the need to weld.

Holes are punched into the bottom of the oven to allow air inside.

The bottom is slightly bent at each of its four corners to make it easier to put together. Less than half an hour was all that was needed for Monsieur Saliba to make this oven, which can be found more or less everywhere in Haiti.

The habit of cooking with charcoal is leading to increasing deforestation in Haiti, and the mountains of Haiti are today sadly stripped of their trees. To overcome this problem it is possible to use what is known as an improved stove, such as this one, which can reduce the use of charcoal by thirty percent.

To make it, you trace out a strip of metal from an old barrel. This will become the cylinder of the stove. You cut it out with a hammer and a chisel, making sure to cut out the door of the stove at the same time.

The two ends of the strip are bent round – one towards the outside, the other towards the inside.

These are then fixed and hammered one into the other. They fix the cylinder without the need for welding.

In the same way, you cut and put together the cone, which will form the inside of the stove.

You bend its edge towards the outside.

You cut out four bits for legs underneath.

Then, with a piece of tubing and a punching instrument, you pierce air holes through towards the inside.

You fix the bottom of the cone, which is also pierced with holes, to the legs, which are already cut out.

The handles, large enough to avoid your hands being burnt, are fixed by rivets.

By hammering, you make the flap for the air door, and then rivet the bolt to shut it.

You fix the door with a small metal rod, which acts as a hinge.

The bottom of the cylinder, into which the ash falls, is held together by legs. And that's it, the improved stove is finished. Very little was needed to make it.

It can be made in several sizes.

Another type of stove or burner devised by Swiss engineers is also made in Haiti. Called the REDI stove, it uses paraffin oil or kerosene. In cities it is cheaper to run than a charcoal stove. It works by gravitation. The petrol contained in a reservoir fills up an empty burner.

It is then heated by some burning paper in a small dish. It becomes gas, and as it comes out under the pressure of the jet, it bursts into flames and keeps turning the paraffin into gas. To make this stove you need to be able to use an electric welder.

To make the burner, you have to weld a mushroom-like shape at the top, made out of two pieces of metal, one hollow, and the other one flat. The jet is placed in the middle, surrounded by two hollow tubes in the shape of a "U". All this can be made with recycled metal, except the jet, which is made and distributed by the Camp-Perrin workshops. During welding operations it is important to protect your eyes and not to touch the burning metal.

The foot of the stove is made out of a triangle, with metal rods welded at each corner.

The entrance pipe, where the paraffin comes in, is welded under the burner, and attached to the foot. It has an expansion tank, which allows the liquid to dilate. You then have to add the hollow dish and the other elements: the expansion tank, and the supply tube. The stove as well as its spare parts are

made at the Camp-Perrin workshops. Its efficiency increases with a windshield. The handling of this stove is slightly more complicated than the previous charcoal stoves. It is important to follow the instructions closely. They can be found in the brochure that accompanies this film.

Further Notes

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The Campaign Package

This Campaign Package has been developed and provided by the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training, Bonn, Germany. Its purpose is to facilitate the organisation of campaigns for mobilisation and motivation of young people, and for providing them with vocational orientation and guidance. The focus is on marginalised youth in the informal sector of least developed countries.

The package consists of eight components.

The current pilot version is being provided in English only. It will be evaluated in the field. Depending on the feedback that UNESCO-UNEVOC will receive, the package will be developed further.

The activities presented in this Campaign Package are not a guarantee of monetary success. The content is based on research, examples and advice from experts. Every attempt was made to ensure accuracy, and neither the authors nor the UNESCO-UNEVOC International Centre can be held responsible for incorrect information or changing circumstances.

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