

# Simple Devices to Assist the Physically Disabled



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Edited by Christine Hogg

# Introduction

The medical adviser, the maker and the user all help to design and make an aid for a disabled child. The medical adviser is important because he chooses the most suitable aid for the child. He measures him and can say what the problems are. The maker of the aid will then try to solve these problems.

Always talk to a disabled child directly and try to involve him in decisions. For example, the child can choose the colour of the chair. You should also talk to the parents about their child so that they are involved in his development. All aids should be fun to use and look as much like toys as possible. Aids should also be educational and help the child's development.

As a child grows, he will need a new aid. Therefore, aids should be as cheap and quick to make as possible. You should use cheap, locally available materials. Wooden aids are best as you can easily adjust them.

Treat a disabled person in the same way as everyone else. For example, he does not need a special chair. You can often adapt an ordinary chair. The disabled child should also use the same lavatory as everyone else in the family. You can put wheels on an ordinary metal tube/wooden chair and then wheel the child in the chair over the lavatory. If the child uses a latrine, a special seat can be placed over it (see page 33).

Each aid should have as many uses as possible. For example, the table for the floor seats can be used either as a stand or as a tray (pages 23 and 24). Many chairs can be used as toilets or chairs. You can even add wheels so that they can move easily. The designs can be made for all sizes. There are no measurements on the drawings in this book. You should measure each child individually.

The aids shown in this book have all been used extensively in India and Africa. Do you think they are useful? Please send us your comments—both on the design of the aids and on the book itself.

# How to measure the child for chairs or seats

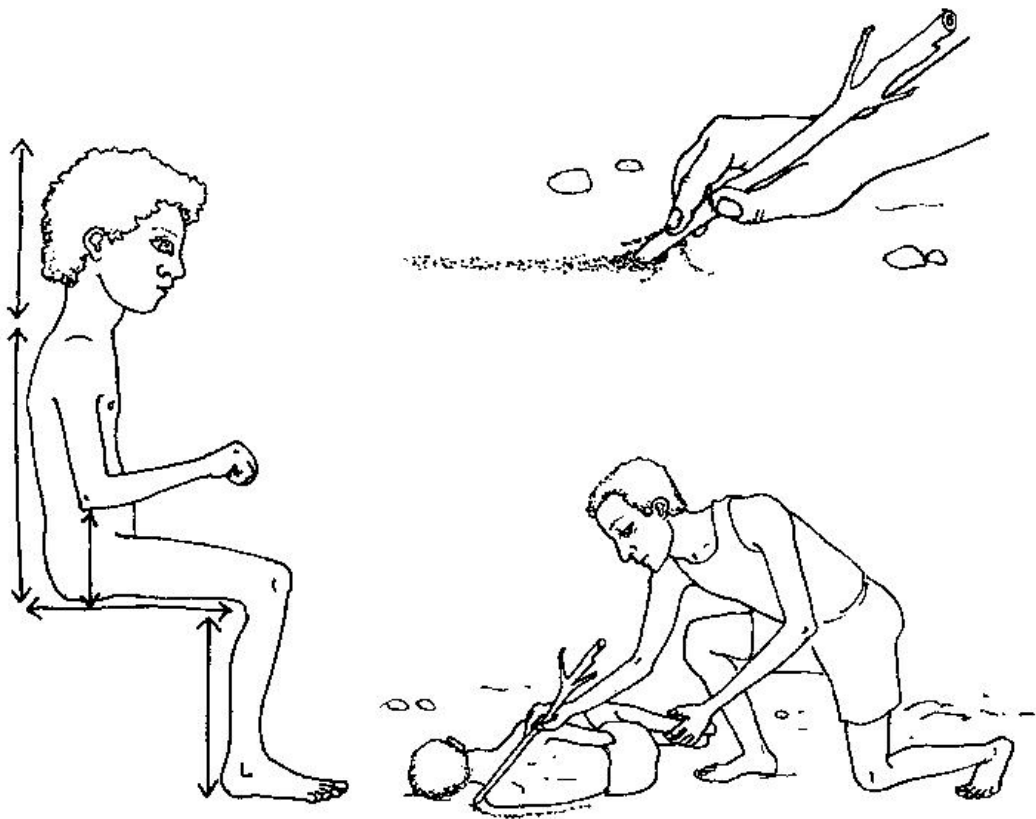
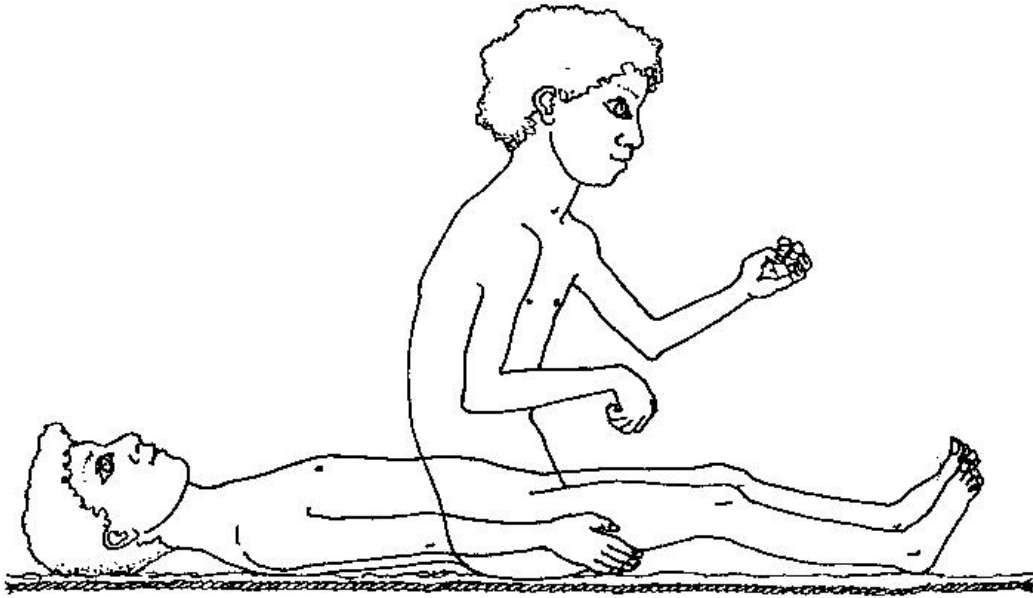
You must measure the child and decide on the type of aid to make with the help of the medical adviser (see pages 4 and 5).

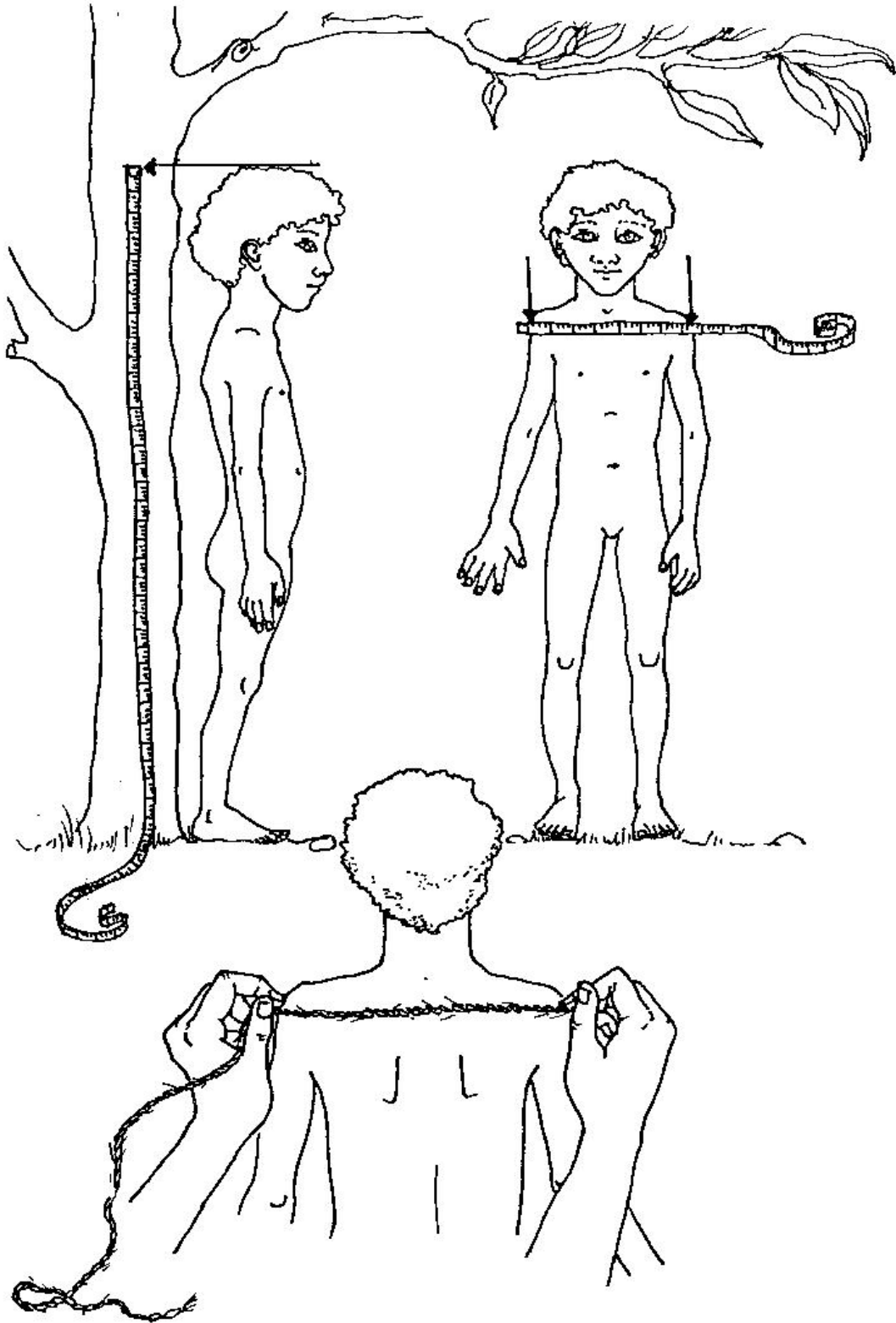
Always use a cloth tape measure and measure along a straight line. Do not measure along the contours of the body for chair size. Remember to leave enough space if you want to use padding.

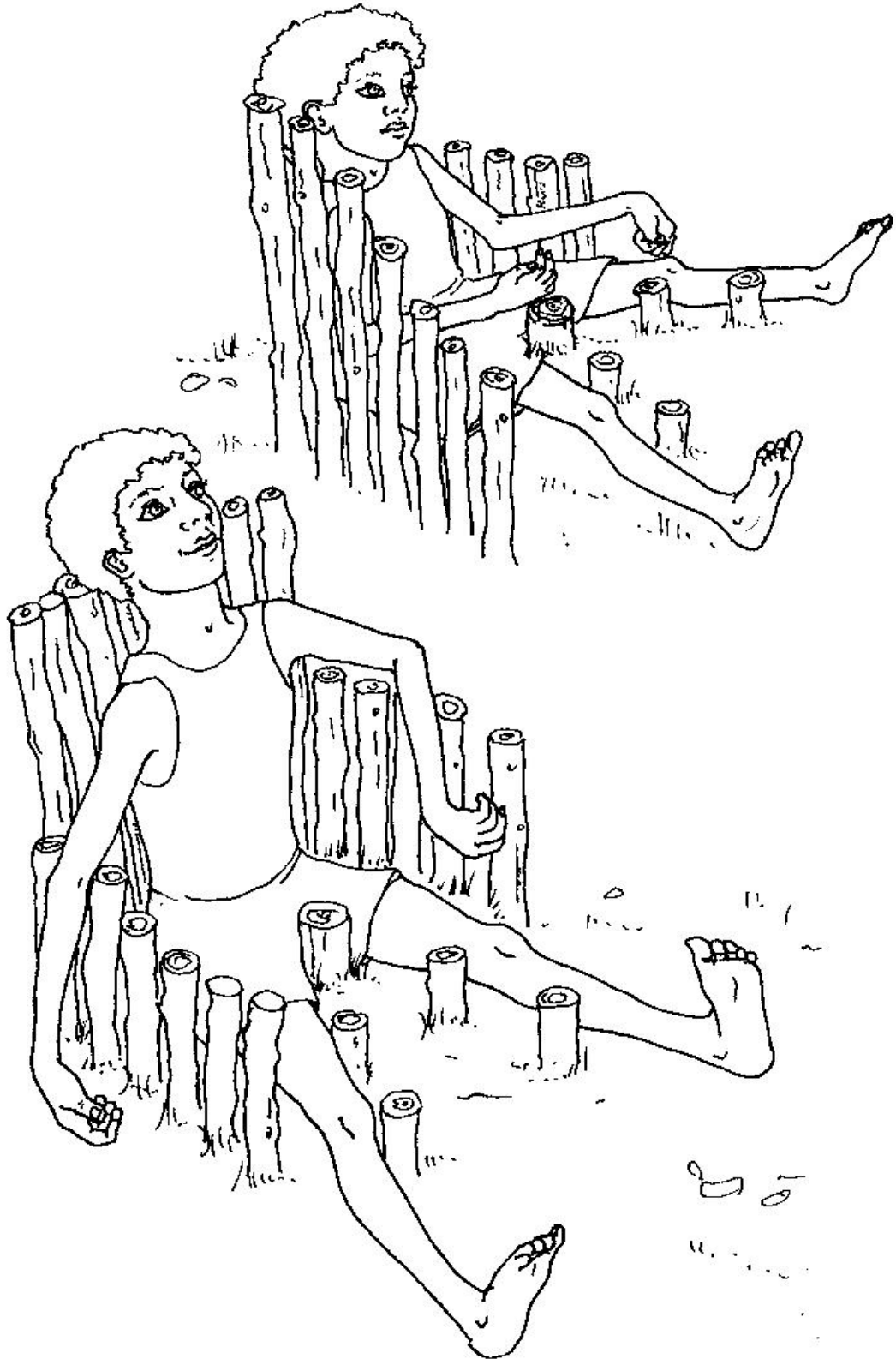
- Place the child on the chair—if the child cannot sit unsupported, lie him on the ground on his side. Bend the legs to a sitting position and chalk around him or mark the ground with a stick. Measure the outline.
- The height of the chair back—measure from the seat to the top of the shoulder. The back of the chair must come up to the top of the shoulders (unless the medical adviser wants the child to support himself from the waist upwards). Then there will not be a pressure line along the shoulders.
- Width of the chair back—measure along the shoulders. Do not follow the contours of the body.
- Depth of chair seat—remember that most people do not sit bolt upright. Allow for this.
- Width of seat—this should be the same as the width of the chair at the shoulder.
- Height of chair seat from the ground—this should allow the child to sit with his feet firmly on the ground or on the foot rest.

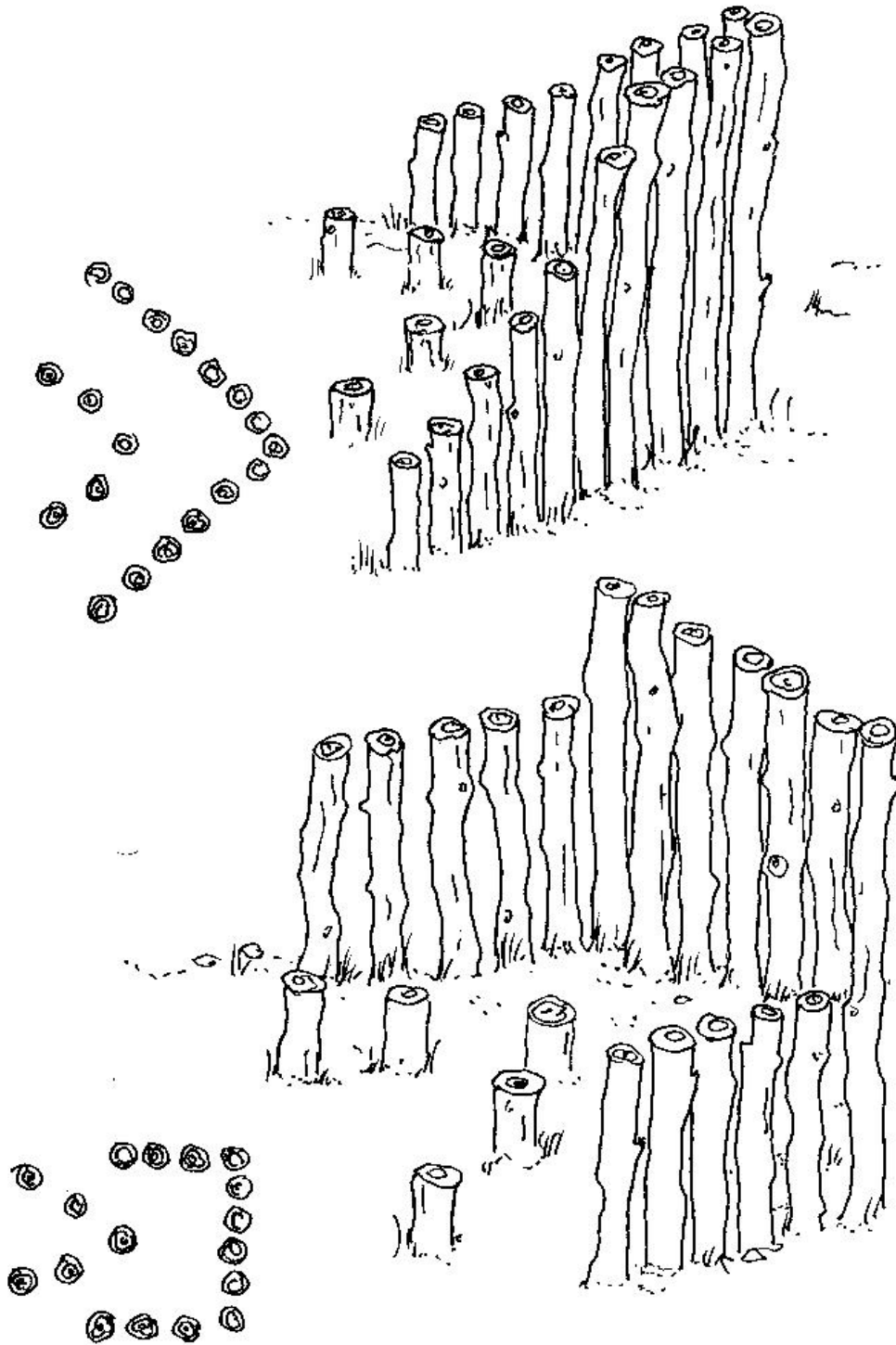
Head rests may be added to the back of the chairs. Measure from the shoulders to the top of the head. Add four inches (ten cm) to the measurement.

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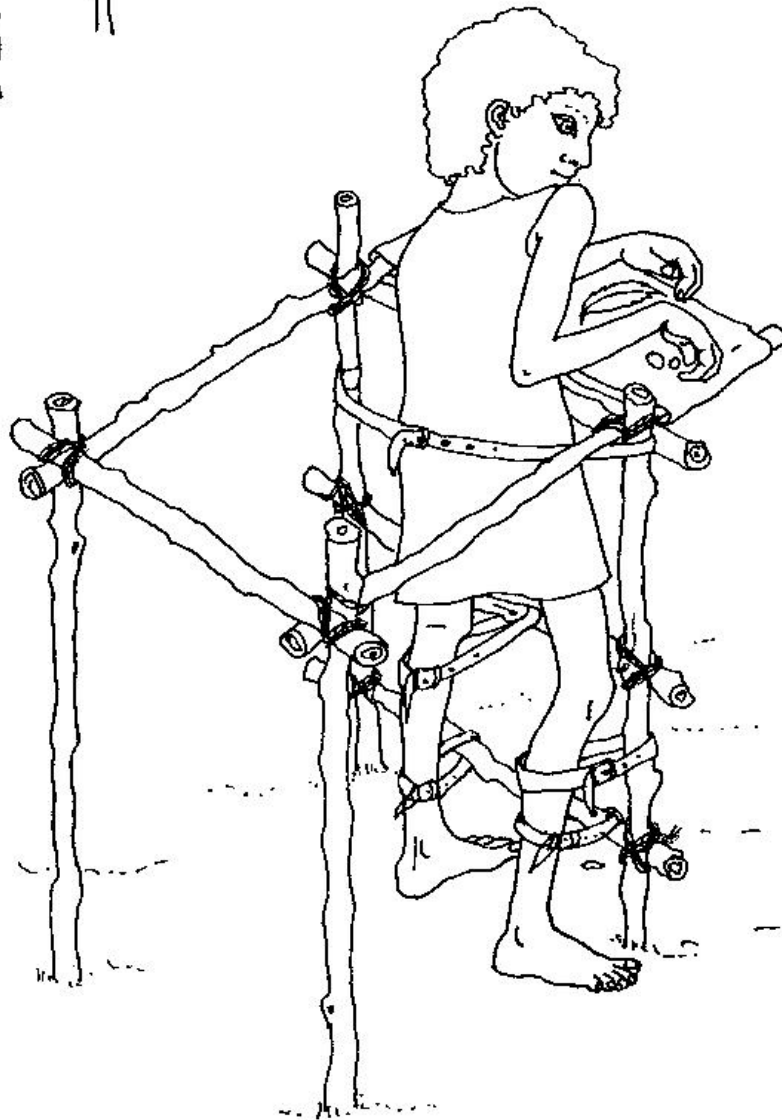
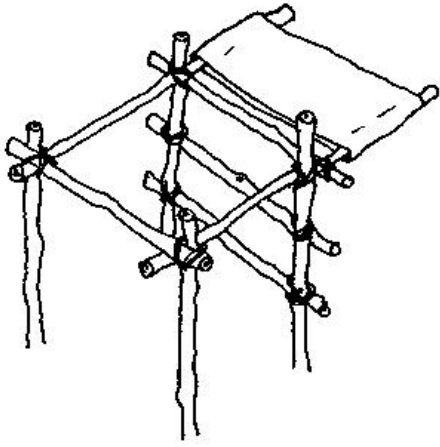




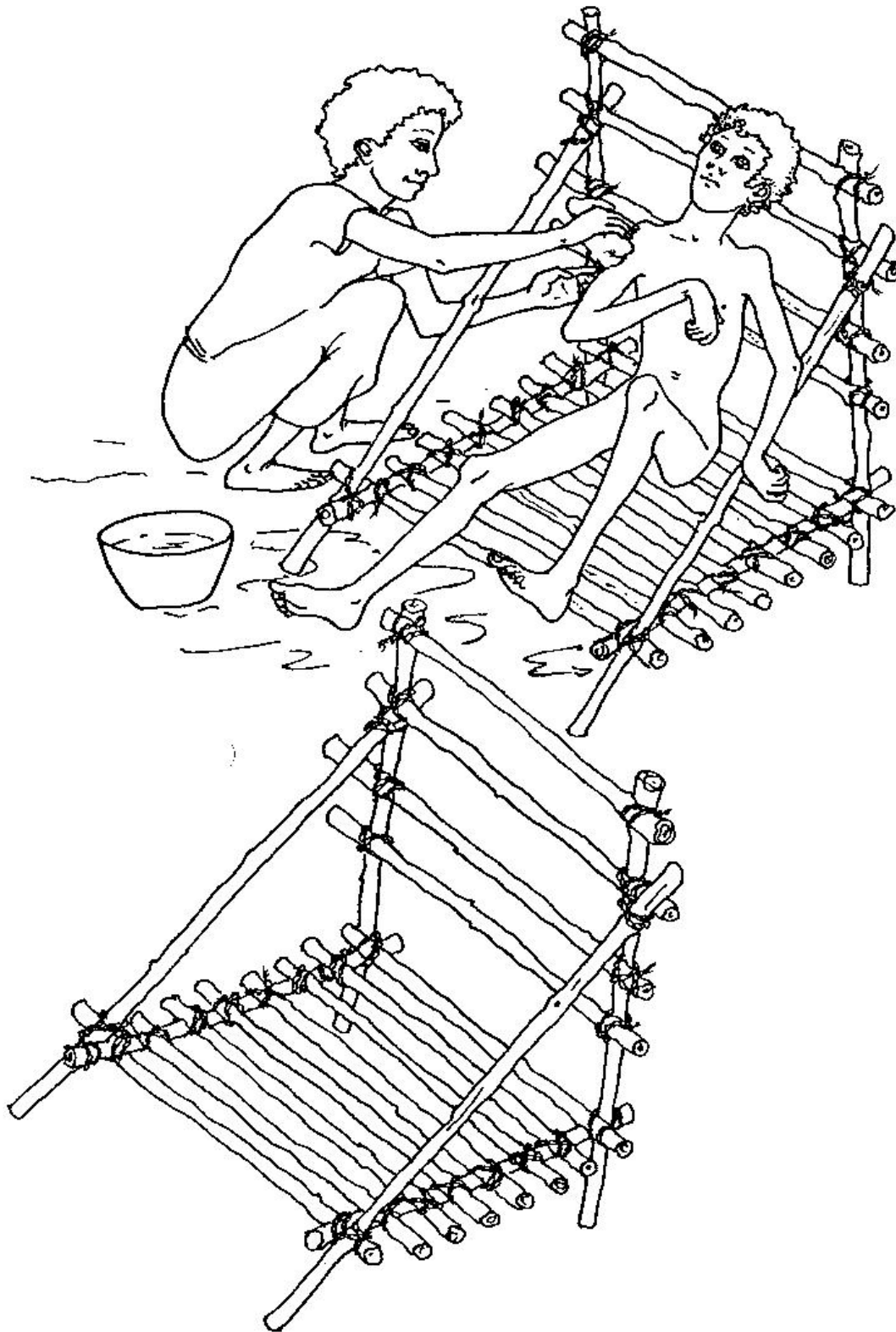




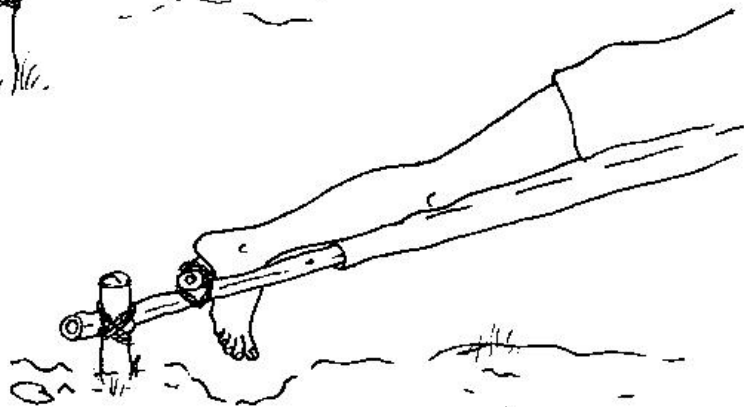
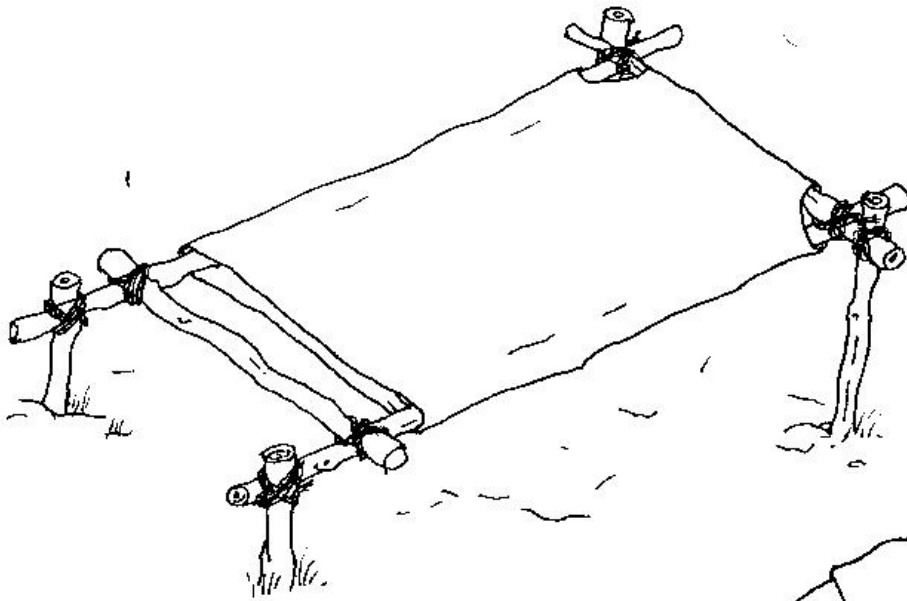
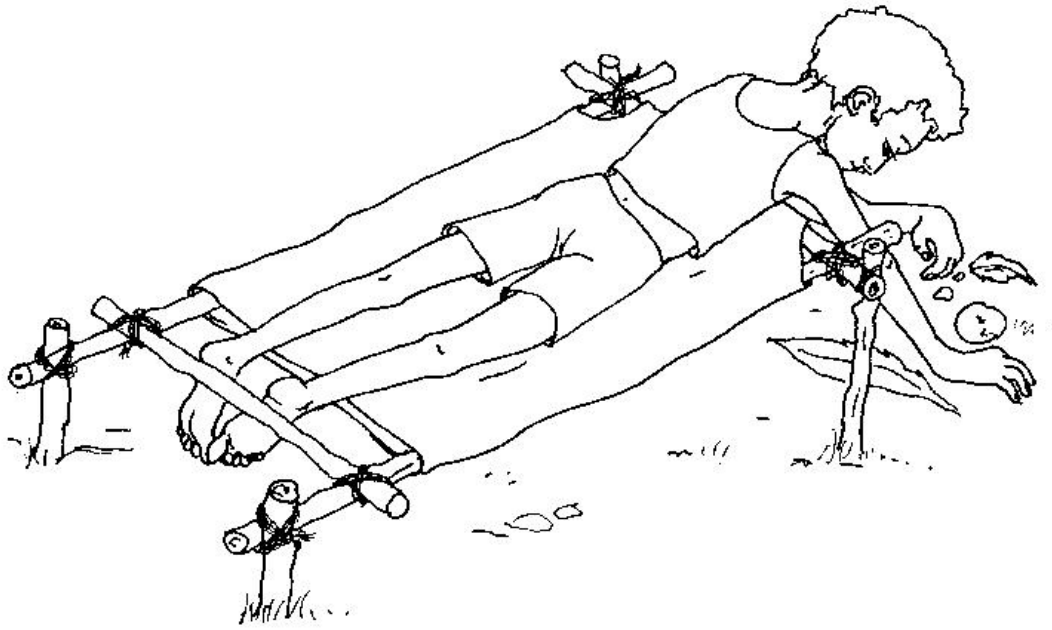
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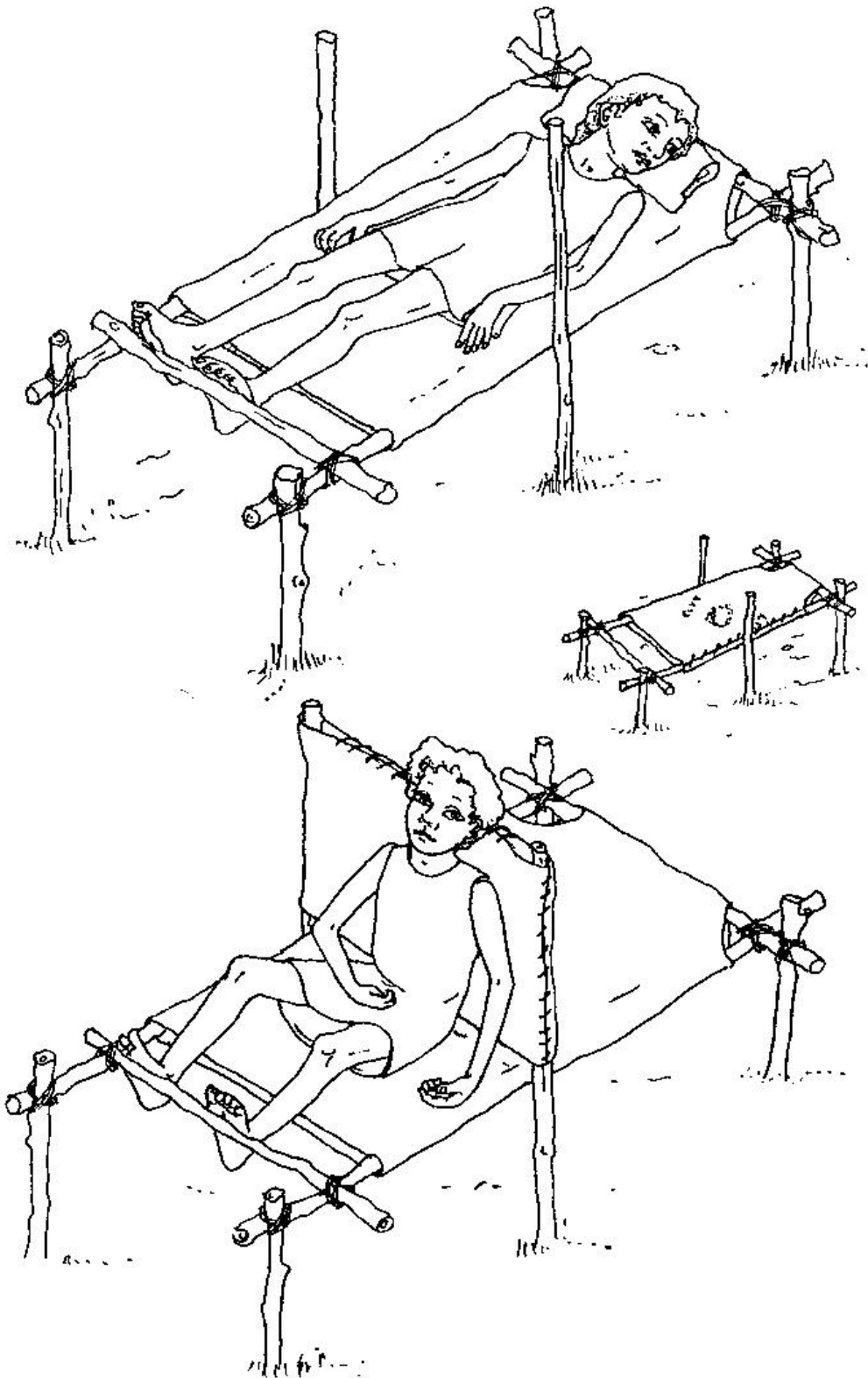


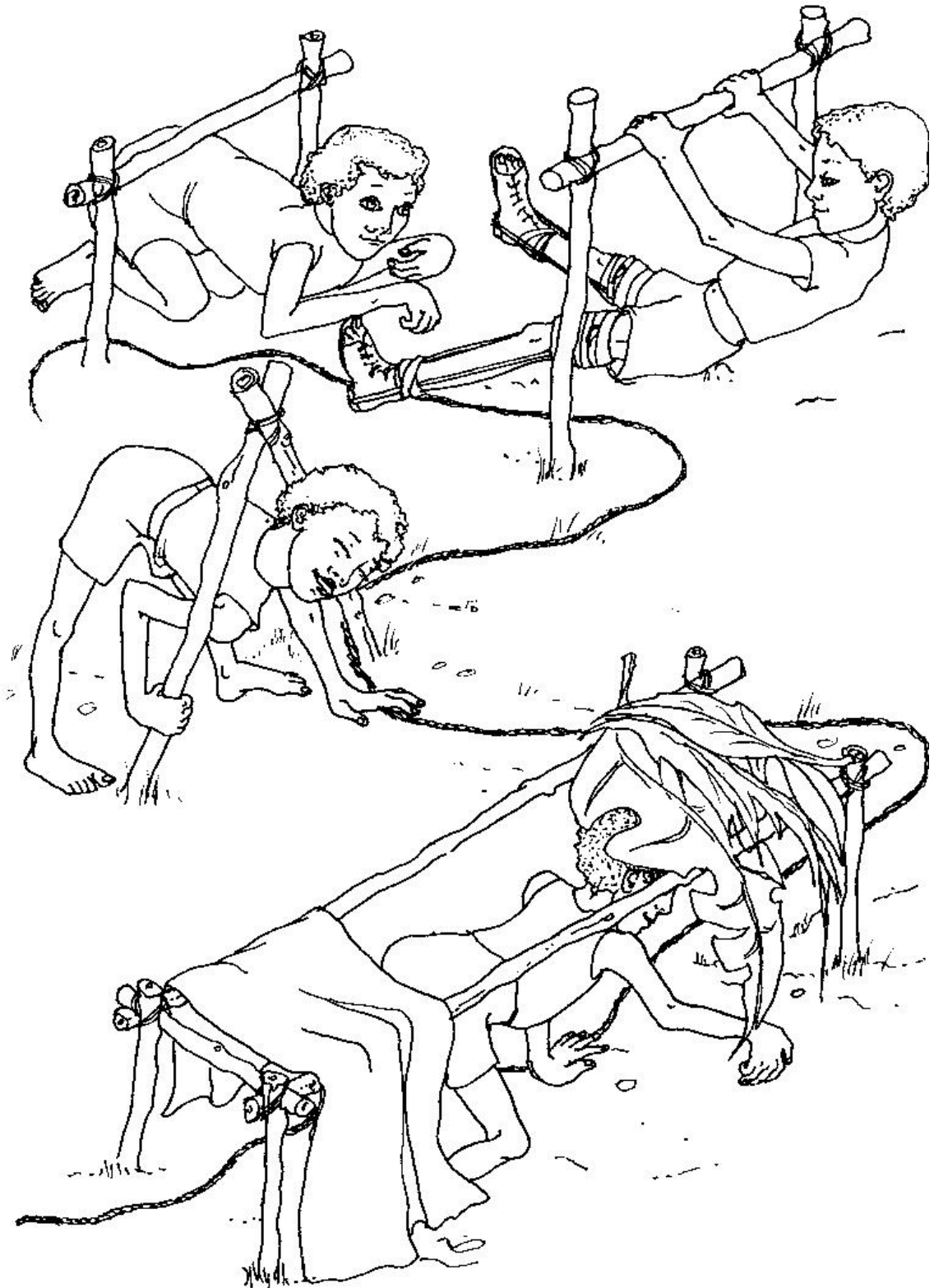


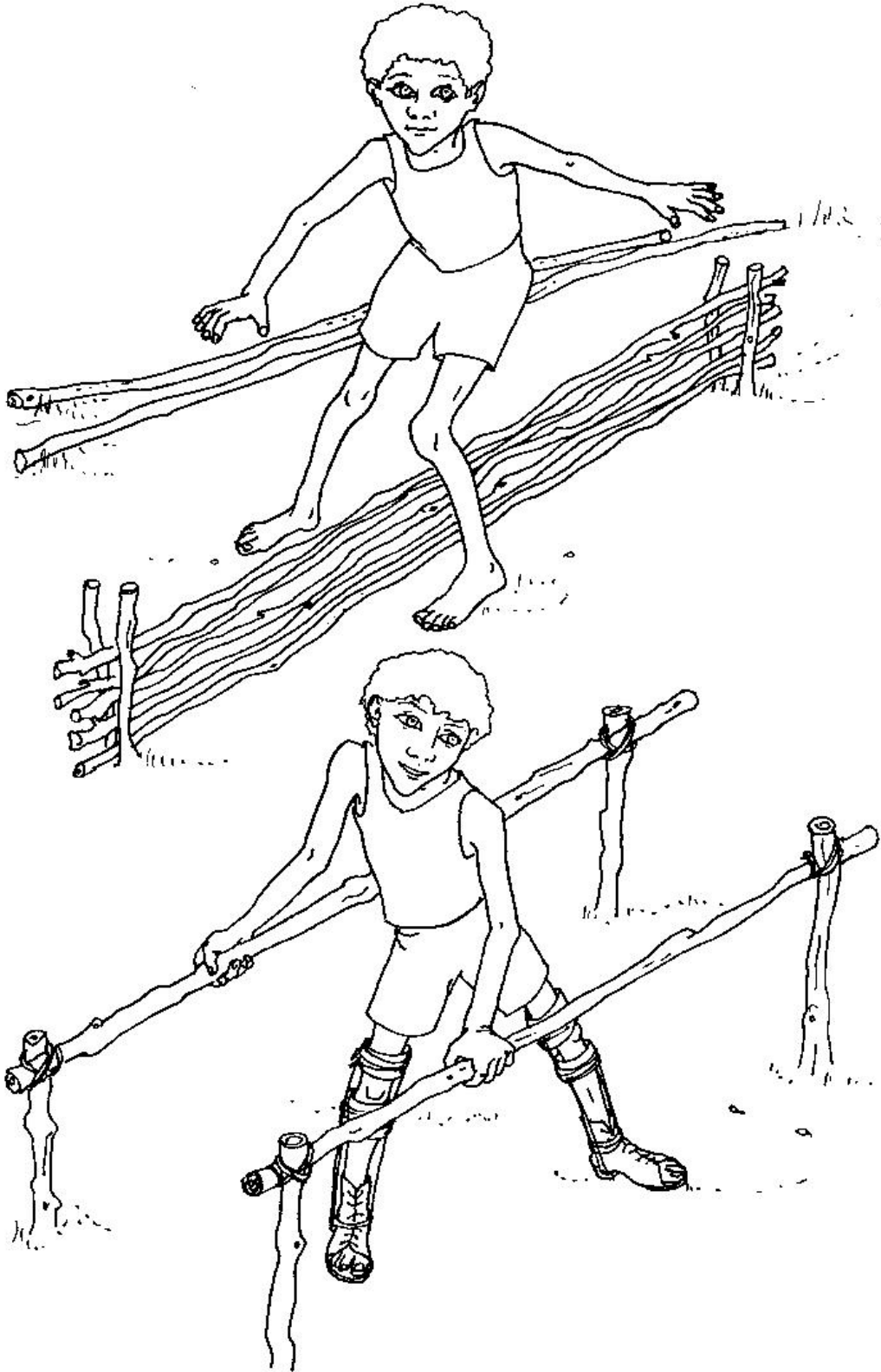
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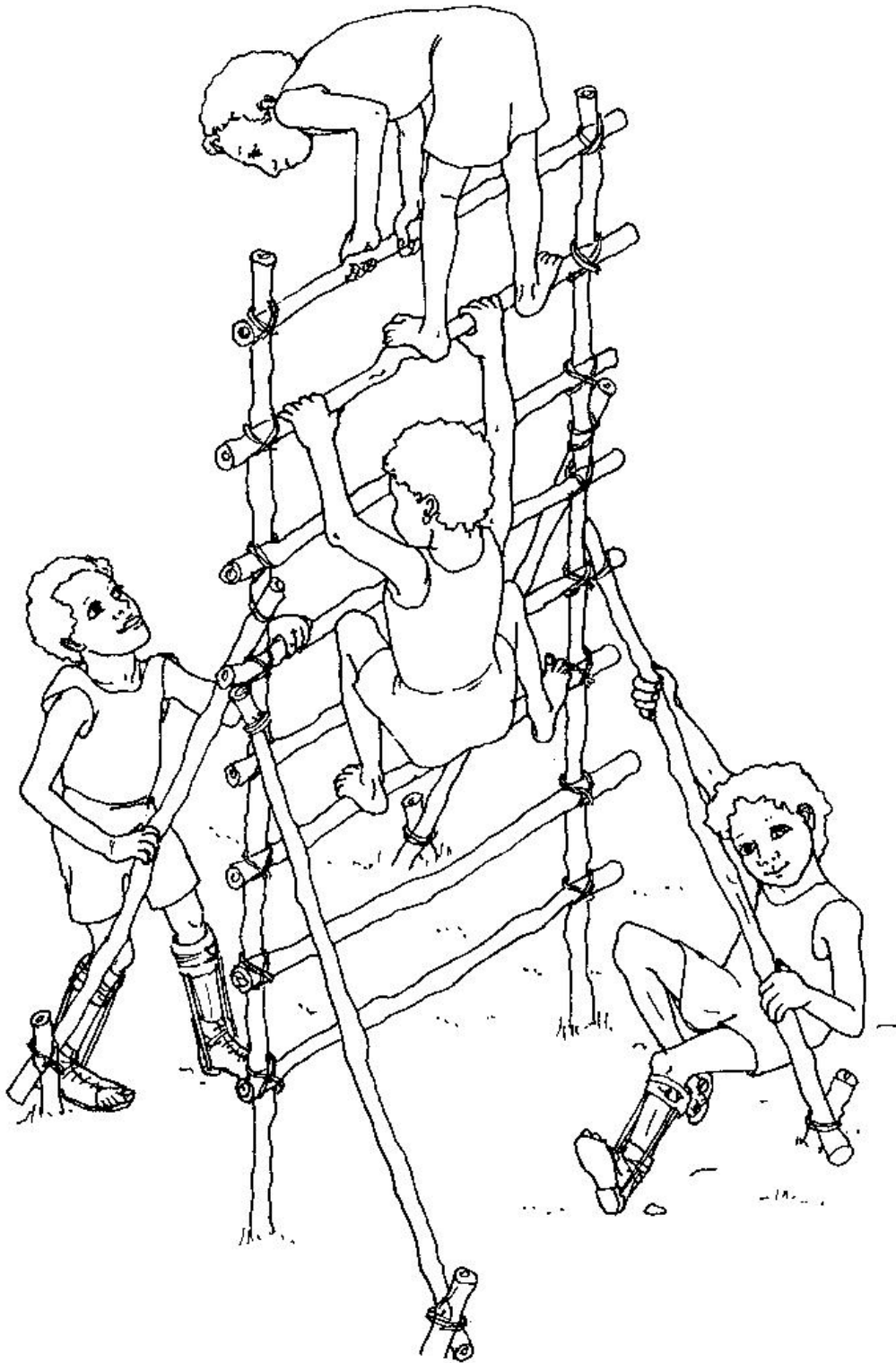


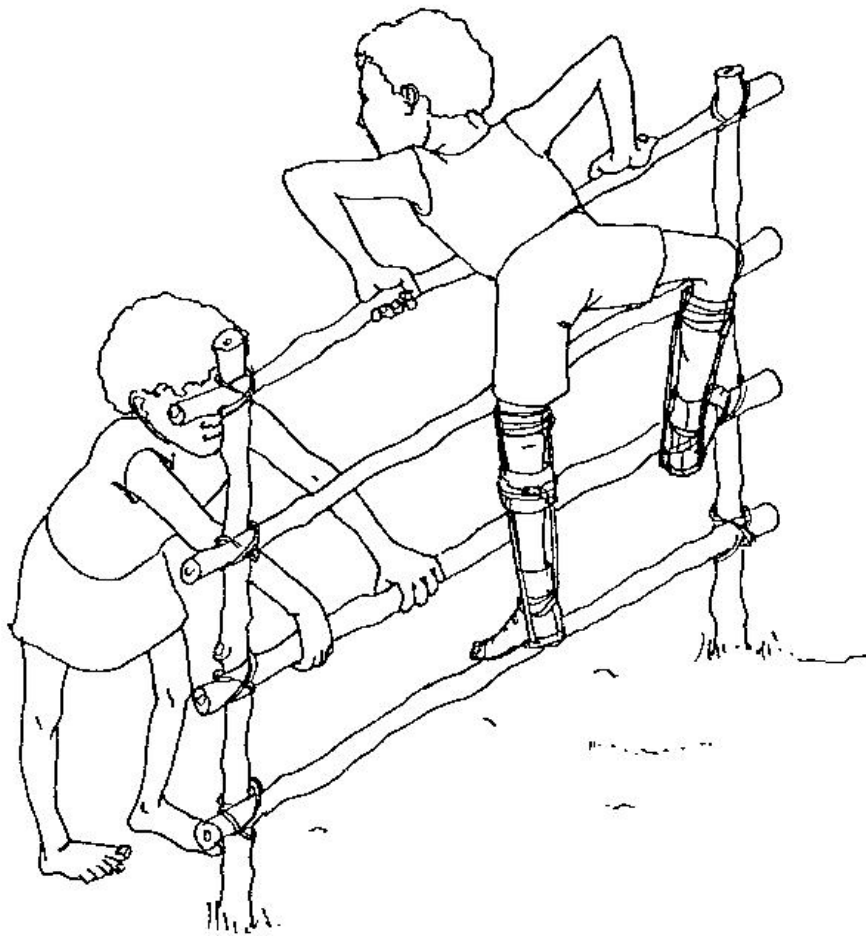
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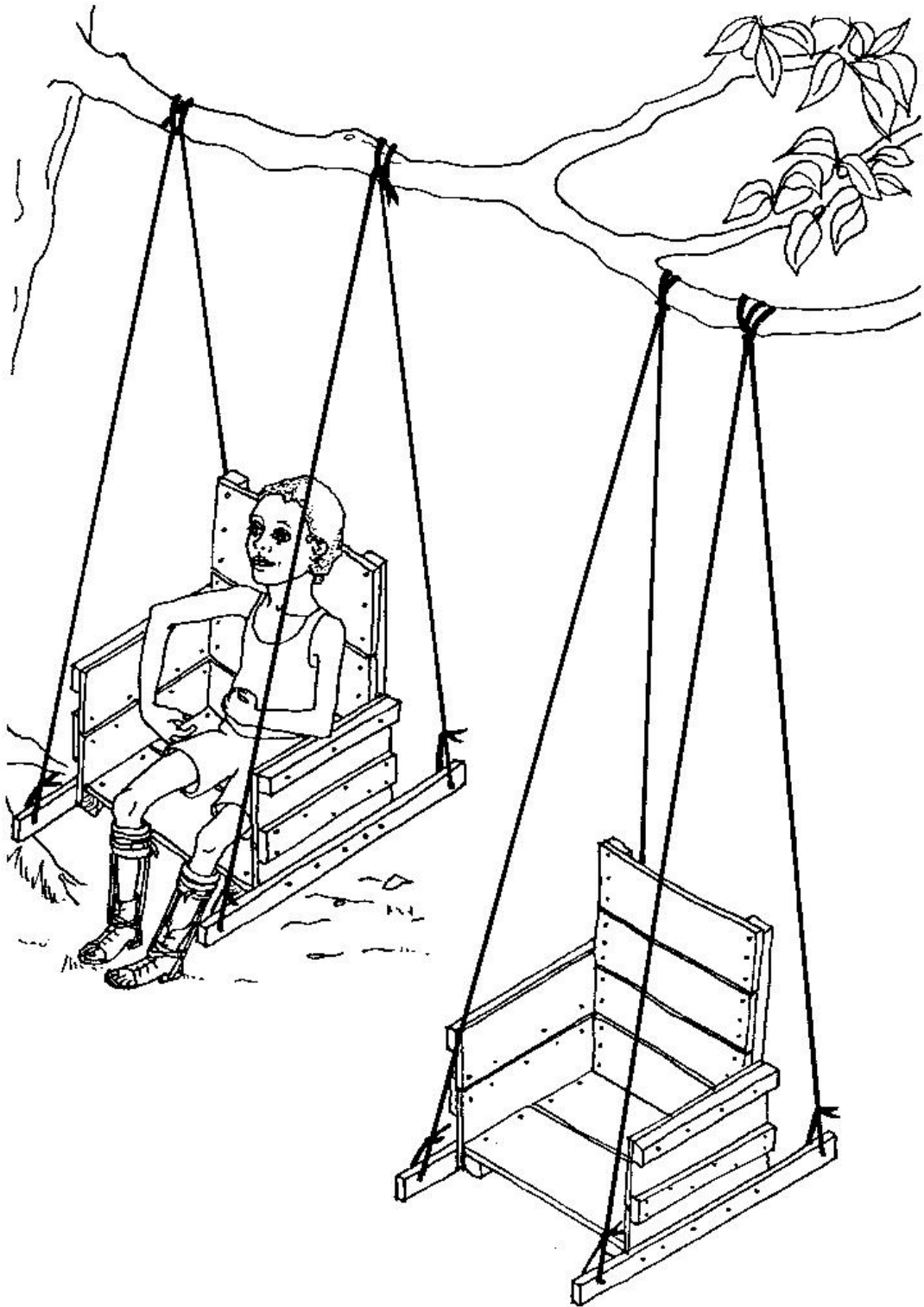






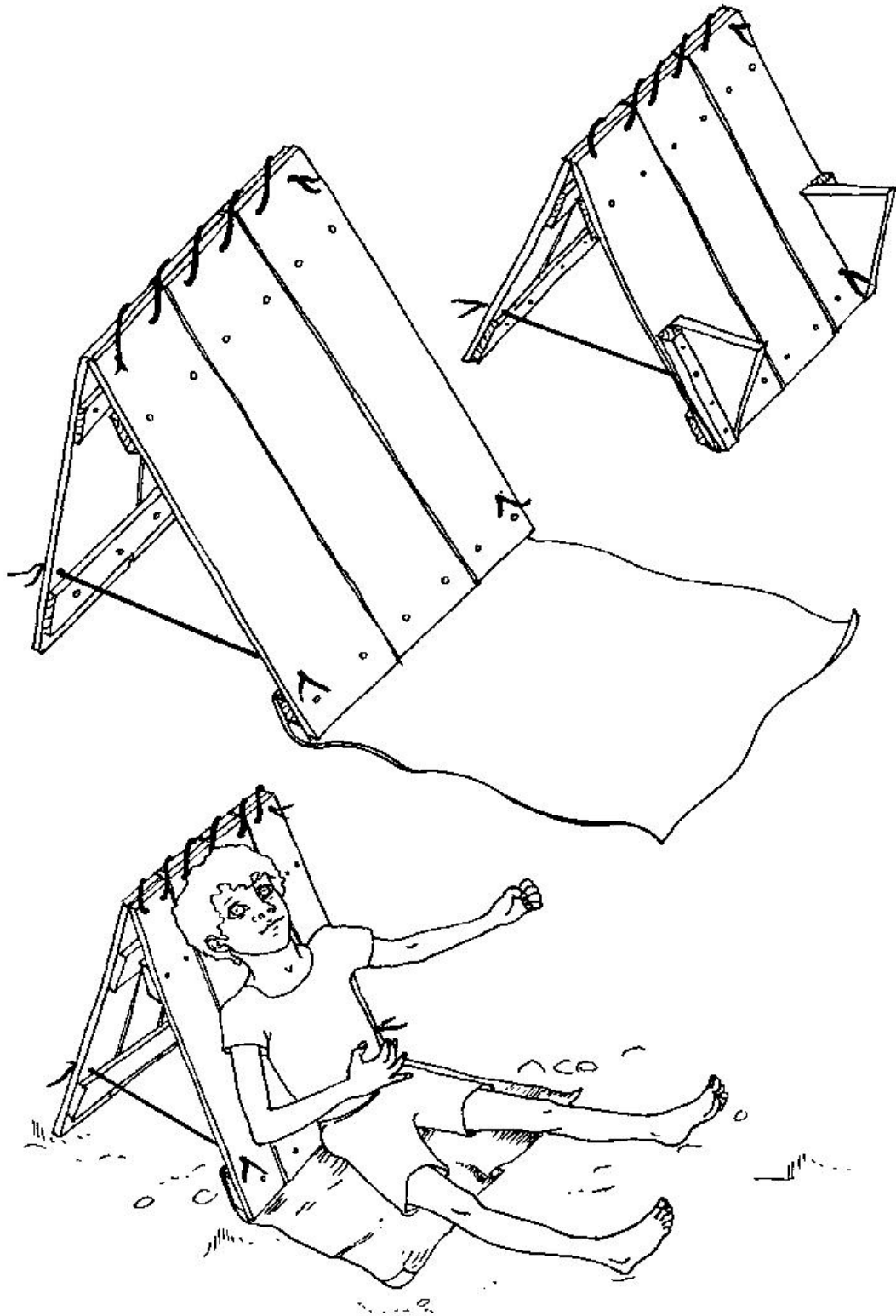


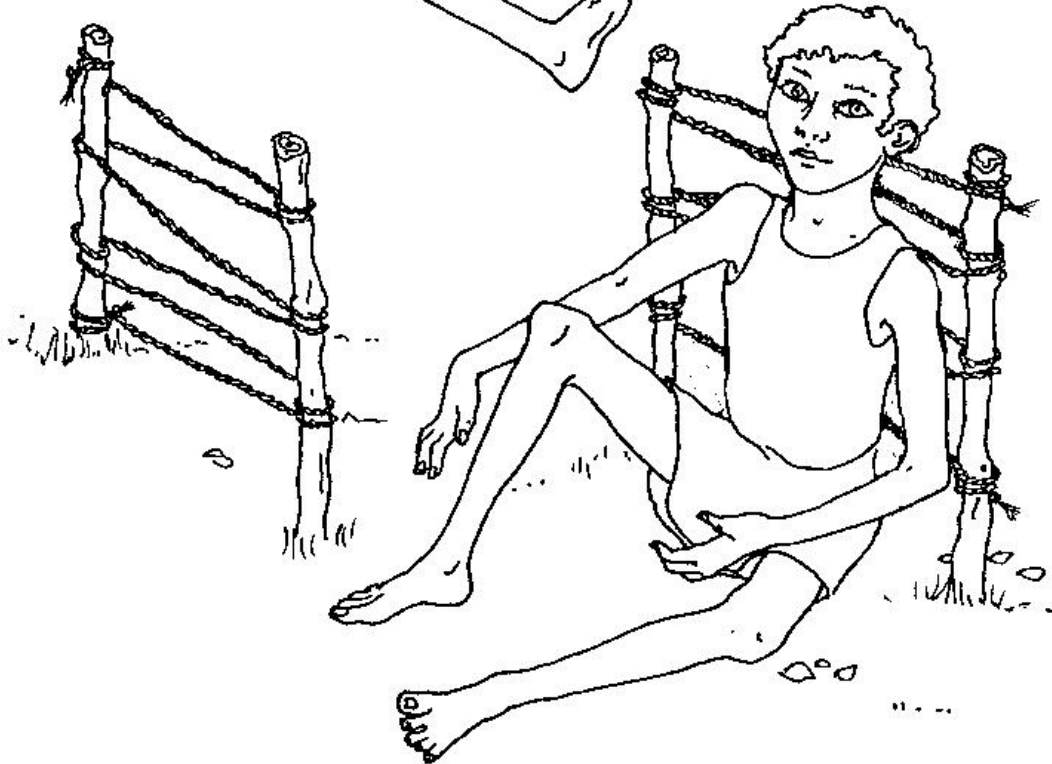


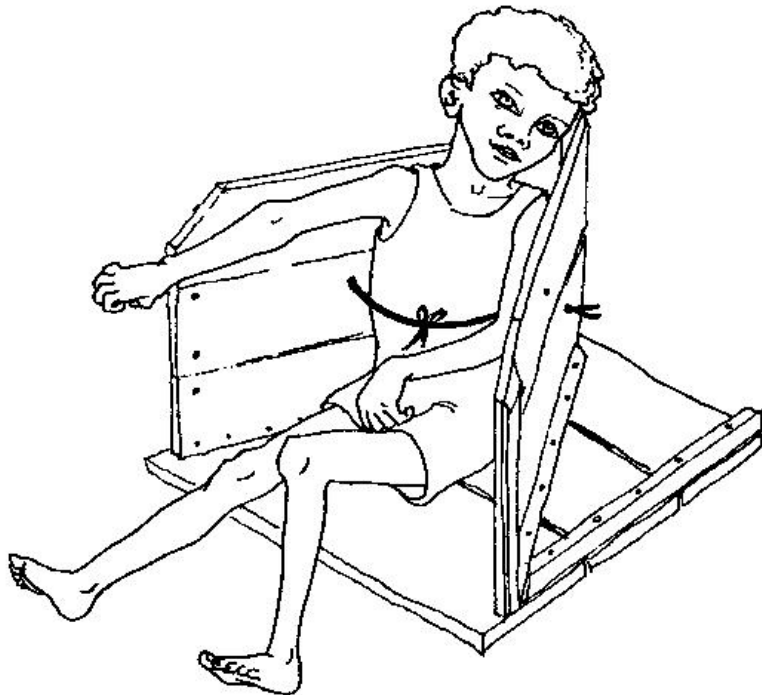
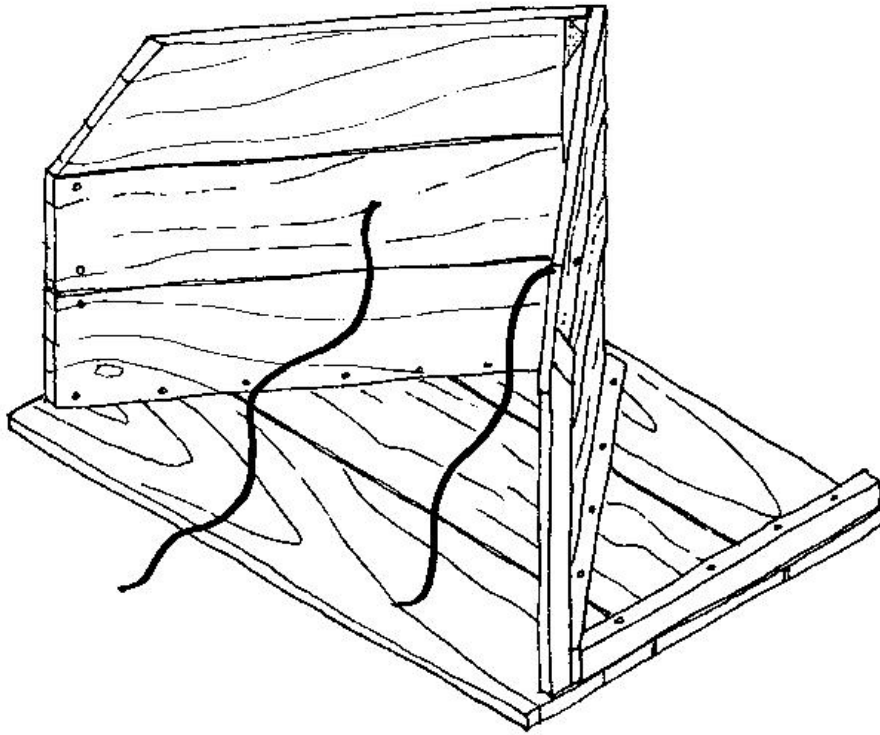


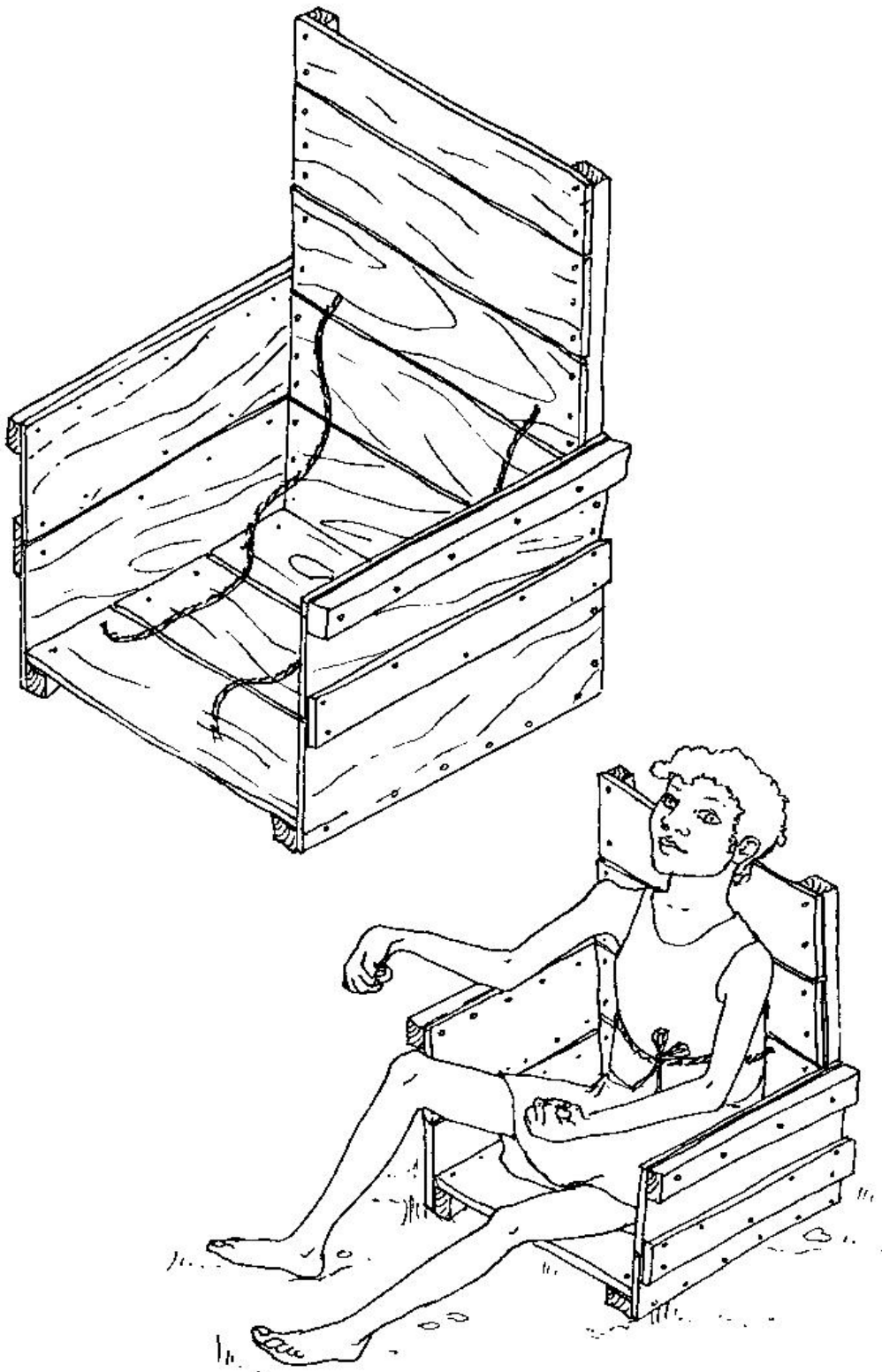


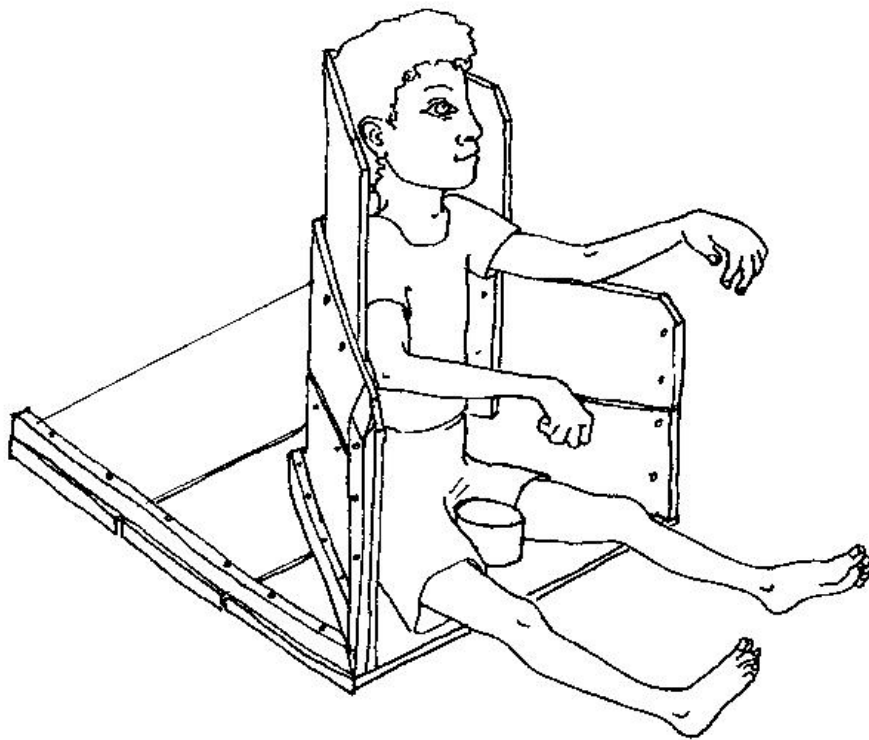
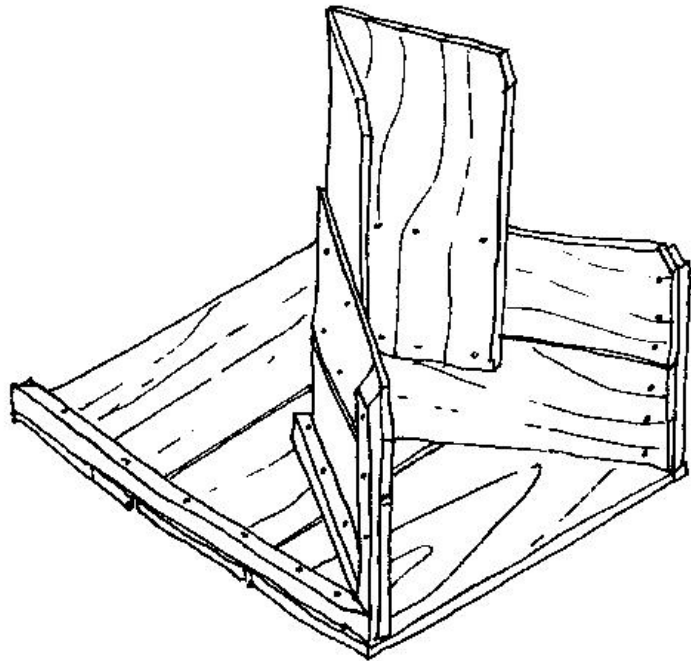


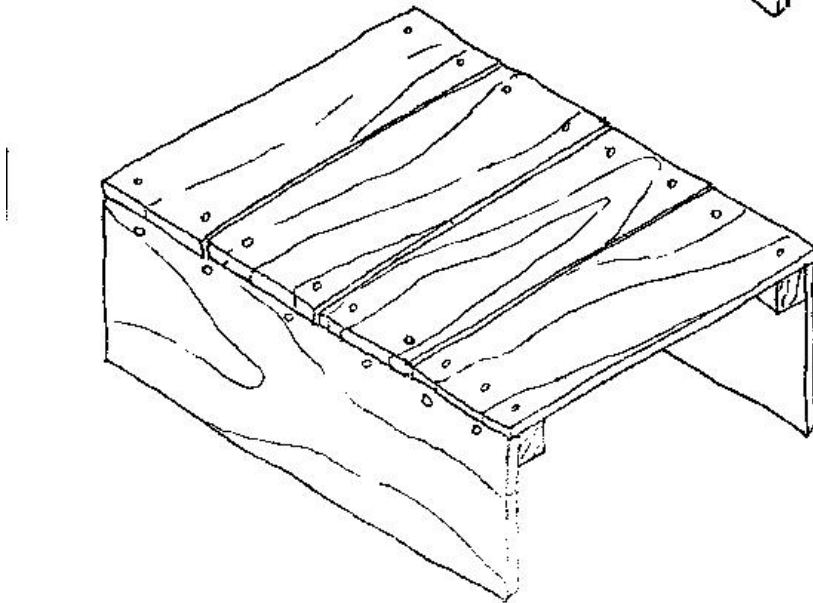
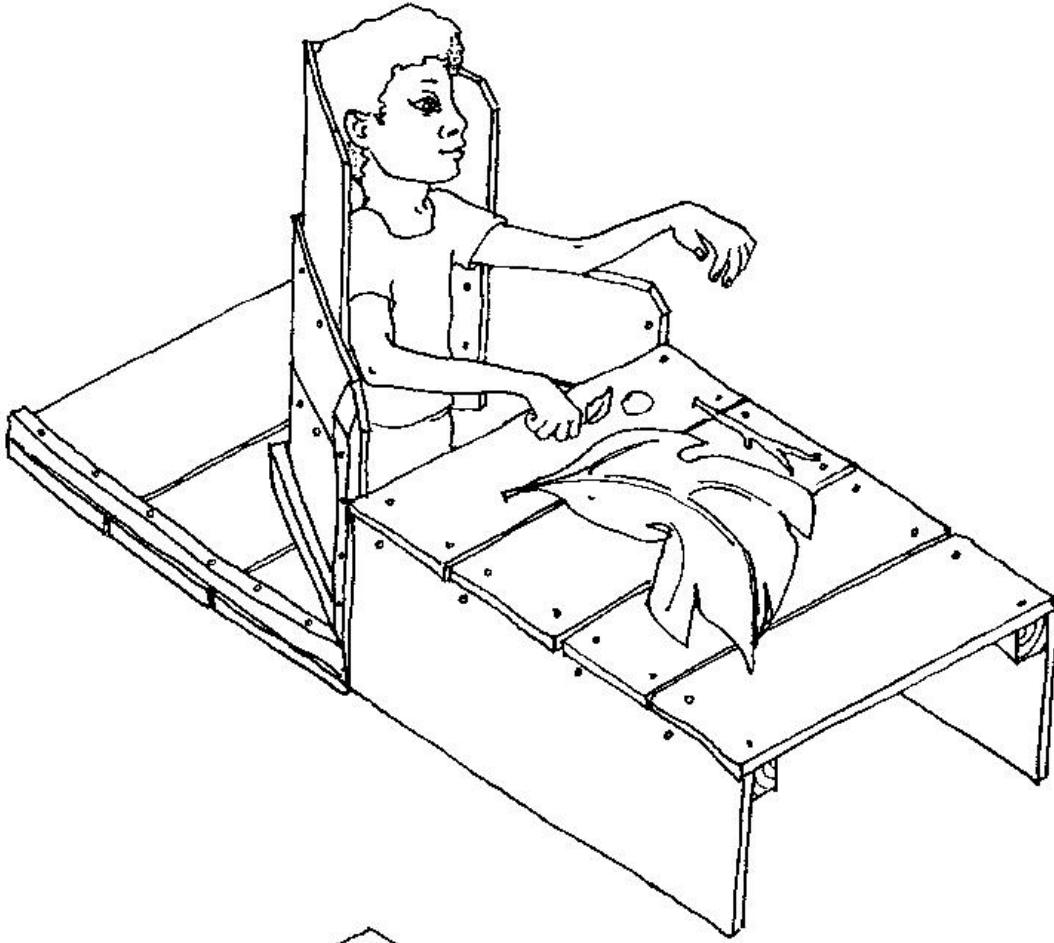




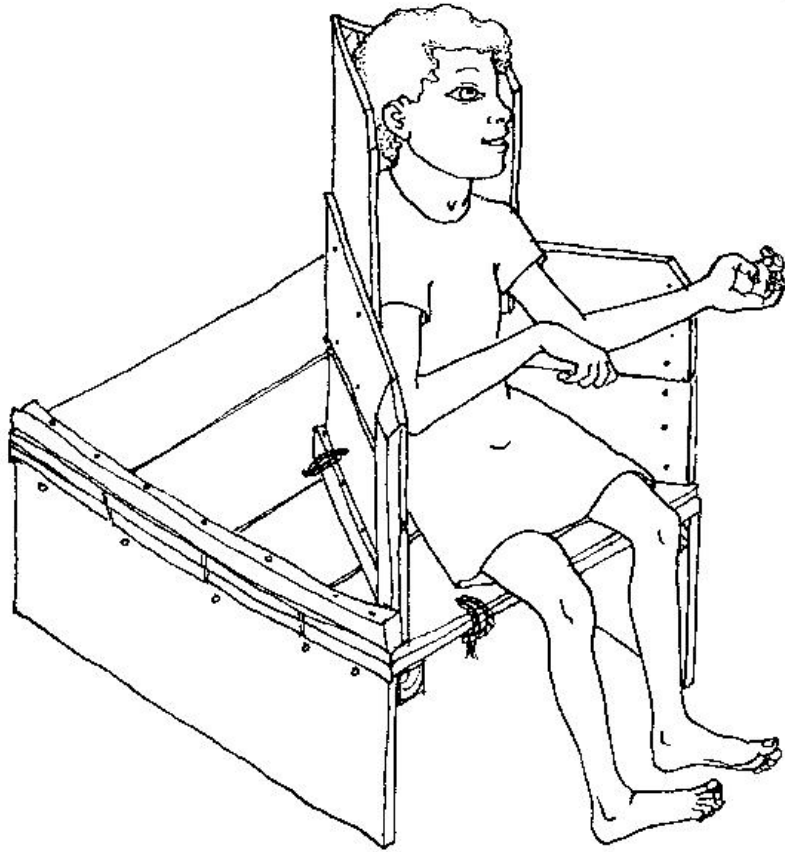
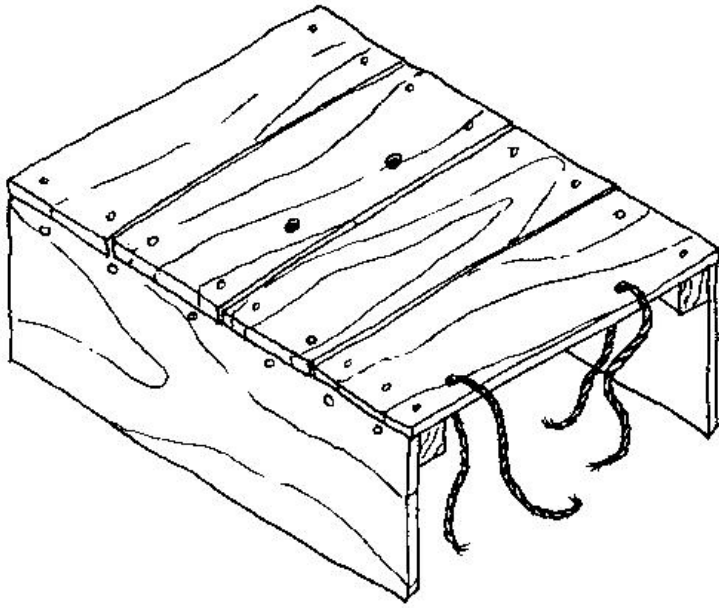






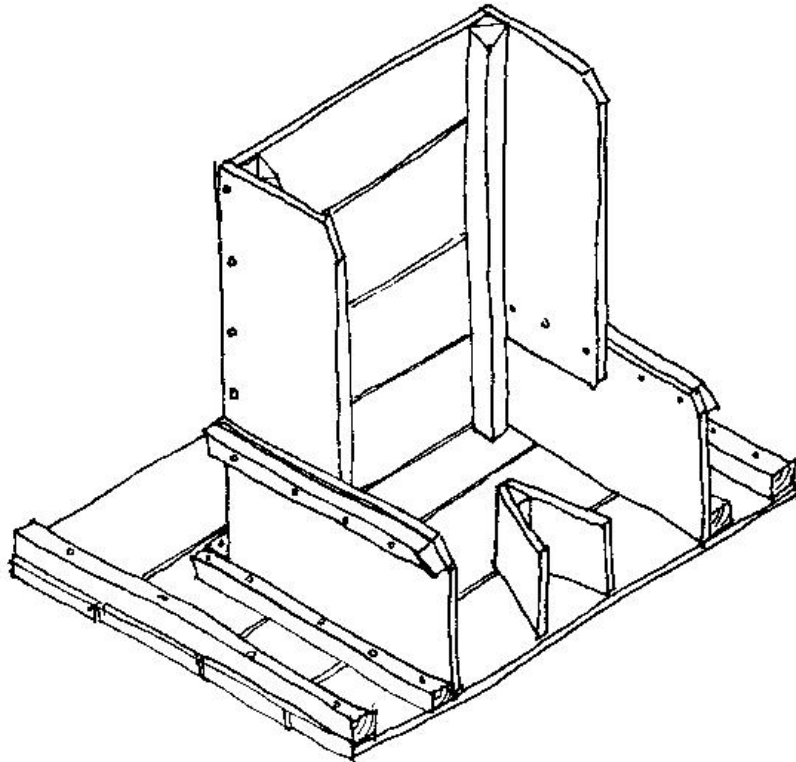
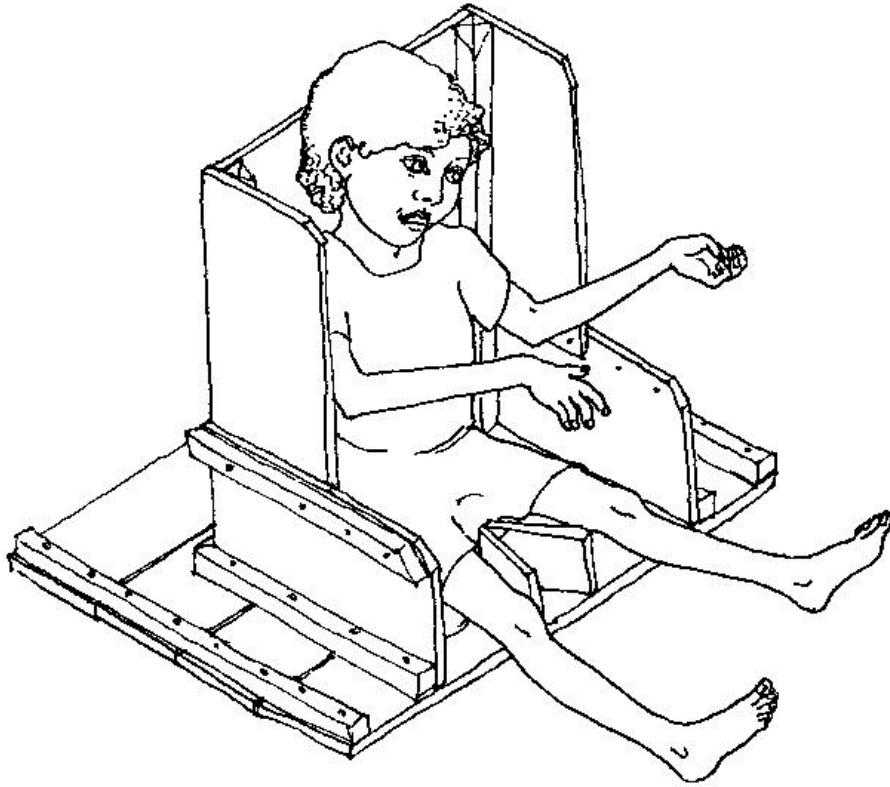


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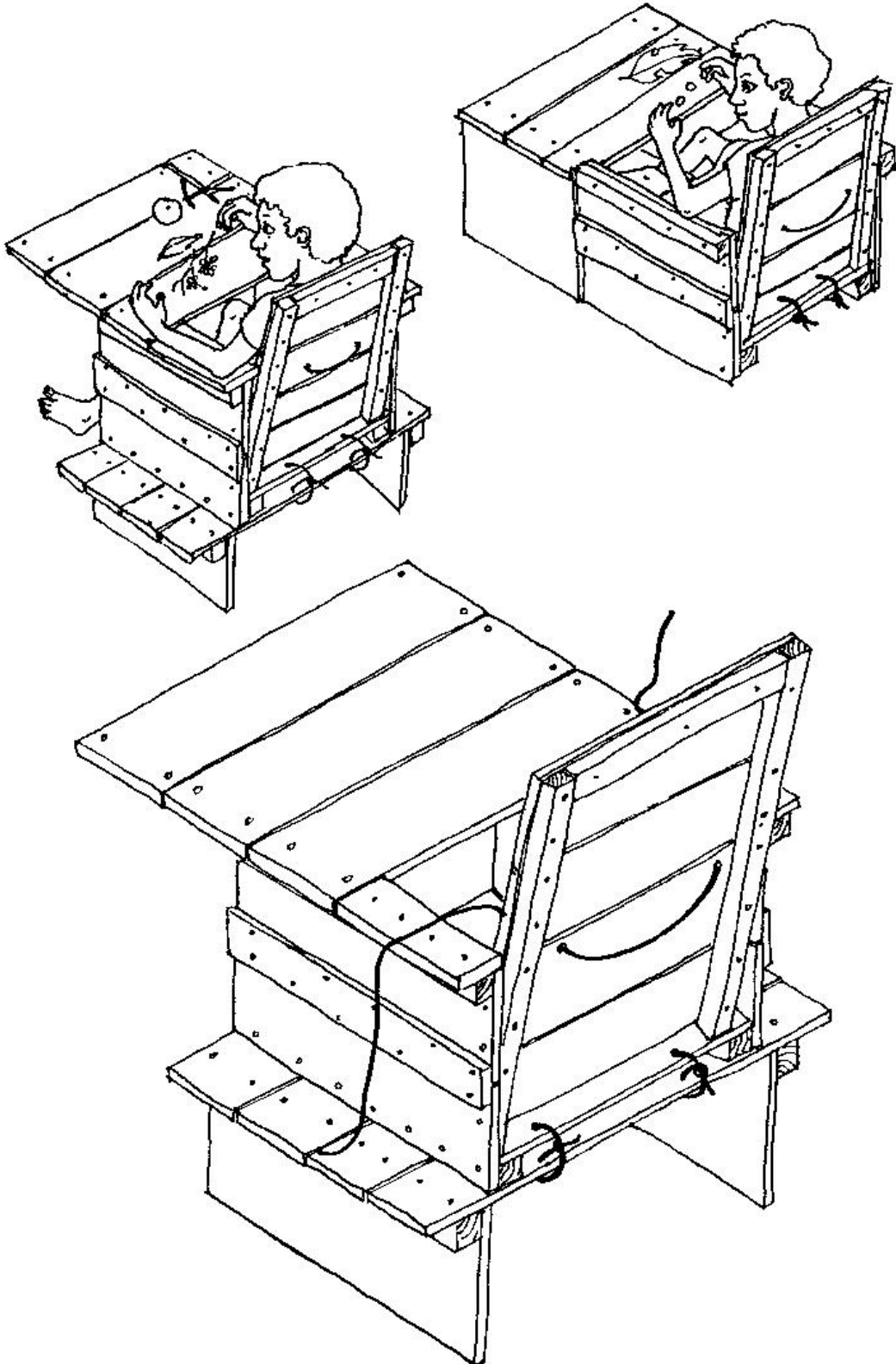




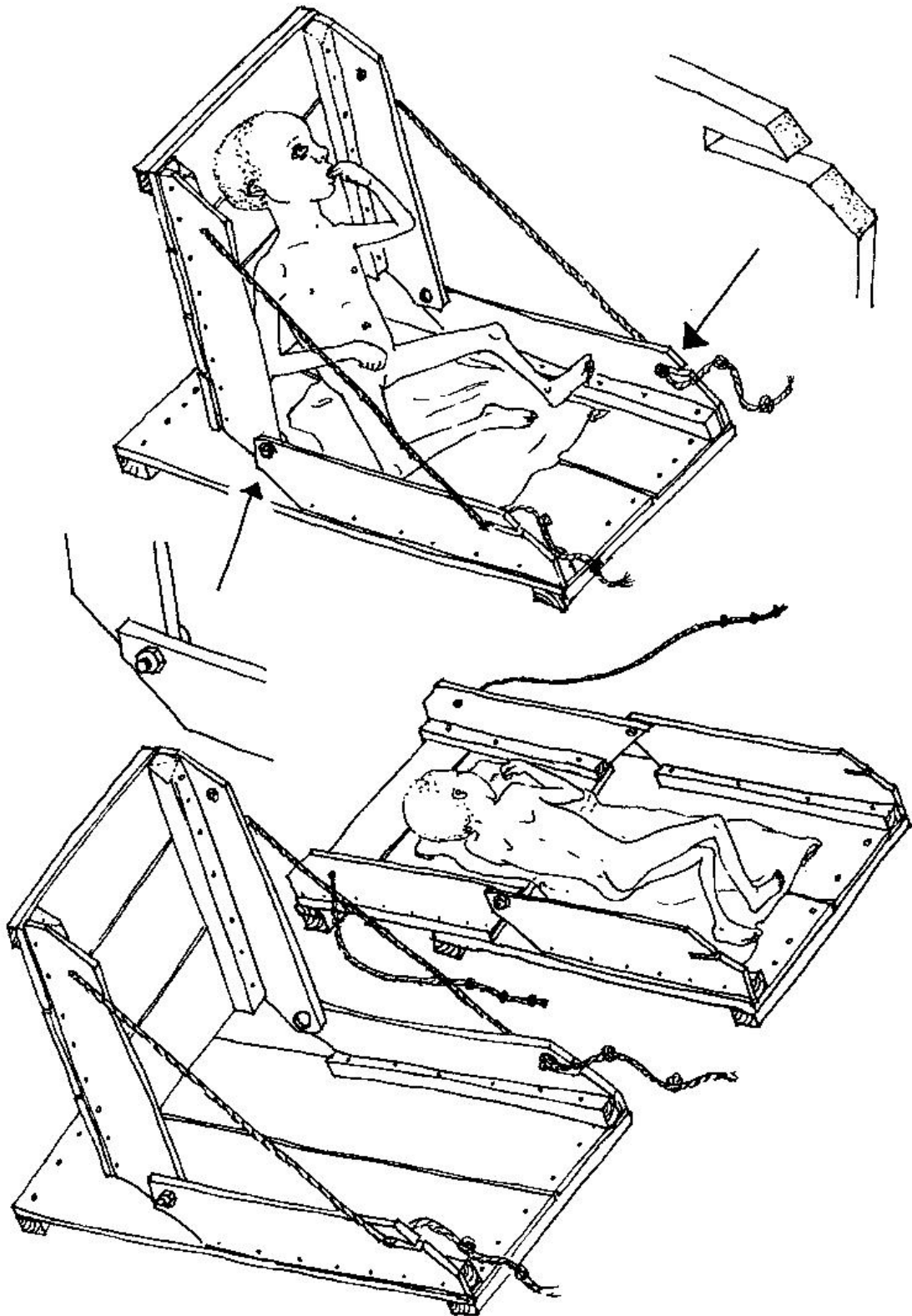
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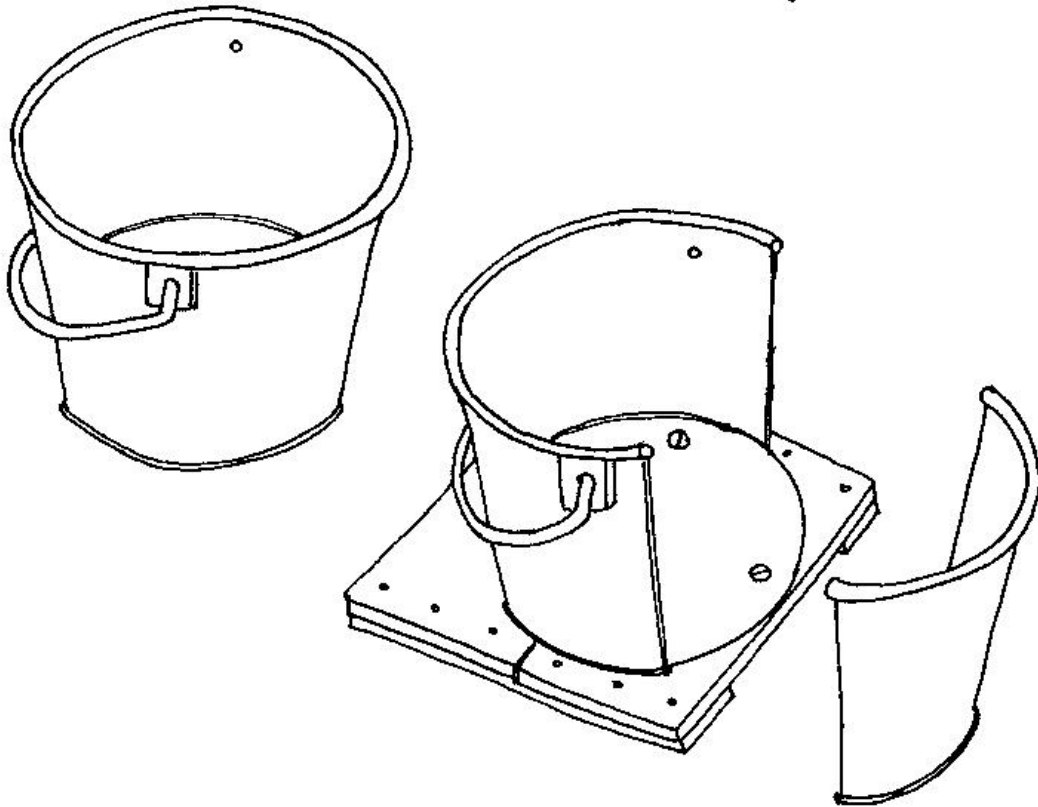
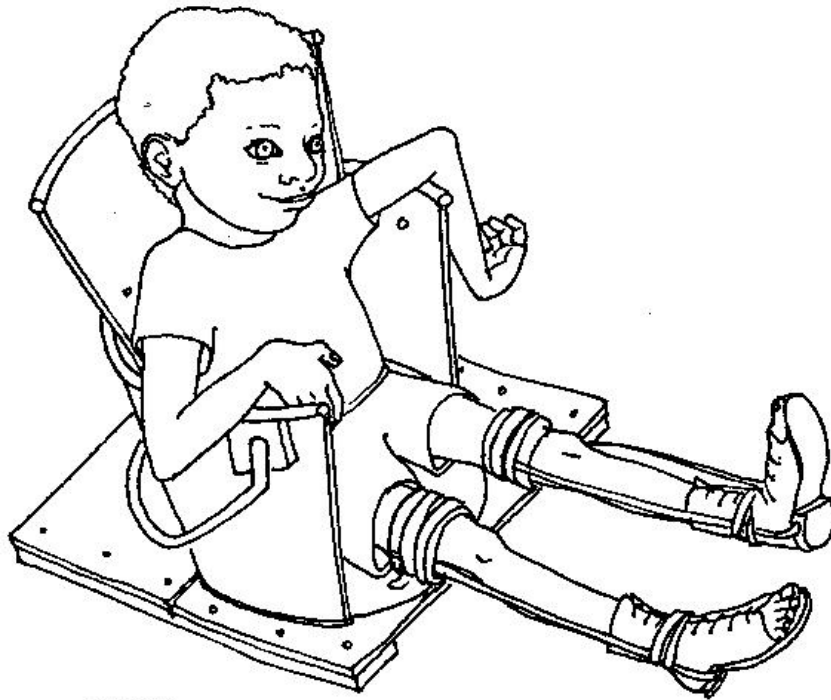


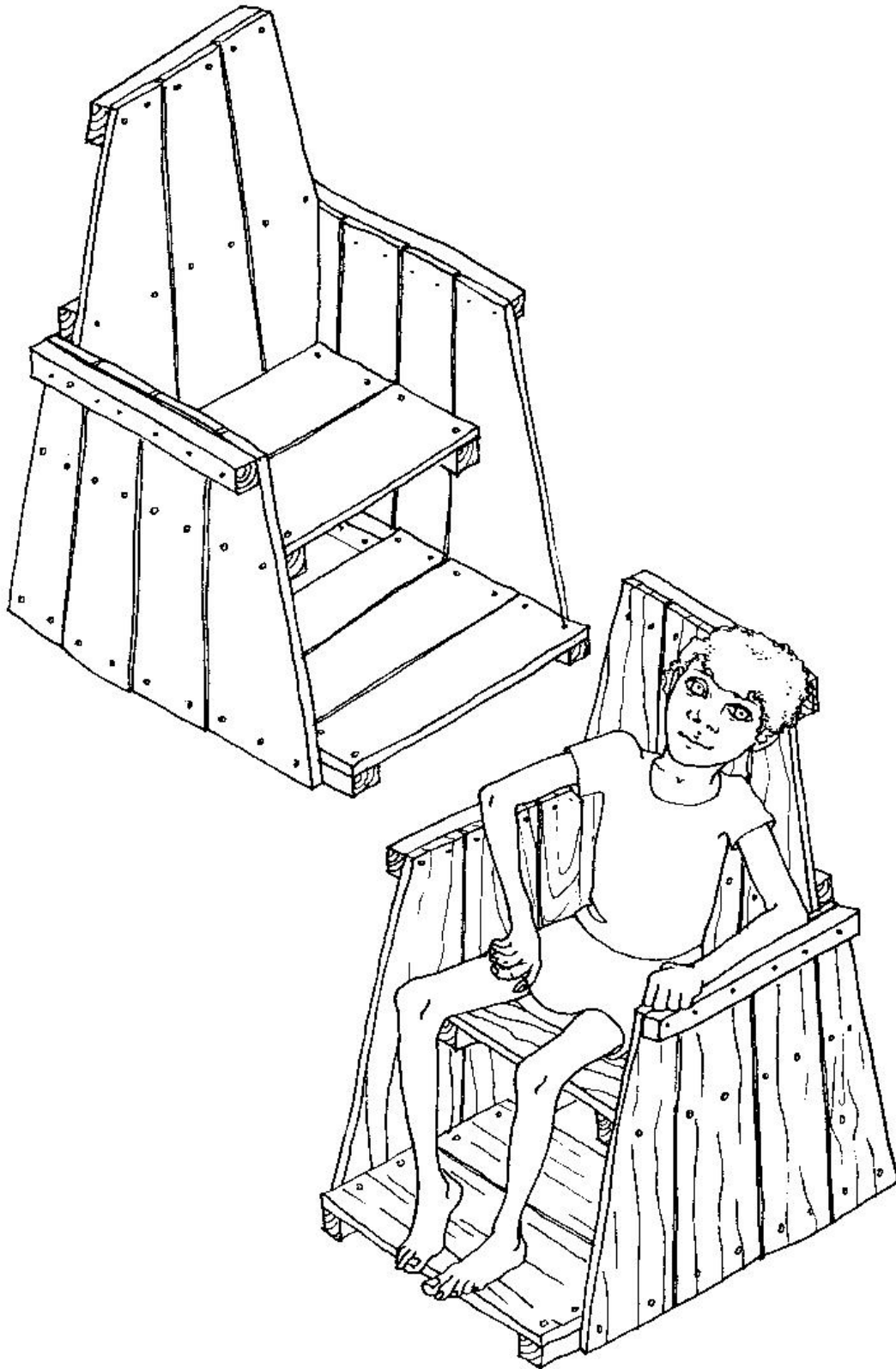
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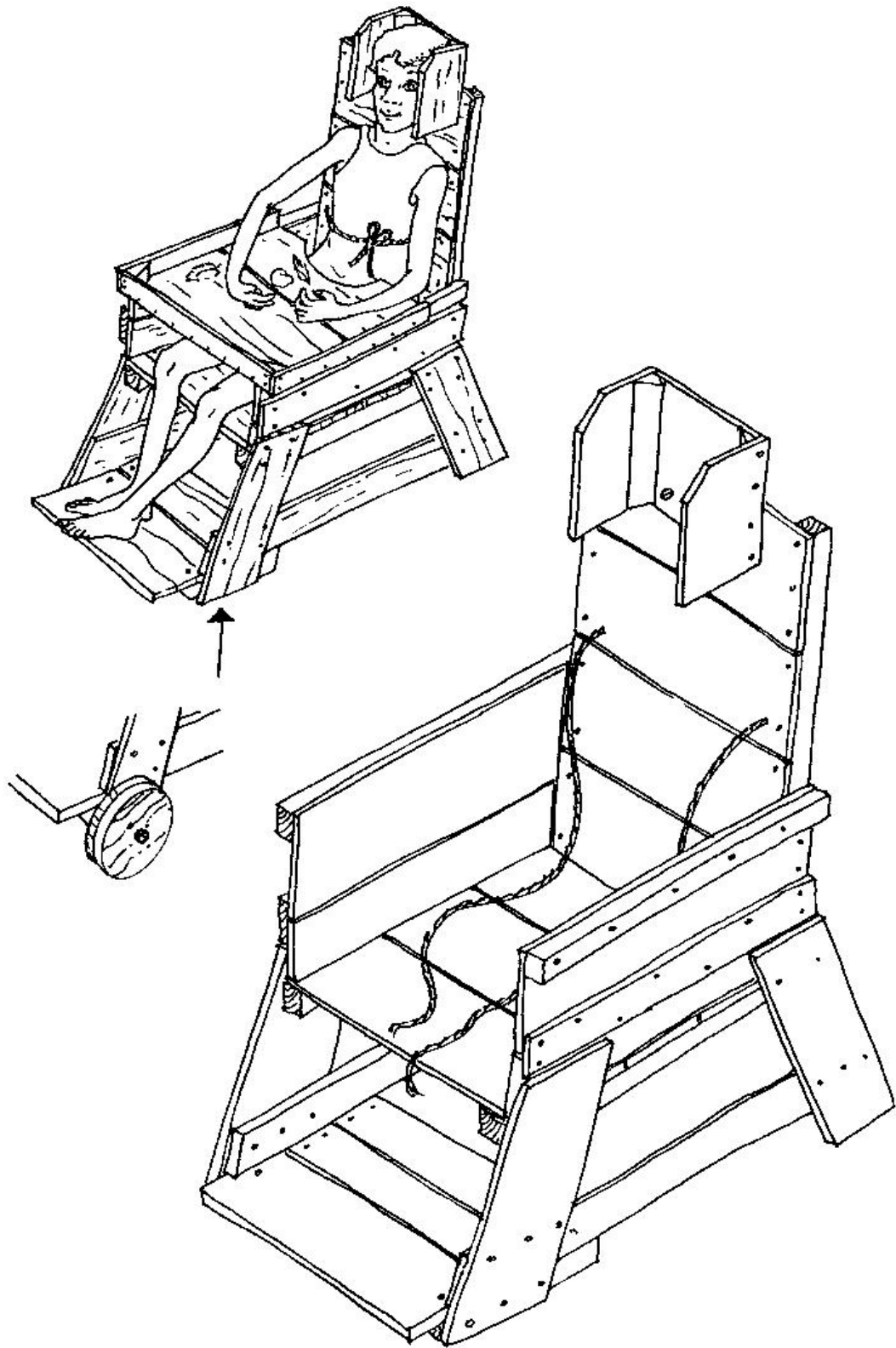
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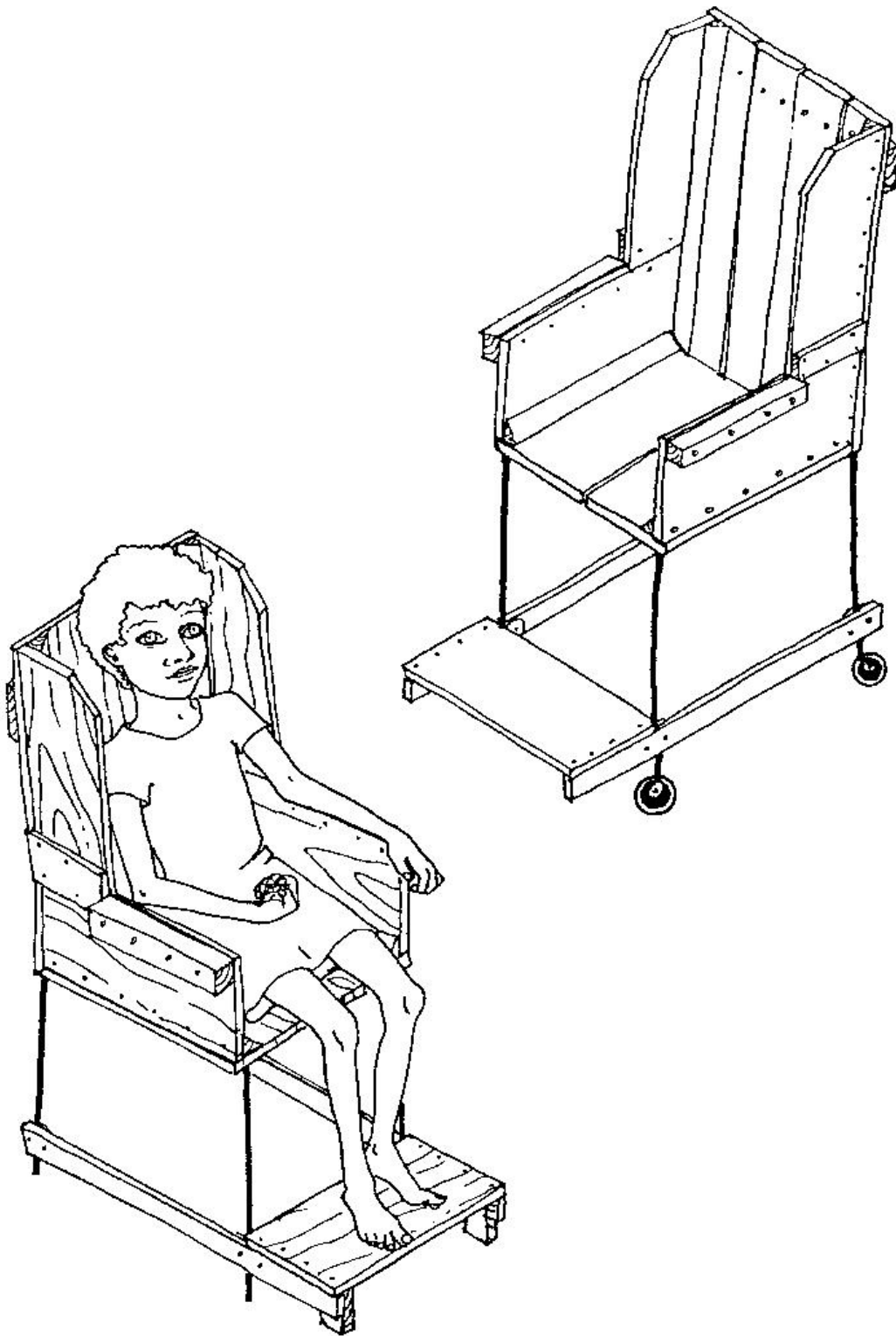


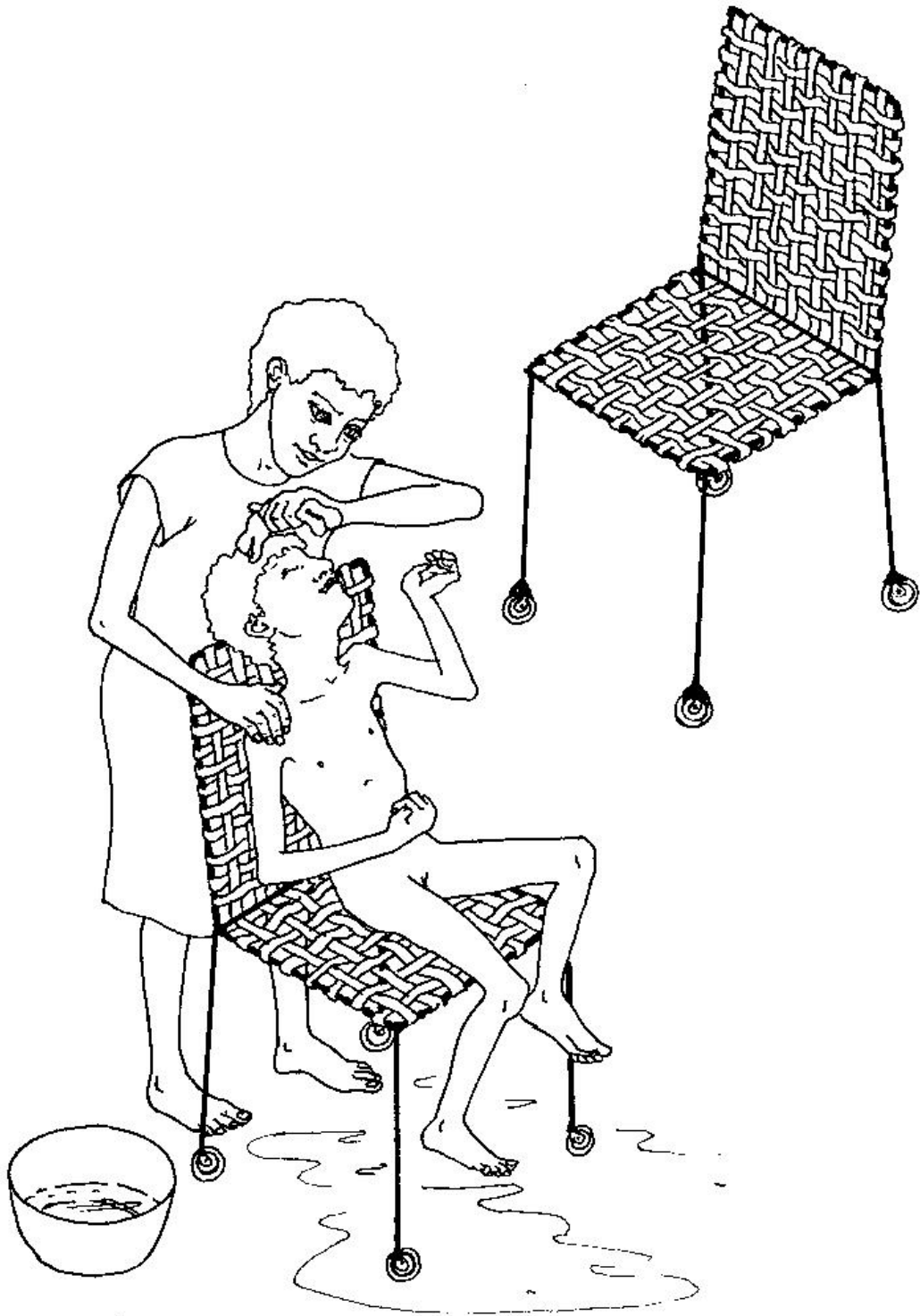


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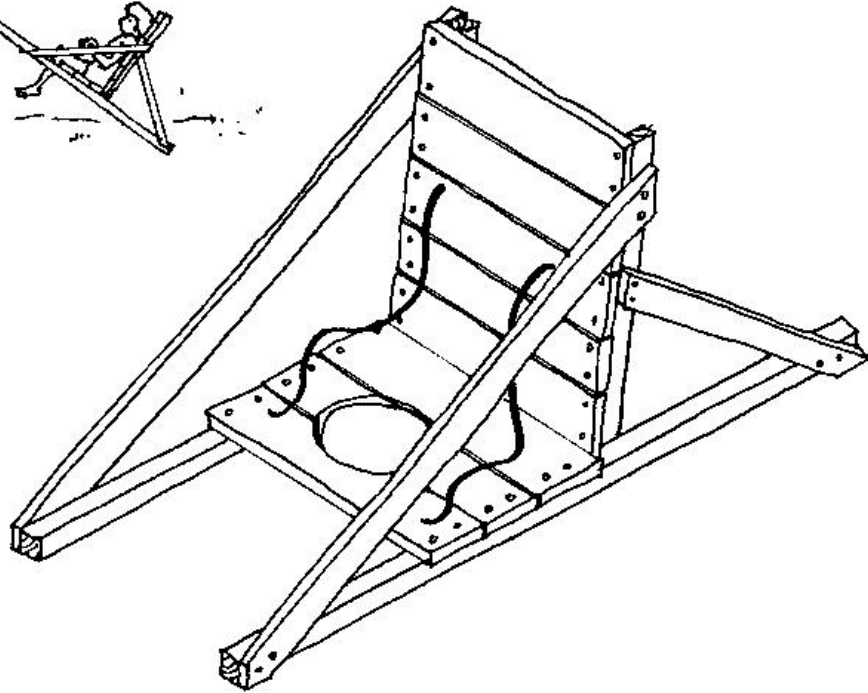
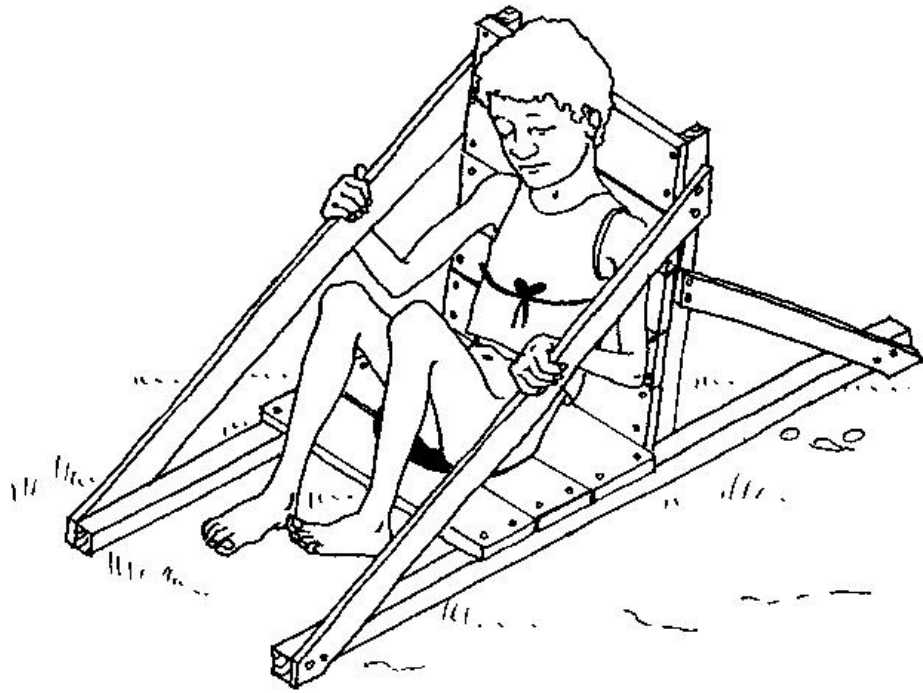


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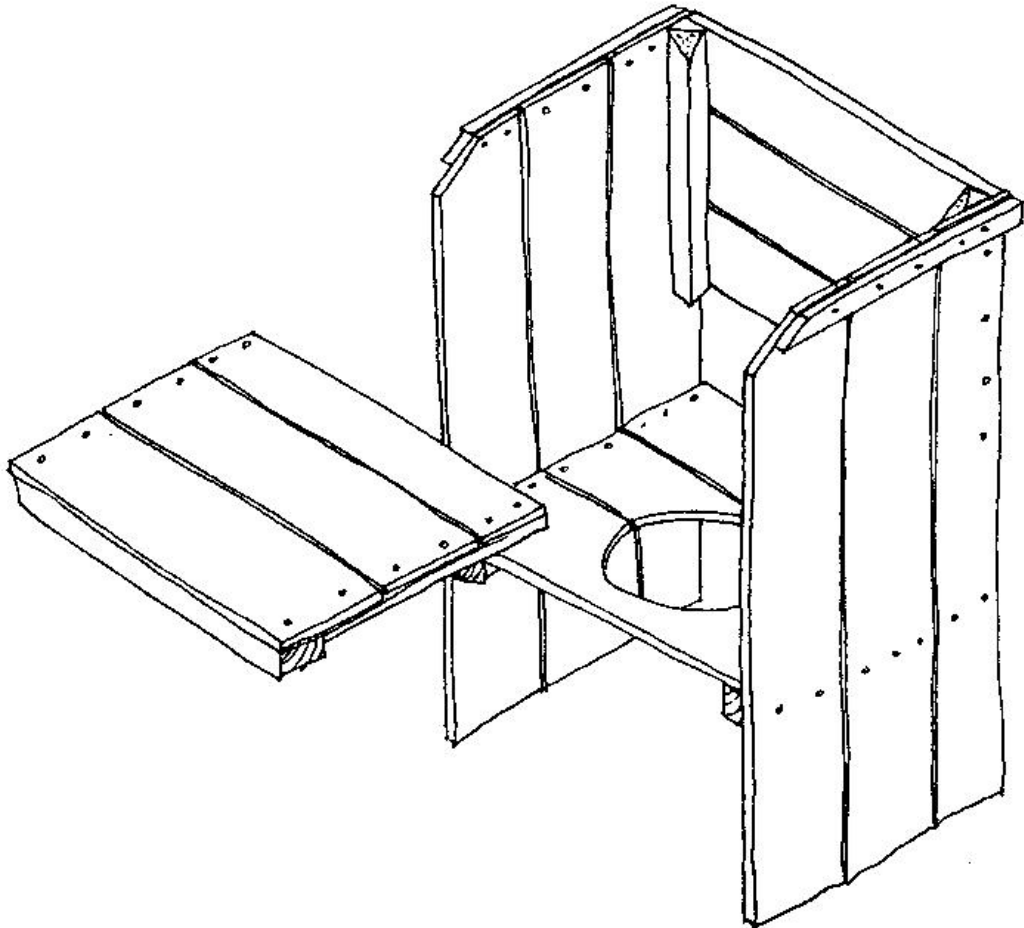
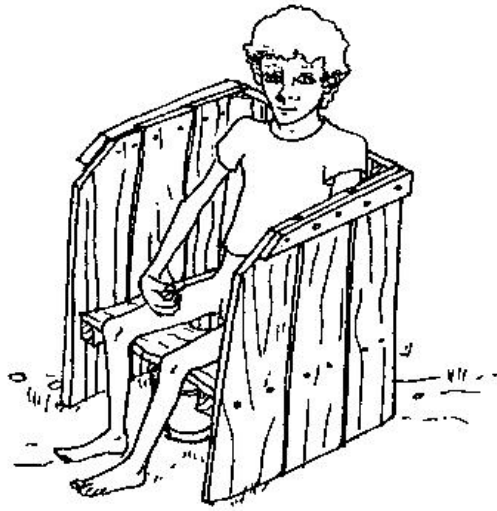


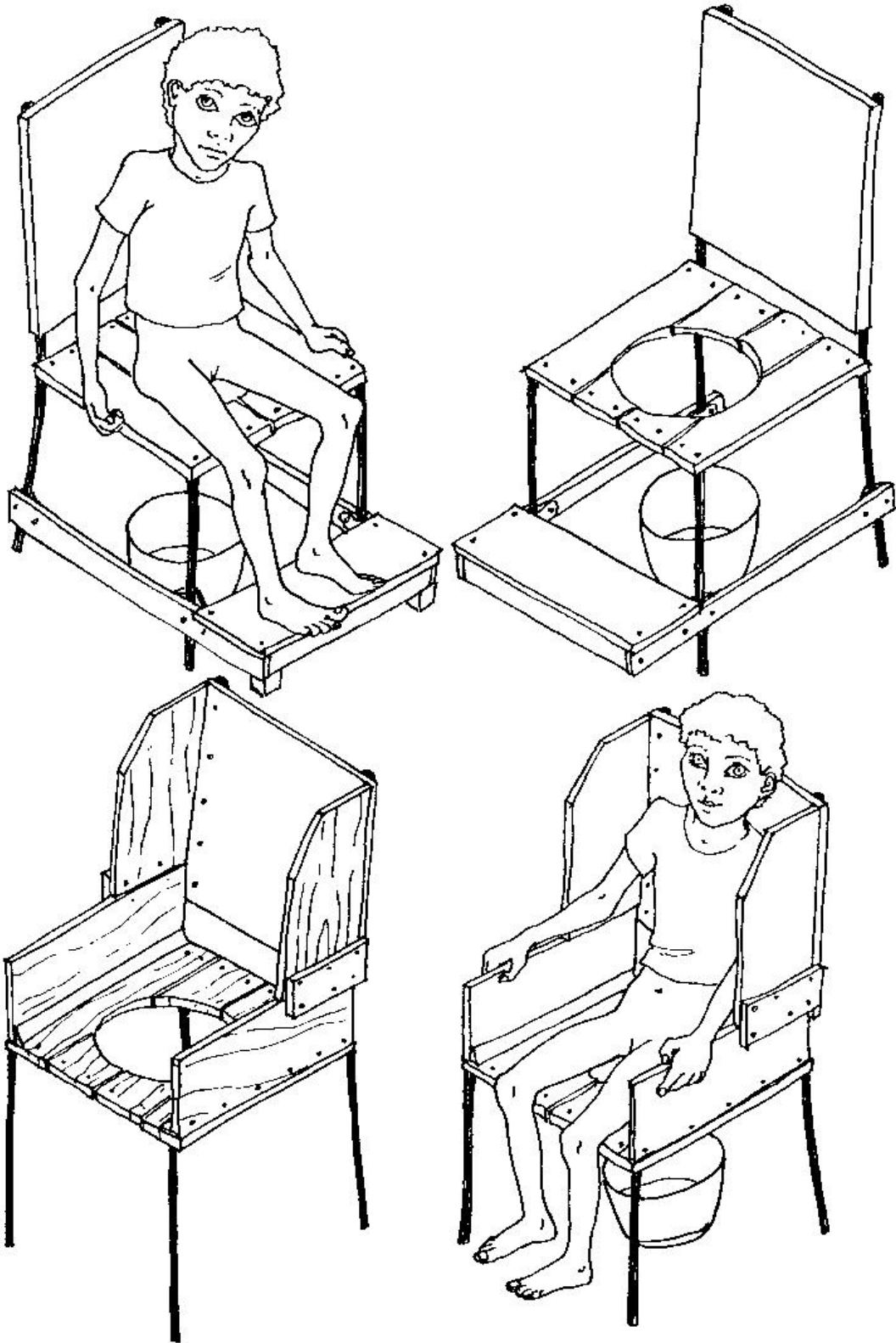




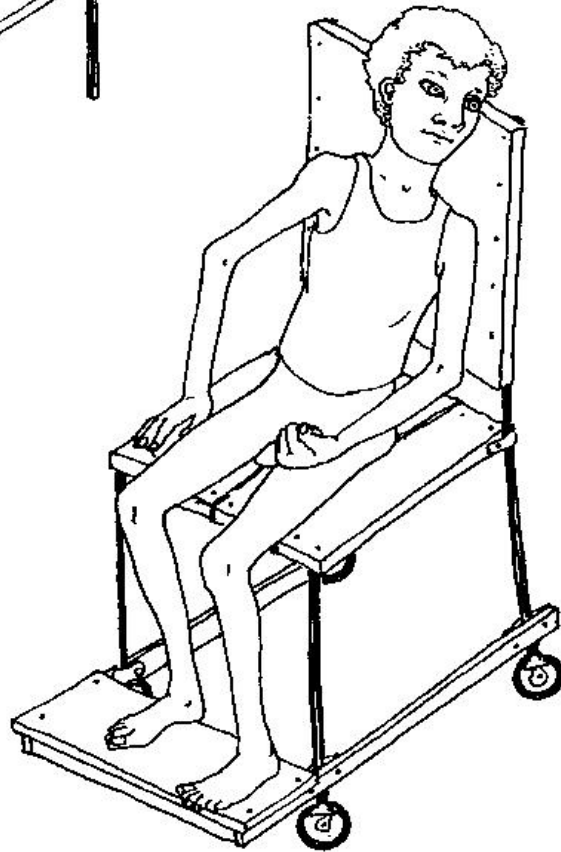
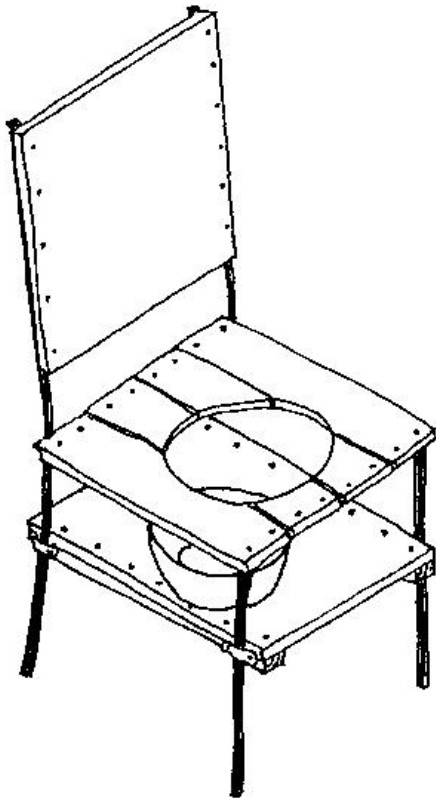


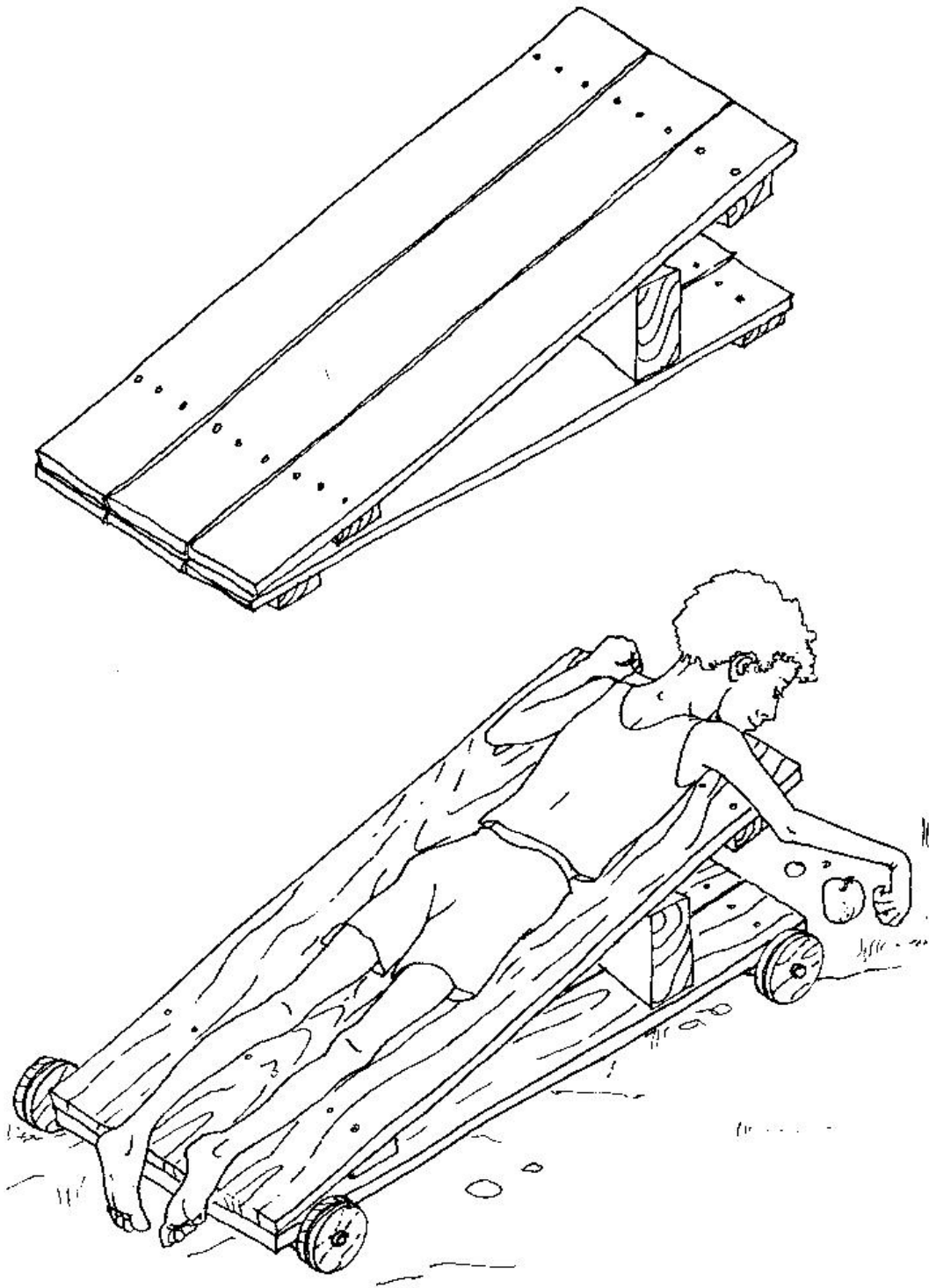
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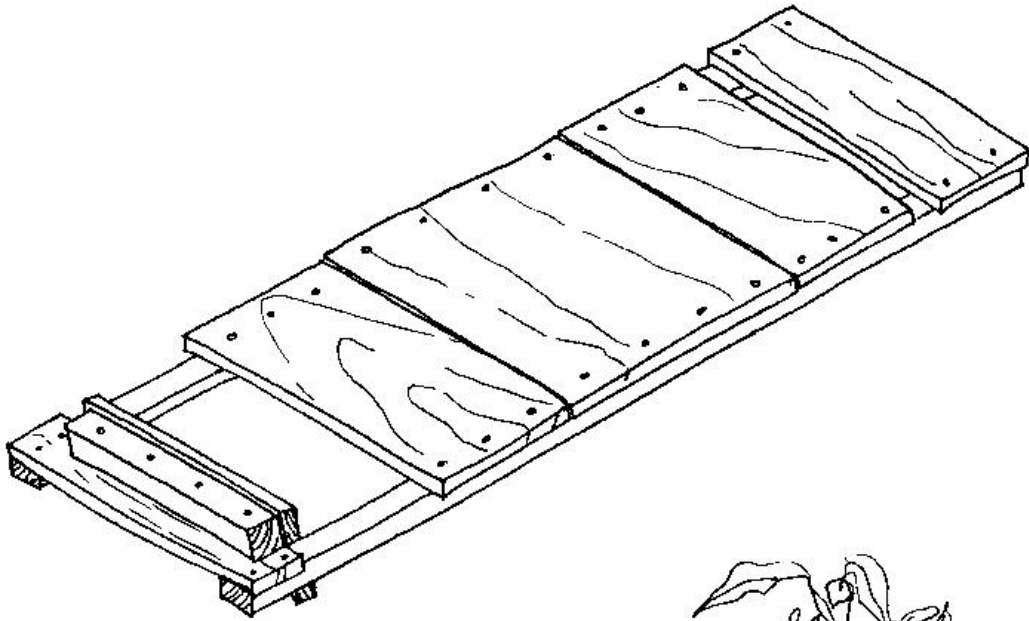


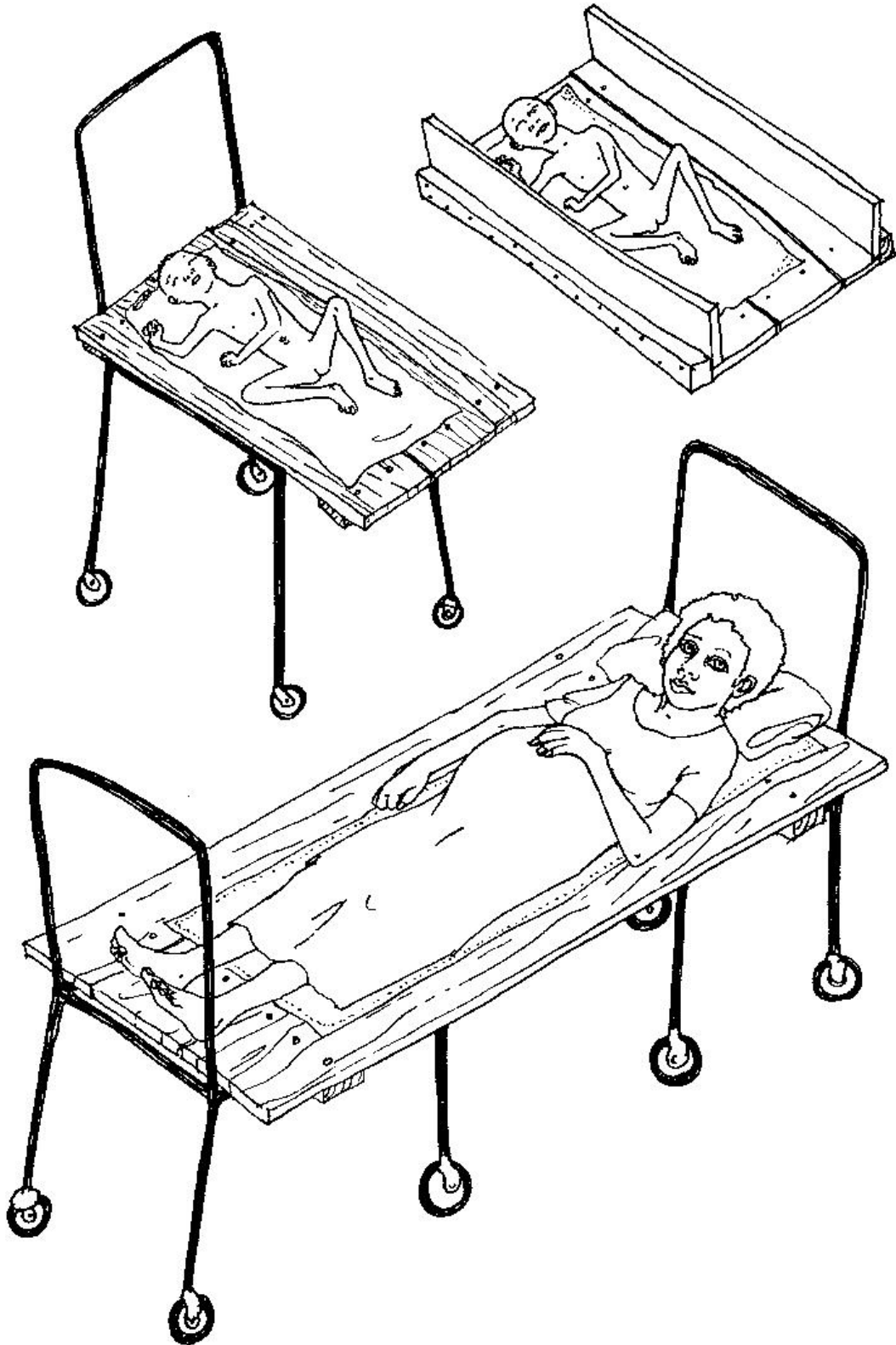


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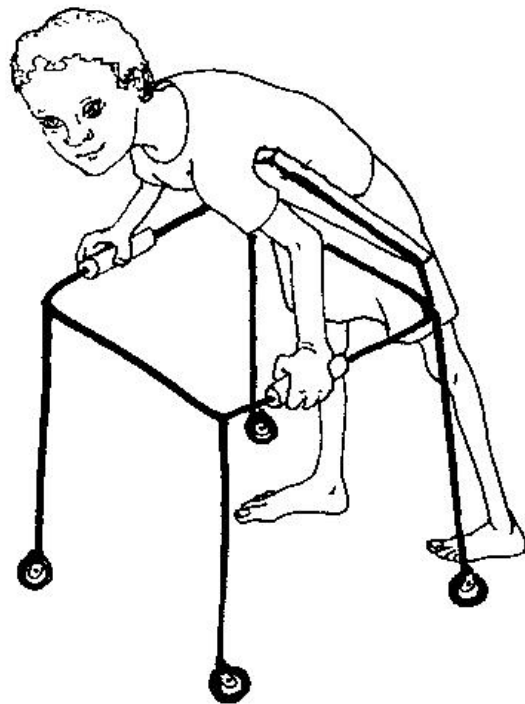
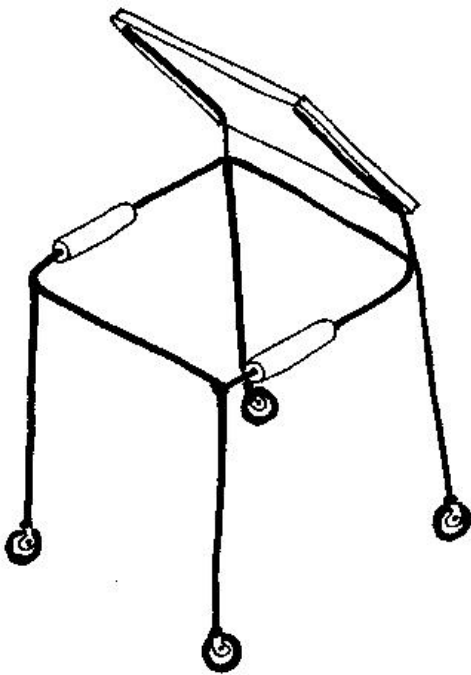
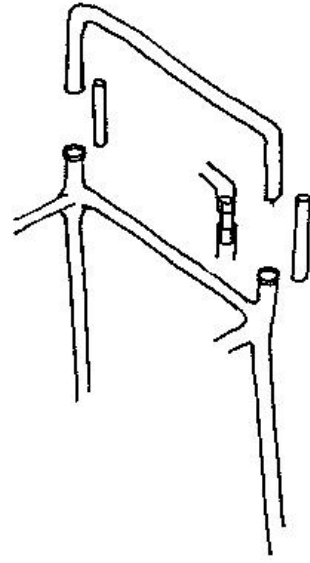
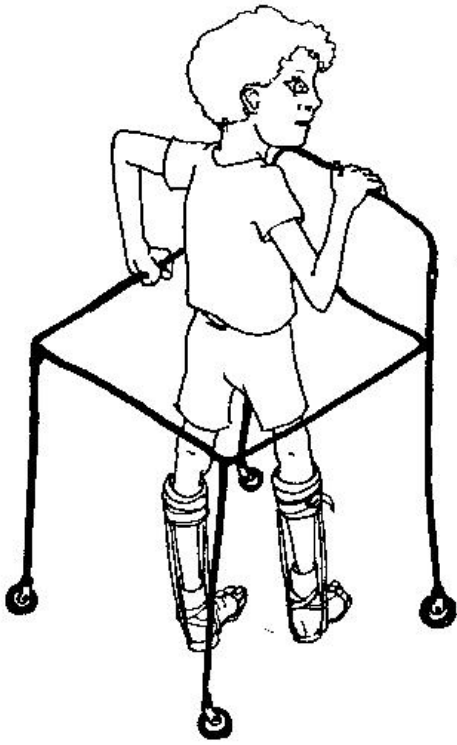




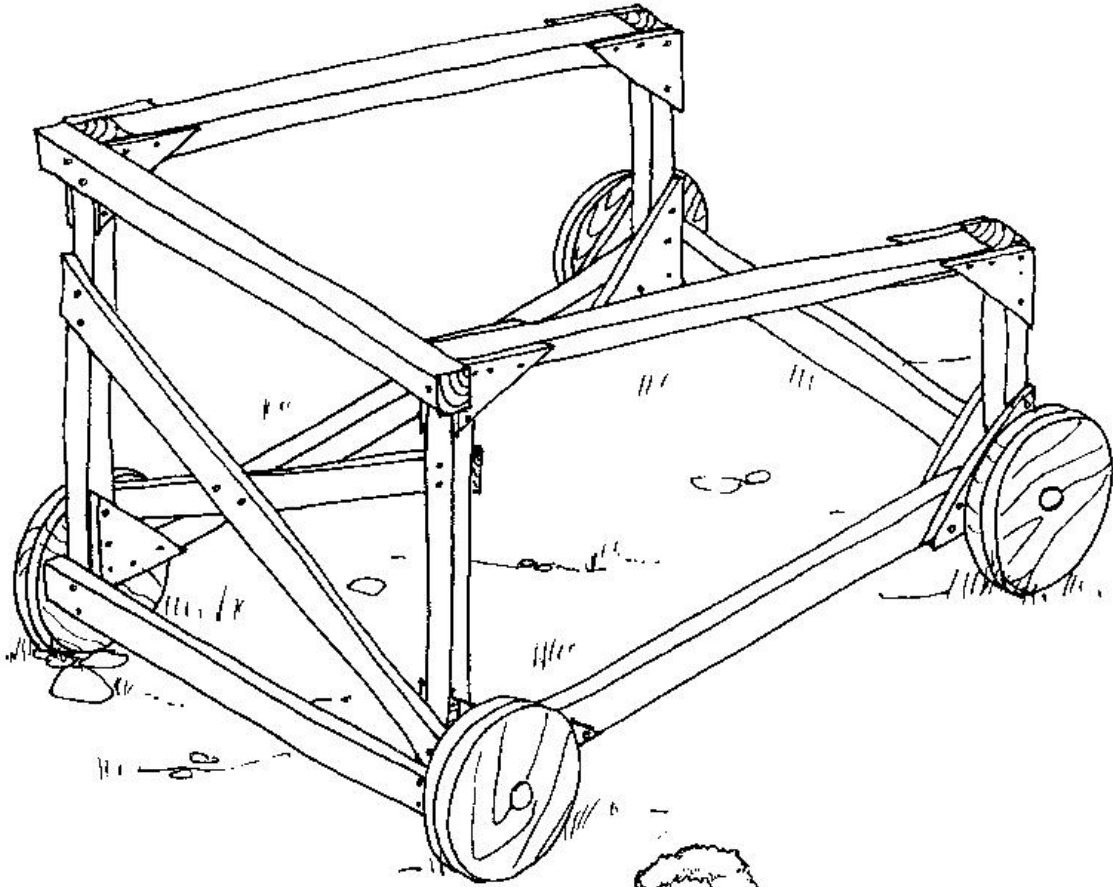


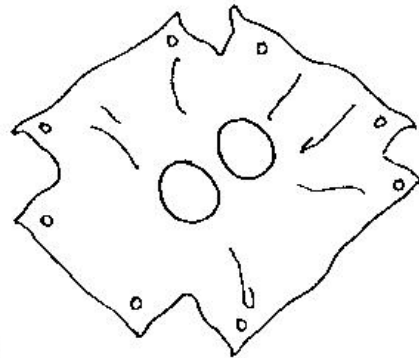
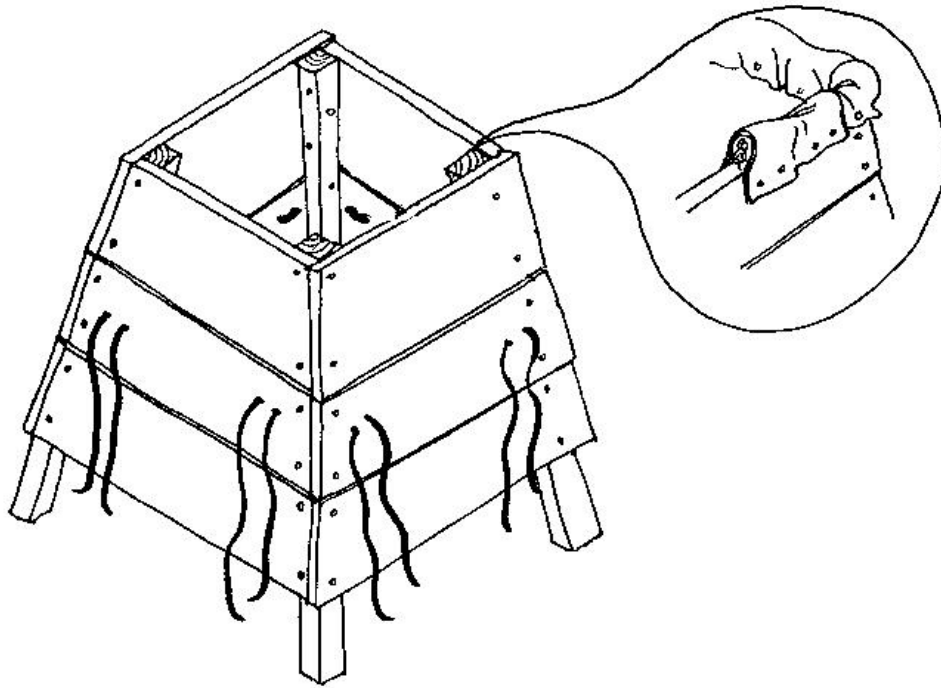


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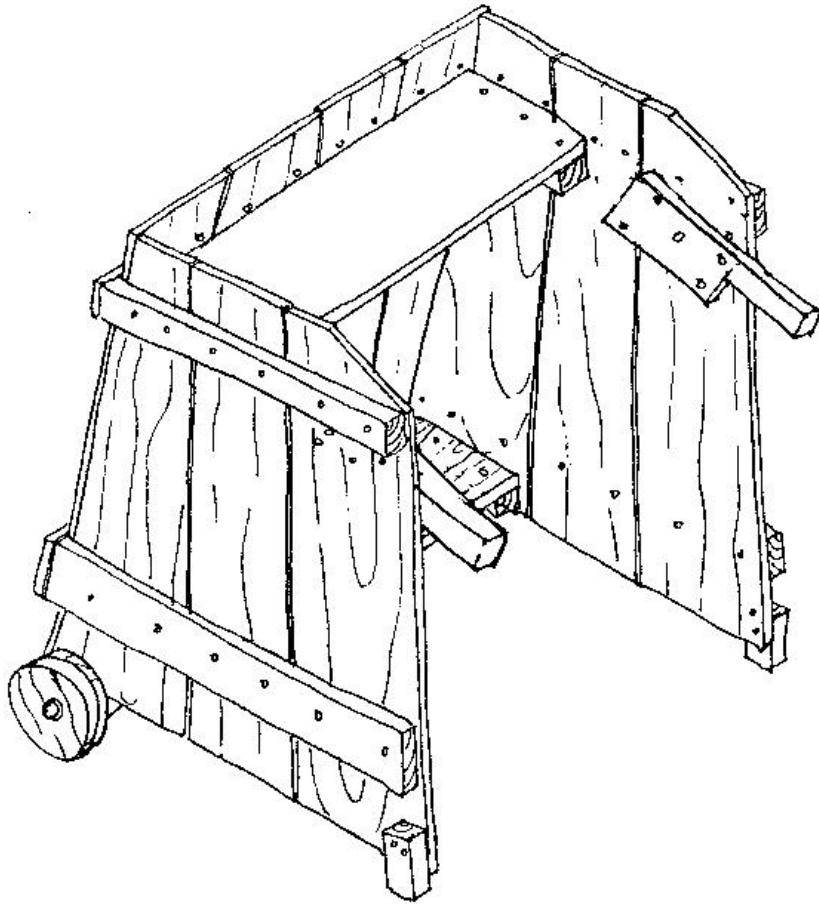




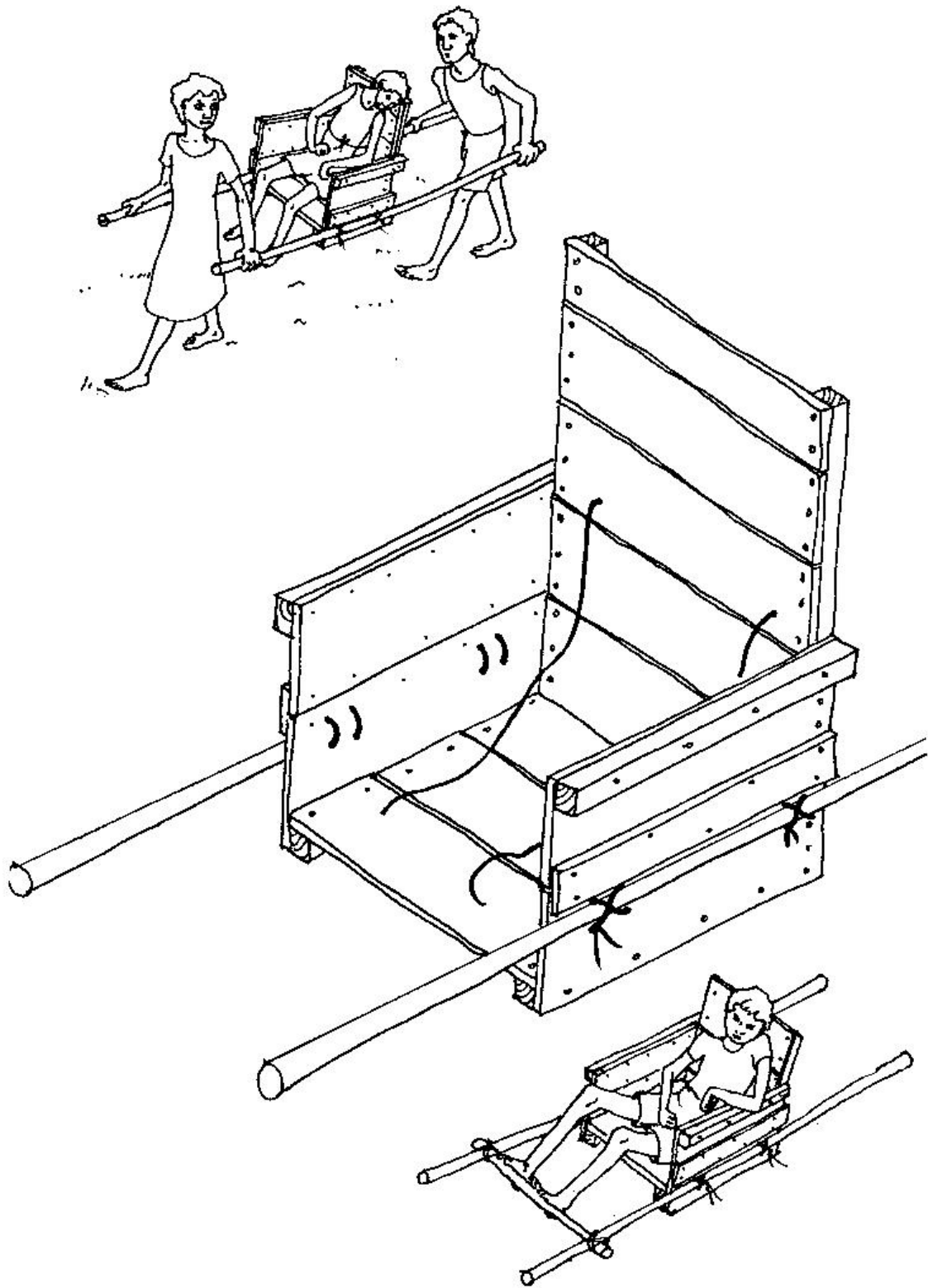




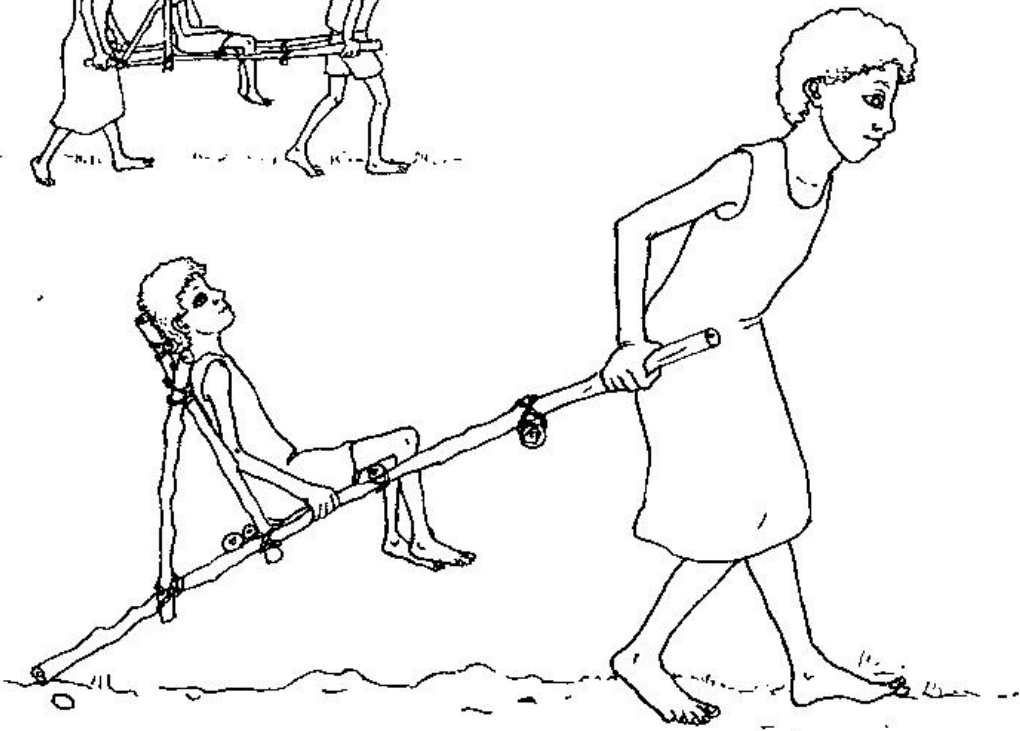
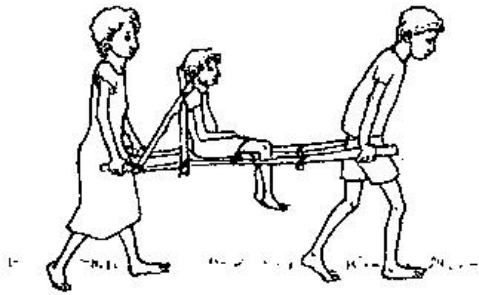
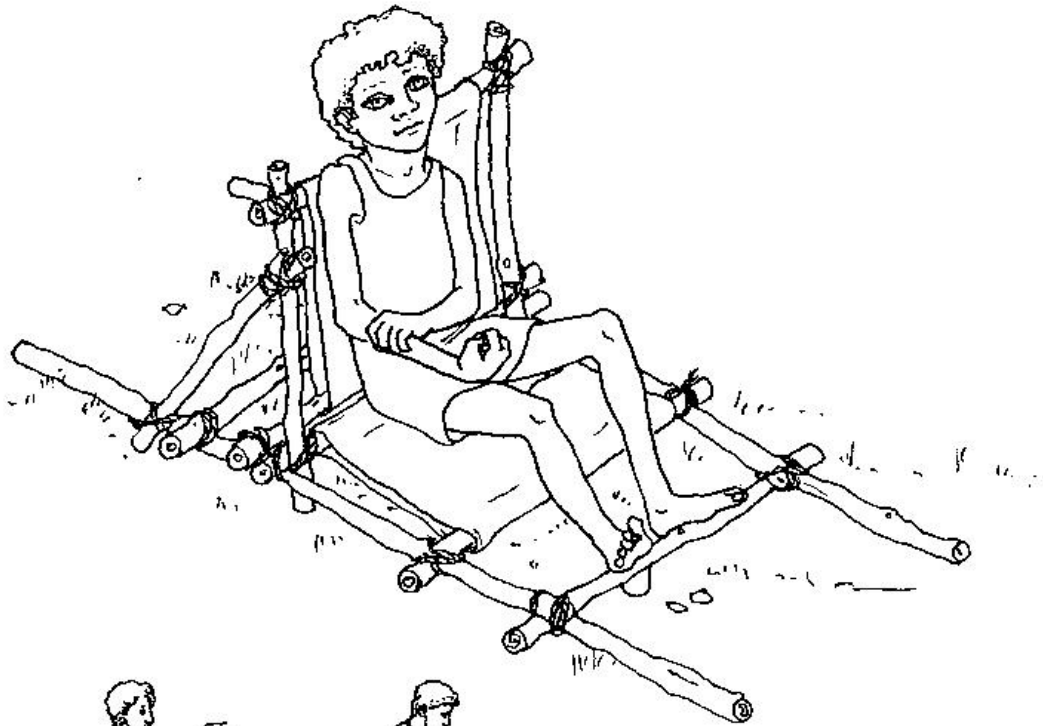
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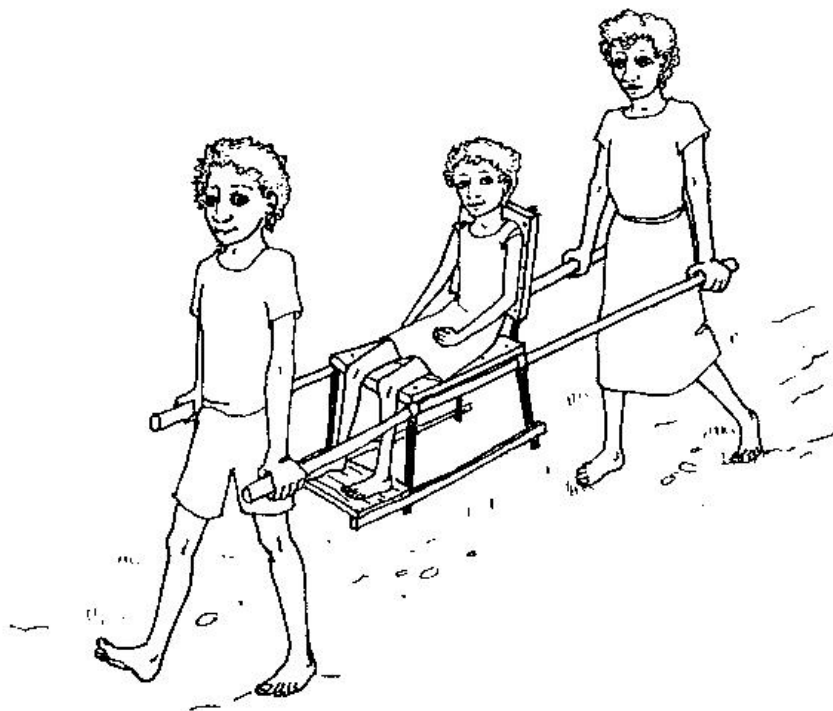
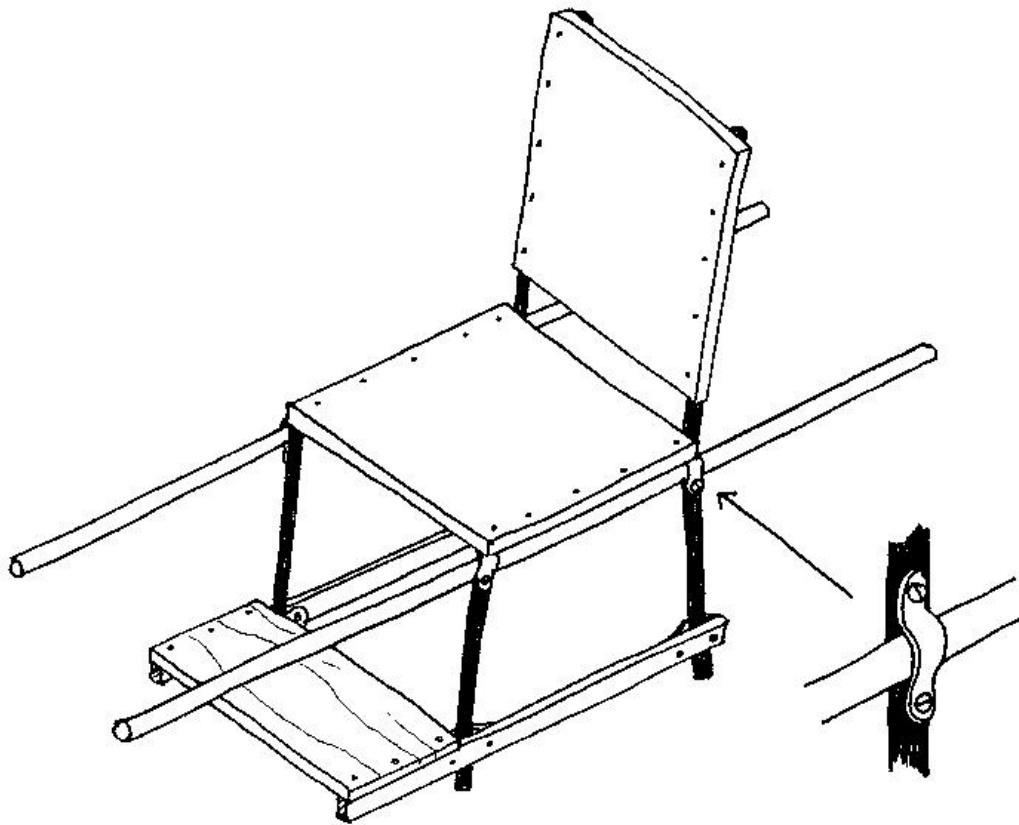
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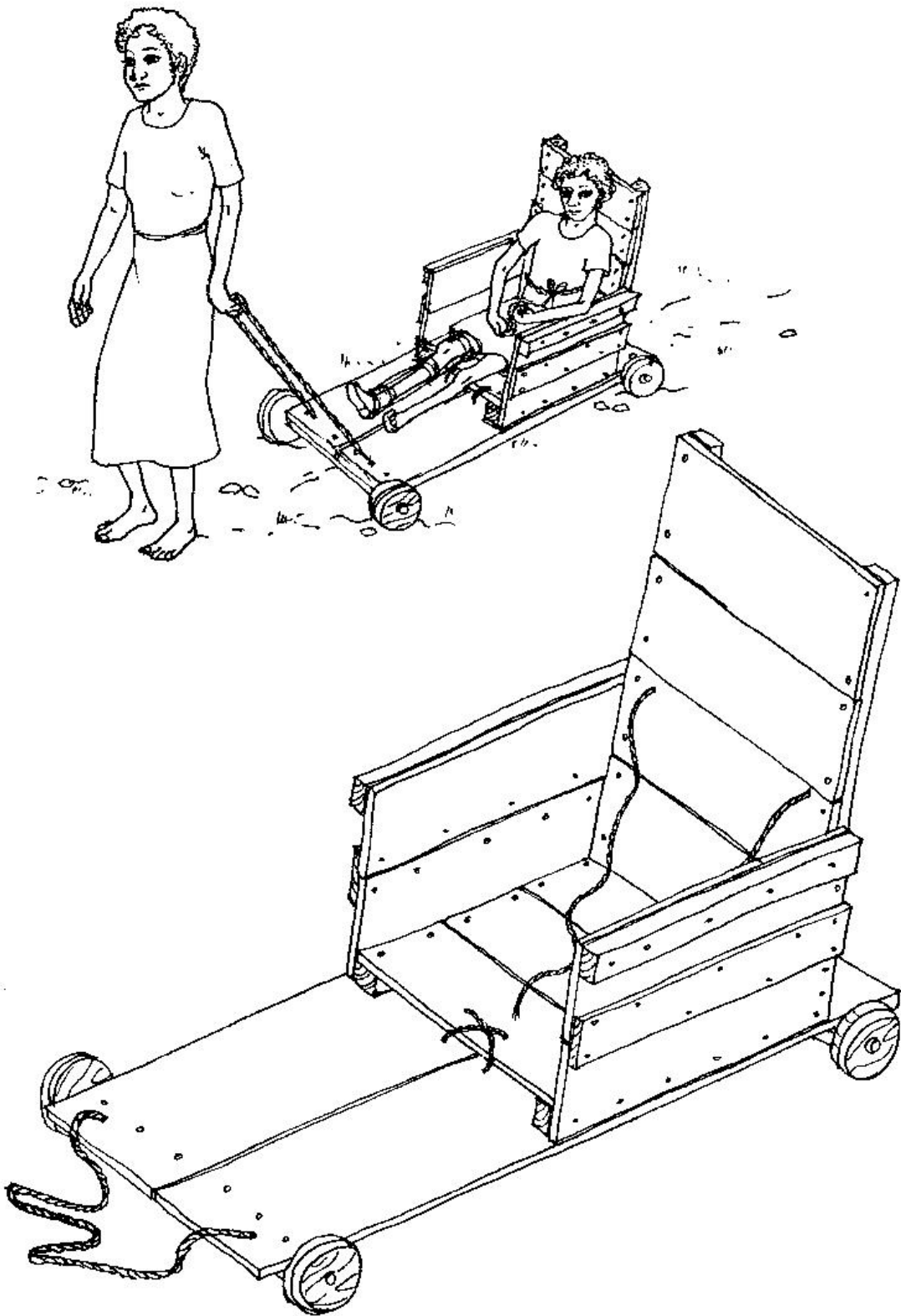
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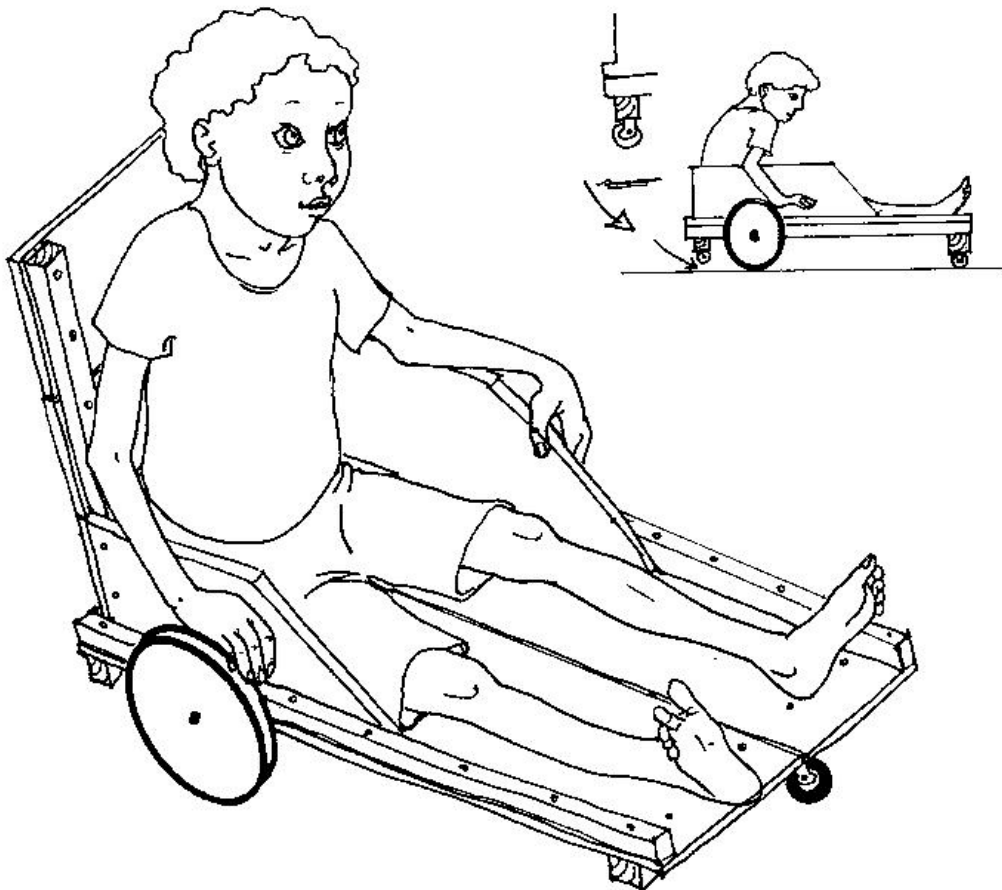
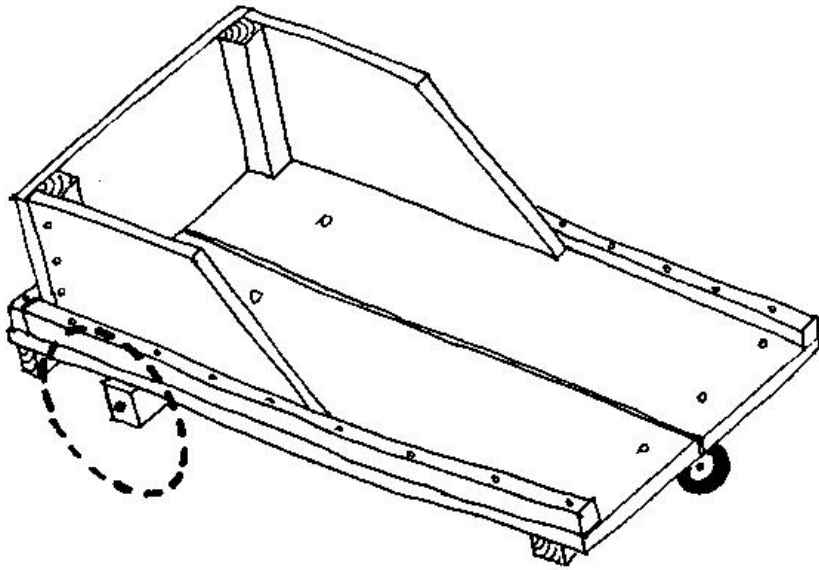


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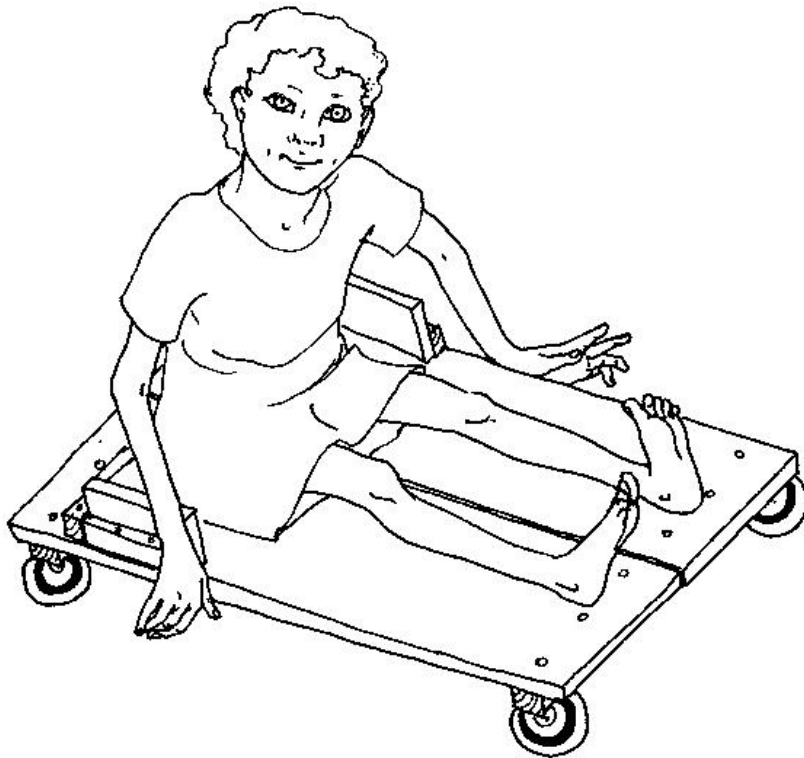
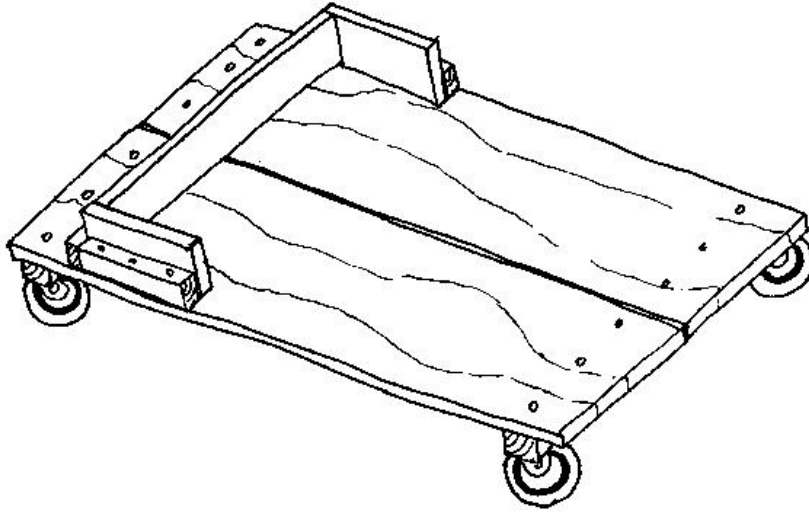
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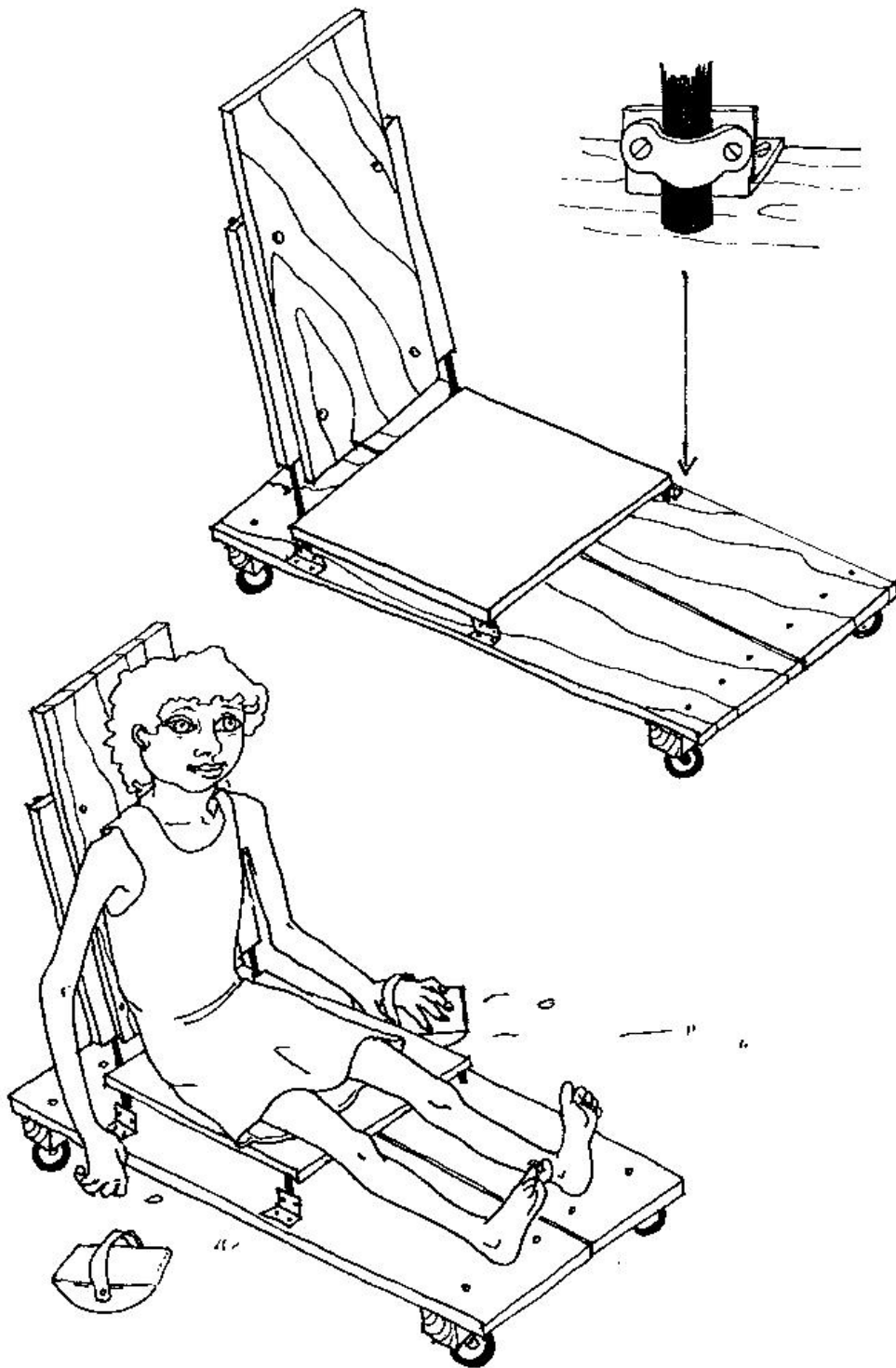


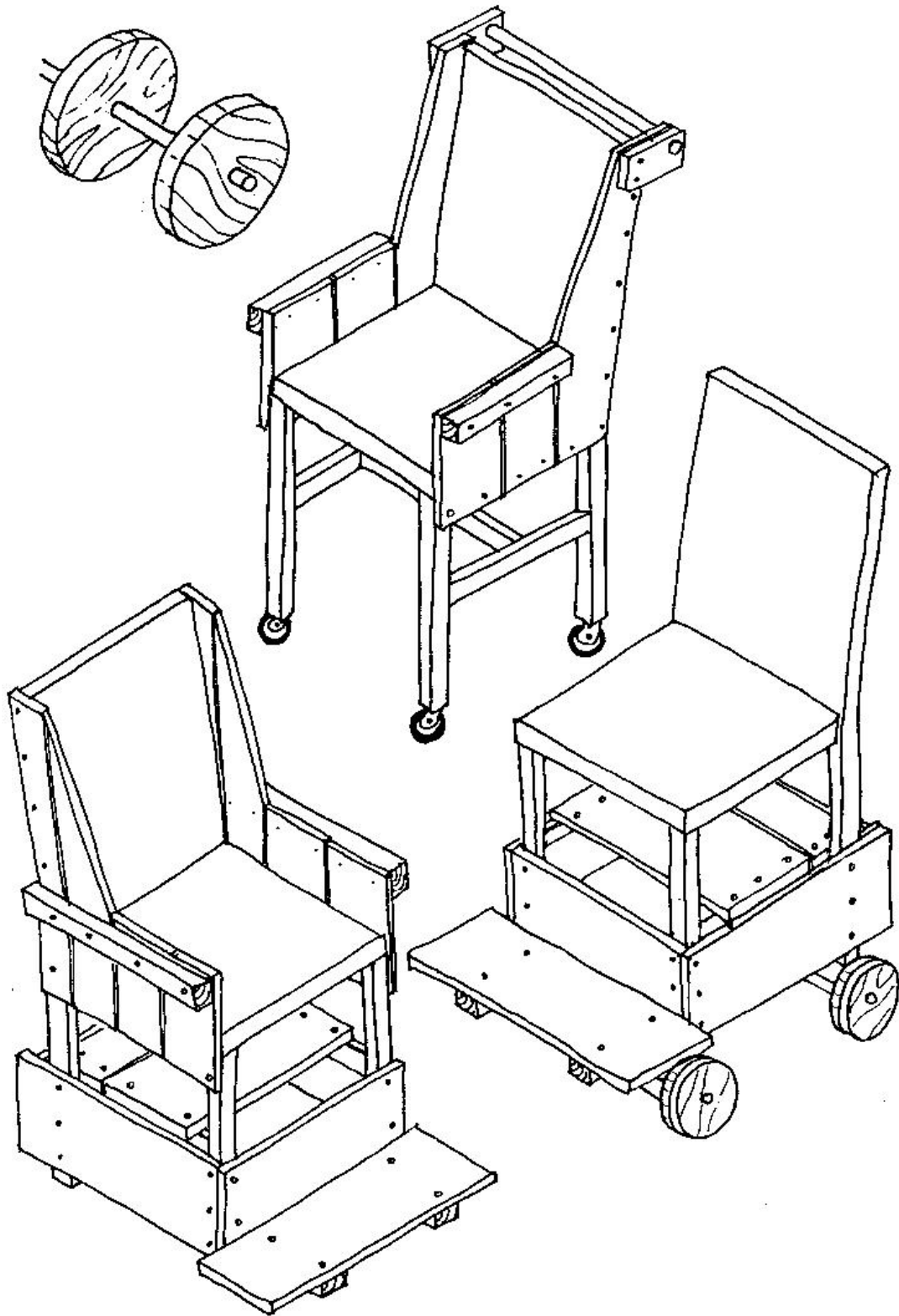


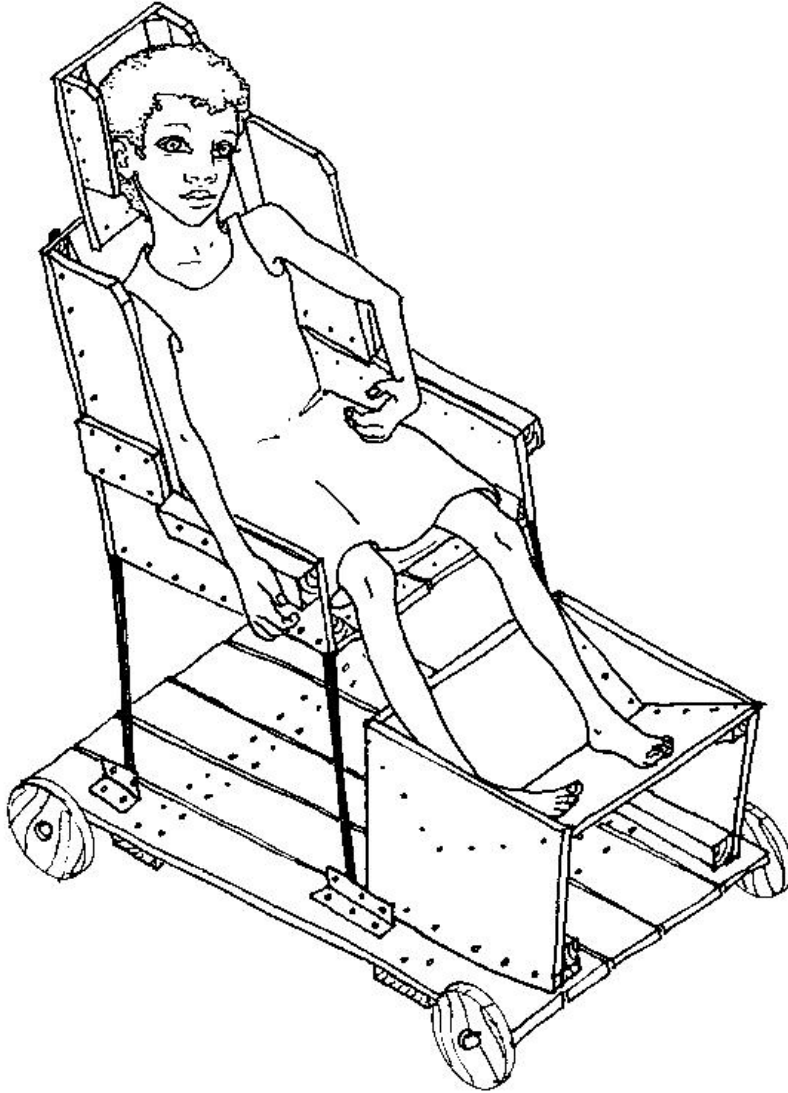


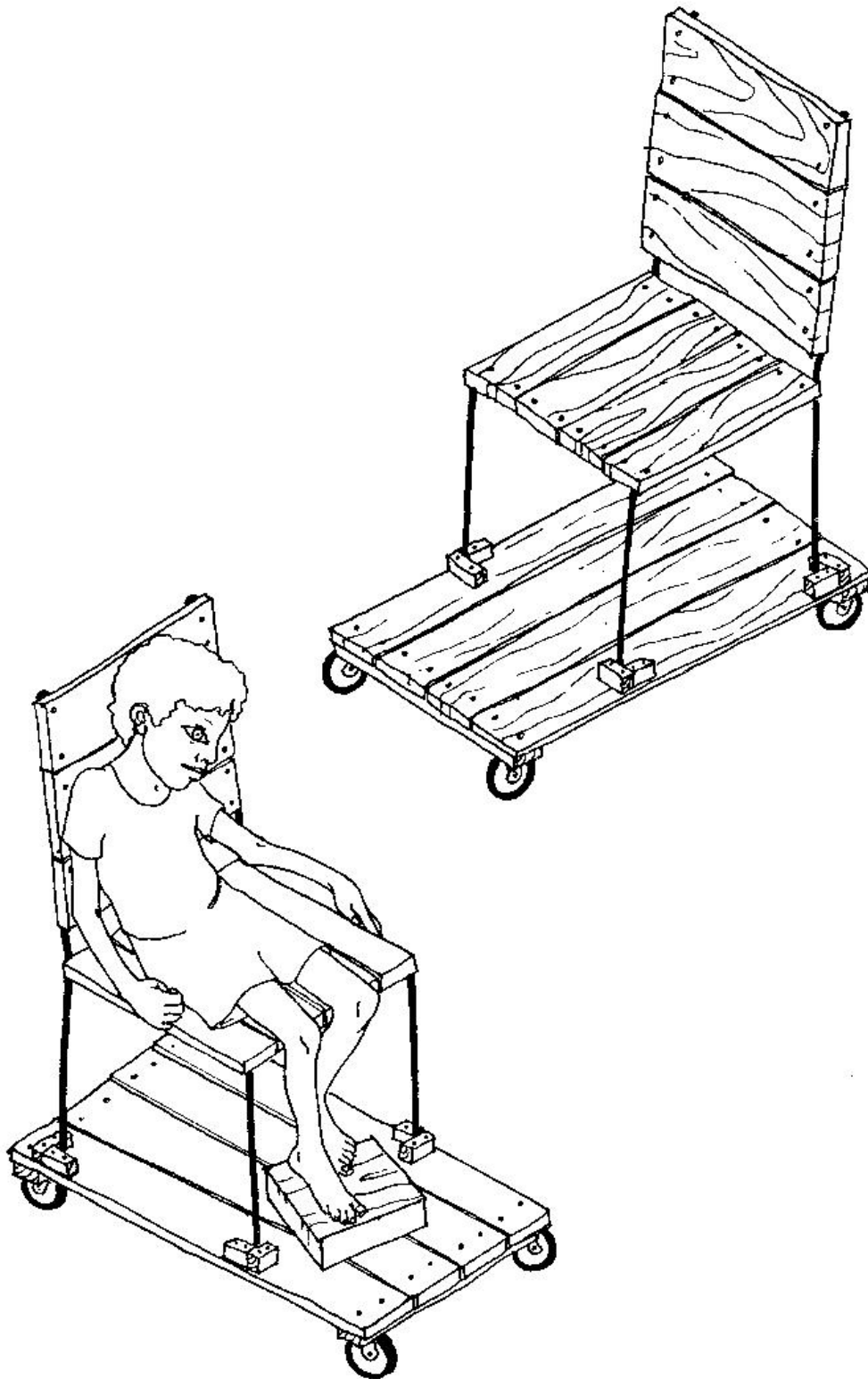
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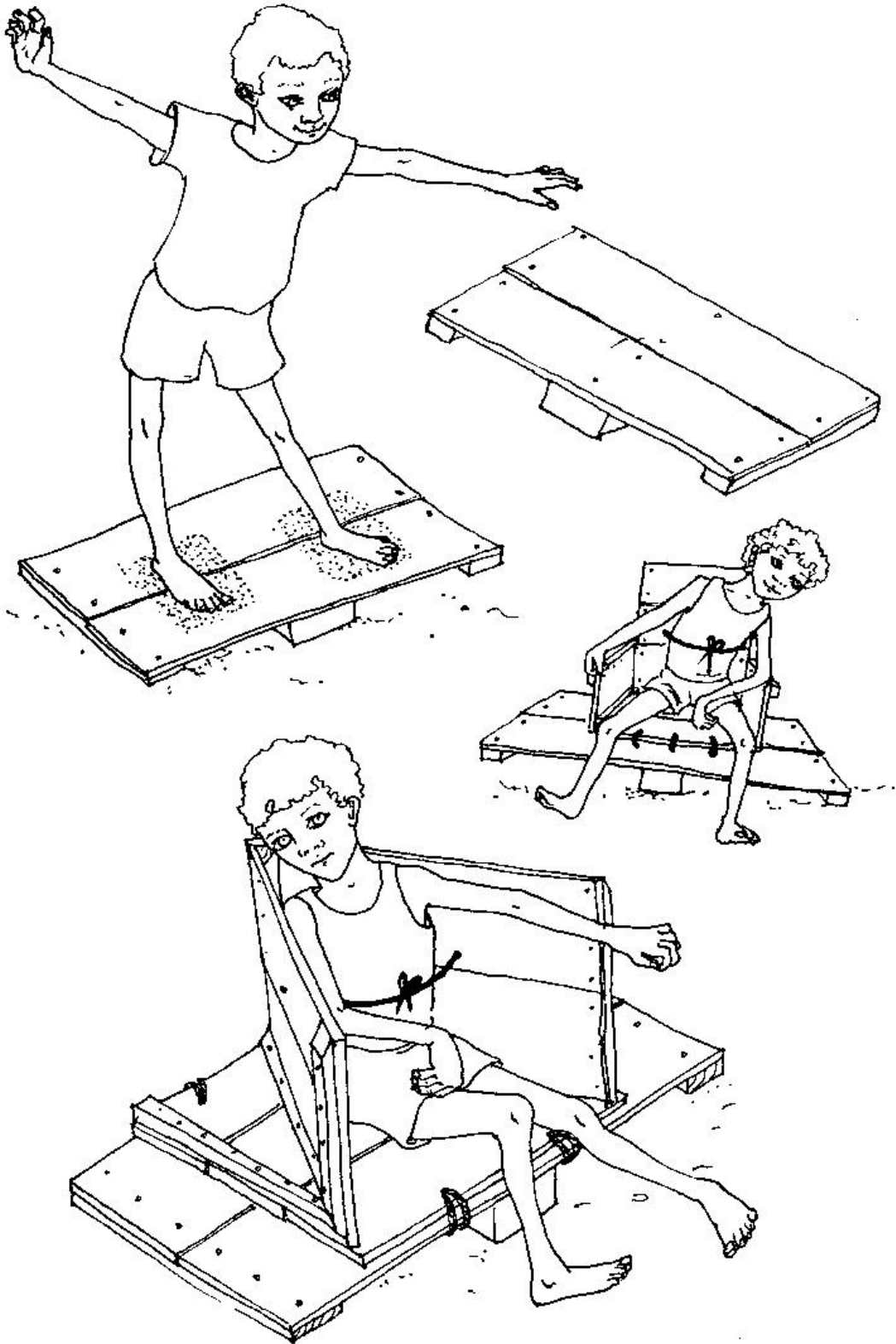








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# Hints on making the aids

## Tools

You only need seven tools to make all the aids:

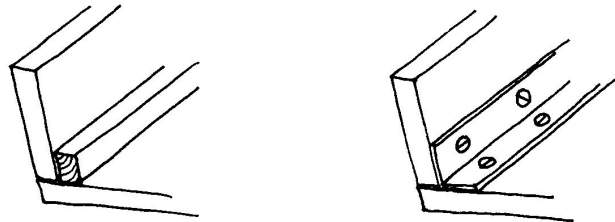
- three saws—handsaw, coping saw and junior hacksaw
- one screwdriver
- one plane
- one hand drill
- one hammer

## Materials

Wood Softwood is often cheap and easily available. Wood from shipping crates and boxes is good. Plywood is useful for chair backs and seats. Ordinary plywood can come apart when it is wet. Therefore, only use it when you have covered it thoroughly with polyurethane paint.

**Nuts and bolts** Roofing bolts are good as they do not rust. Use nuts and bolts rather than nails or screws. You can then adjust parts of the aid. If you use nuts and bolts do not use any glue.

**Joining two pieces of wood together** You can do this with one inch (25mm) aluminium or iron angles, or one inch x one inch (25mm x 25mm) softwood. When you are putting the pieces of wood together to make the aid, leave gaps where possible between the pieces of wood. For example, a gap should be left between the seat and the chair back to make cleaning easier.



**Glue** Urine can get into joins in the wood of chairs. The wood then becomes dirty and smells. Glue all surfaces to be joined with a waterproof glue, e.g. the glue boat-builders use. You can then wash the aid. All joins should fit well so that dirt will not be trapped between the pieces of wood.

**Paint** Use brightly coloured polyurethane paint. Only use paint suitable for children's toys and always follow the maker's instructions. Coloured wood dye is cheaper and dries more quickly than paint. If you use wood dye, you must next cover the aid with a clear polyurethane paint.

**Hinges** Drill a row of holes half an inch from the edge of each of the two pieces of wood. Each hole should be one inch apart. Then thread a string through the holes on each piece of wood alternately and knot the ends to hold the string in place (see page 18).

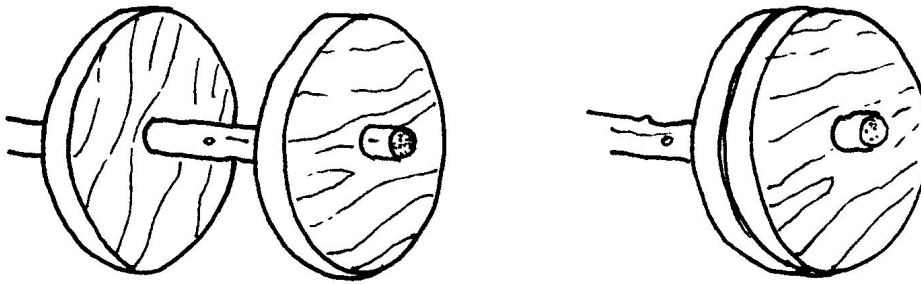
**Sandpaper** Plane and sandpaper the surfaces. (Glue a piece of sandpaper on to a board or flat surface—it will last much longer.) Remove all corners on which children could hurt themselves.



## Wheels

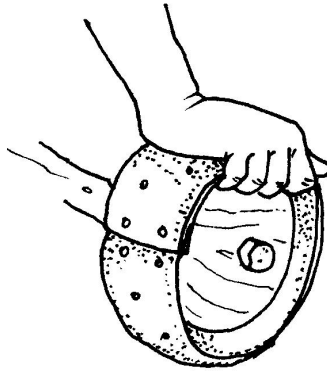
**Solid wood wheels** Solid wood wheels are best for mud and sand. If a wheel has spokes, the mud and dirt will get between them and stop them working properly. If you fit a mudguard it should be at least four inches above the wheel. Otherwise dirt will be trapped between the wheel and the mudguard.

You can cut solid wheels by hand from any piece of wood. It does not matter if they are uneven if they are used on rough ground. The minimum width of a wood wheel is one inch. Use two layers of wood. Glue and then nail them together. The grain of the layers should be at right angles to each other. The wheels will then last longer.



Fix wooden wheels to the aid with nuts and bolts, screws or an axel.

You can nail pieces of old car tyres to the rims of the wheels. This will protect them. Always leave a bit of tyre over the edge of the rim. The child can then hold on to this.



**Castors** Only use castors on the aids for older children as they can be difficult to control. If an aid has four wheels, two of the wheels may be castors (i.e. both at the front or back). If four castors are used on a walker, two should be fixed with string. If you make a three-wheeled aid, only the front wheel should be a castor.

**Coconuts** Drill right through the coconut and push an axel through the holes. You can fill the nut with cement mixture and fibres to make them last longer.

# How to make the aids more comfortable

No padding has been shown on the drawings, so that you can see how to make the aids. If you want you can pad all surfaces (and edges) of the aid. For this, fill sacks or polythene bags loosely with wood shavings or sawdust, leaves or dried grass. If the bags are too full, they will be uncomfortable.

If you use polythene bags, put the open end of the bag between two pieces of wood with 1/8 inch (3mm) of the bag sticking out. Hold the wood tightly together. Run a small flame quickly across the two edges you want to seal. Make a few holes in the edges of the bag to stop the bag bursting.

**Sacks** You can also use old sacks for chair backs and seats. If you do this, leave a gap of at least three inches (75mm) between the seat or ground and the back of the chair. Then the chair back will not become wet from urine (see pages 11 and 19).

**Adjustments to the aids** You should make as many parts of the aid adjustable as possible, (such as the head rest, foot rest, arm rest, angle of the back and height of the seat). You can do this by either:

- a series of holes drilled at regular intervals and held together by nuts and bolts or wood screws. Do not use glue.

Or

- slots which should be at least two inches long. The slots should be a good fit for the bolt or the head of the bolt will slip through.

**Head rests** If the child does not have head control he may need a head rest with sides. The sides should not be so large that they stop the child from seeing properly. You must make a head rest that can be adjusted up and down. Use at least a half inch (12mm) of padding to protect the head and ears.

**Foot rests** These are mainly used on mobile chairs (see pages 52 and 53).

**Foot boxes** The feet can be put in boxes to prevent too much movement and the damage which this can cause. Make sure the box is large enough. Pad the inside of the box.

You can glue sandpaper on to the foot rest to give more grip. You can also sprinkle sand on glue or wet paint (see page 54).

**Pommels** Pommels are used to keep the legs apart. The pommel can either be of solid wood or hollow. They allow heat to escape which may otherwise cause sores. They stop the child sliding down the seat when you do not want to use a harness. If the pommel is hollow, toys can be put inside it. This may encourage the child to move his arms to get the toys out. Tins, bamboo and polythene bottles are especially suitable. Pad the pommel if desired.

**Harnessing** The medical adviser must decide whether to harness the child. Incorrect harnessing can be dangerous.