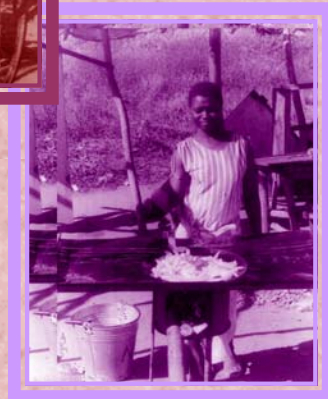


FAST-FOOD VENDING



Income Generating Ideas
for Urban and Rural Poor in Less-Developed Countries

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Feedback on this publication is welcomed.

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Title:

Fast-Food Vending: *Income Generating Ideas for Urban and Rural Poor in Less-Developed Countries*

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ACKNOWLEDGEMENTS AND DEDICATION

The original practical experience on which this book is based was accumulated in Malawi during 1991 to 1994. During this time, I worked as a consultant under the auspices of the United Nations High Commissioner for Refugees (UNHCR) and the Norwegian Refugee Council (NRC). My brief was to design and lead the implementation of vocational training and income generation programmes for Mozambican refugees, then in exile in Malawi.

Especial thanks are due to: Mr Mario Kamangeni, a Mozambican refugee tinsmith, whose knowledge and experience was central to the compilation of fabrication instructions included in the book and some of the designs used; to Norwegian Refugee Council field staff; and all those Mozambican refugee and Malawian project participants who were involved in piloting development project activity in Fast-Food Vending.

It is also wished to express appreciation to Mr David Friswell, formerly of the Malindi Workshop, Malawi, who worked through earlier versions of the Fast-Food Vending Equipment fabrication instructions contained in this book and offered advice and criticism as to how they could be corrected and improved. Any remaining shortcomings in this publication are, of course, my responsibility.

This book is dedicated to my parents, Frank and Gladys Smawfield, and to the memories of Charles Mwambira and Catherine Banda: two wonderful young field workers centrally involved in promoting Fast-Food Vending and whose lives were subsequently cut tragically short.

Dr David Smawfield
Easington

September 2002

NOTES:

NOTES:

INTRODUCTION

Ideas for promoting income generating activity through Fast-Food vending, developed for the most part during time spent working in Malawi, first came about during a visit to a village market, where four men were noticed all barbecuing goat meat on improvised grills. The same day, during a stop at another village market, four men were to be found all frying and selling potato chips! The first thought that occurred was surely it would be better if two men at the first market changed to selling chips and two men at the second market changed to selling goat meat! Customers would then be able to order barbecued meat and chips, seemingly a far more attractive offering than only one product or the other! A second thought that occurred, in the context of Malawi, was why were only men apparently involved in this type of activity?

Curiosity thus aroused, it was not long before thoughts went in lots of other directions. What other things might it be possible to sell on improvised cooking equipment typically found in rural and urban markets and by the side of the road? What opportunities might there be for moving into Fast-Food vending as an income generating activity, including the involvement of women? What would be required, what marketing strategies would be appropriate, and so on?

Follow up activity has included visiting lots of other markets, not only in Malawi but in other parts of the world, studying the types of vending equipment to be found, how they have been made or improvised, and the types of food products on sale. Follow-up activity has also included talking to lots of people about ideas as they developed, modifying these accordingly and, perhaps most importantly, testing out revised ideas within development project activity. Such have been the successes achieved that it was felt appropriate to try to share with others in a book of this form, the knowledge, experiences and insights gained. If you are an individual looking to start a successful business or a development worker trying to help others to do so, it is hoped what has been included will enable you to do just that!

FAST-FOOD VENDING, then, sets out to show how it is possible to start a business with very limited capital investment: through the improvisation, making, and use of different types of Fast-Food vending equipment; and through the preparation and sale of a range of popular, but simple, food products. From the

book, it is possible to acquire all the practical information, knowledge, skills, and attitudes, necessary to make the ideas that are presented become a reality.

The book is divided into four main Parts. Part One looks at some of the major considerations that will need to be taken into account in launching a successful income generating activity. It gives suggestions and advice on site selection, what to sell, marketing techniques, and some of the finer points of practice that can add real panache to the operation of a business!

Part Two is concerned with equipment. A range of possibilities is illustrated, and detailed, step-by-step, instructions are provided showing how three, very versatile, pieces of equipment can be fabricated from old oil drums.

Part Three discusses the important related topic of Safety and Hygiene.

Part Four is written expressly for development agencies and workers. It considers how the practical ideas presented in the book might best be exploited by these change agents in their work, both with individuals and groups.



PART ONE

Business Aspects

In the parts of this book that follow, attention will be turned to what might be needed for Fast-Food vending. This will include both basic equipment and important knowledge to do with safety and hygiene. Here, it is intended to look more at questions of "where", "when", "what" and "how". It is important to stress that it does not necessarily matter which questions are considered first, but all factors need to be taken into account before any commitments are made. Deciding on an answer to the question "What to sell?" is likely to be influenced by the question "Where to sell?" and vice versa. In other words, it will probably be wise to read right through this book before trying to come to any final decisions!

Sites and Timing

In the identification of possible suitable places for attracting custom, a key question to ask and to try to answer is "where do lots of people, who may like to buy Fast-Food products, gather or pass for other reasons?" Here is a list of some possibilities:

- Football matches
- Public meetings
- Concerts
- Market Days
- Road sides
- Car Parks
- Lorry Parks
- Bus Stations and Stops
- Train Stations
- Cinemas
- Factory gates
- Educational Institutions (especially colleges)
- Festivals,
- Weddings, funerals

- Public Parks
- Bars and Bottle Stores

It is also important to take into consideration patterns of ebb and flow of people movement. There are likely to be particular times of the day, days in the week, and so on, when significantly greater numbers of people congregate at certain locations (for a particular event) or travel on a particular route: out and back from their fields, to and from shopping and trading centres, to and from places of work, and so on. Peak periods are obviously the times that it is best to try to exploit.

It should also be apparent, even from the list of notional examples of vending sites provided, that one should not necessarily think in terms of planning for a "one location only" business. It could be advantageous to set up the same stall at different places at different times of the day, or on different days of the week: say by being at the football ground, for the big match, on Saturday afternoons, by being at the lorry park in the early part of the day, and near to a popular bar in the evenings. For this kind of approach, the more easily portable the vending equipment the better.

For a preliminary period, in trying to set up a viable income generating activity, it might be sensible to experiment with different sites, at different times, to find what seems to be the most lucrative, and when. Thereafter, however, it is important to recognize the potential returns that can be associated with consistency: say, always being at one site in the mornings, and always at another in the afternoons. A lot of successful business is based on the building up of "good will". First custom, for the most part, has to be won simply by people seeing what is on sale and being attracted to it spontaneously. But people are creatures of habit, and after a period of time some customers will start to plan their daily routines knowing that they can count on particular services. For example, a football supporter might think to him or herself "I won't bother eating before I go off to the match, because I know I can buy a bag of chips outside the ground"; a worker might think, "I shall not bother making sandwiches today, I'll buy a hot-dog at the factory gate at lunchtime"; and so on. It is important to build up this confidence, and not to undermine it through lack of consistency.

What to Sell

The following is a list of examples of the types of products that could easily be prepared and sold in a Fast-Food vending business:

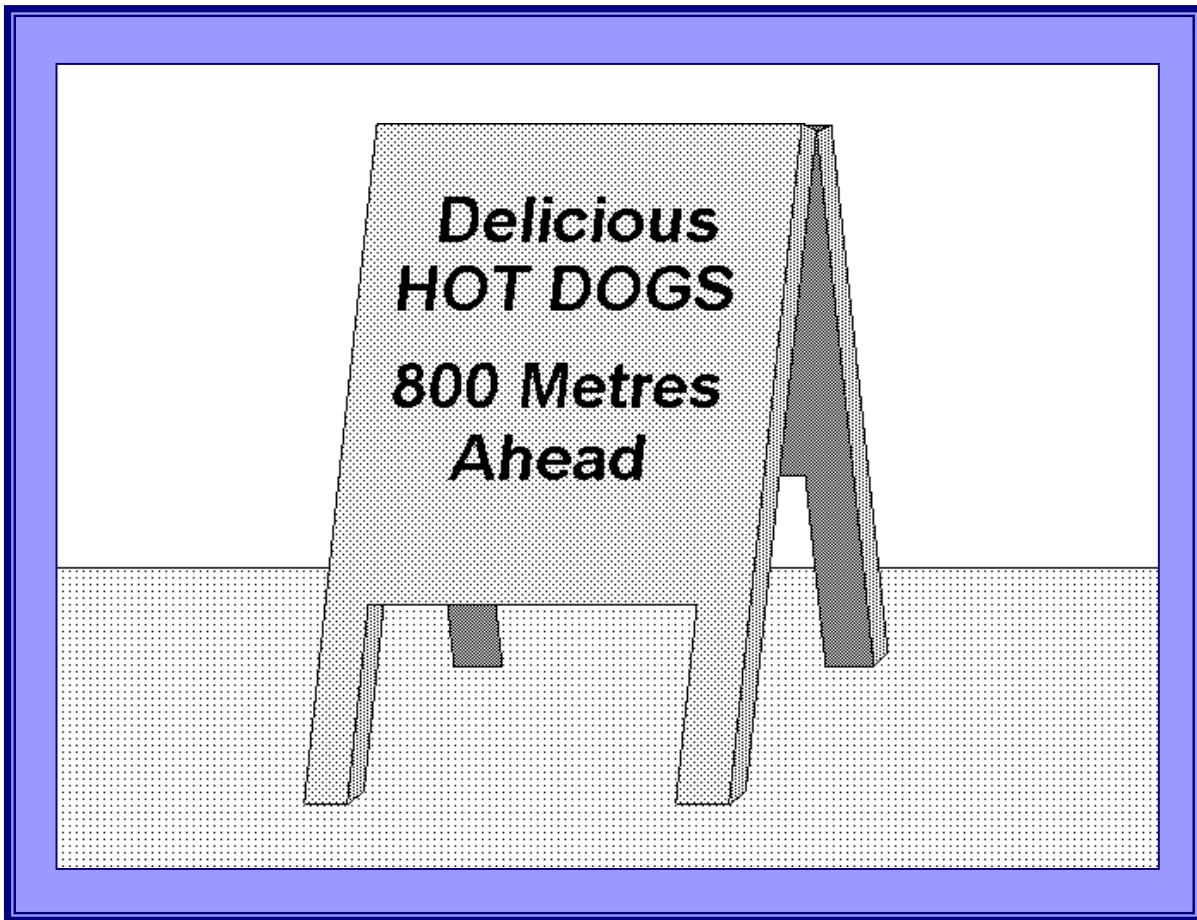
- Hot dogs
- Burgers (fish/beef)
- Meat steaks or chops: barbecued, fried or grilled
- Kebabs
- Fried bananas with chocolate sauce
- Banana fritters
- Banana crisps
- Chips
- Grilled maize
- Popcorn
- Fried eggs (in/on toast)
- Bean cakes
- Rotis
- Hot roasted nuts
- Chapattis
- Samosas
- Doughnuts
- Cold drinks
- Sandwiches
- Hot drinks (tea, coffee, etc)
- Soups

Marketing

Having given thought to what to sell, and where and when to sell it, another important consideration is how to go about Fast-Food vending. Much that has to do with the question of "how?" comes under the heading of "marketing". It is marketing techniques, therefore, that are considered in this section.

One of the most crucial forms of marketing is visual advertising, particularly through the use of signs drawing attention to the business. Use of signs to catch attention, can have an enormous impact on the amount of custom consequently attracted. This would especially be so, for example, for a road-side business aiming to attract passing traffic. Three signs might be appropriate. In the notional example of a hot-dog seller, two signs might say something along the lines illustrated in Figure 1.1.

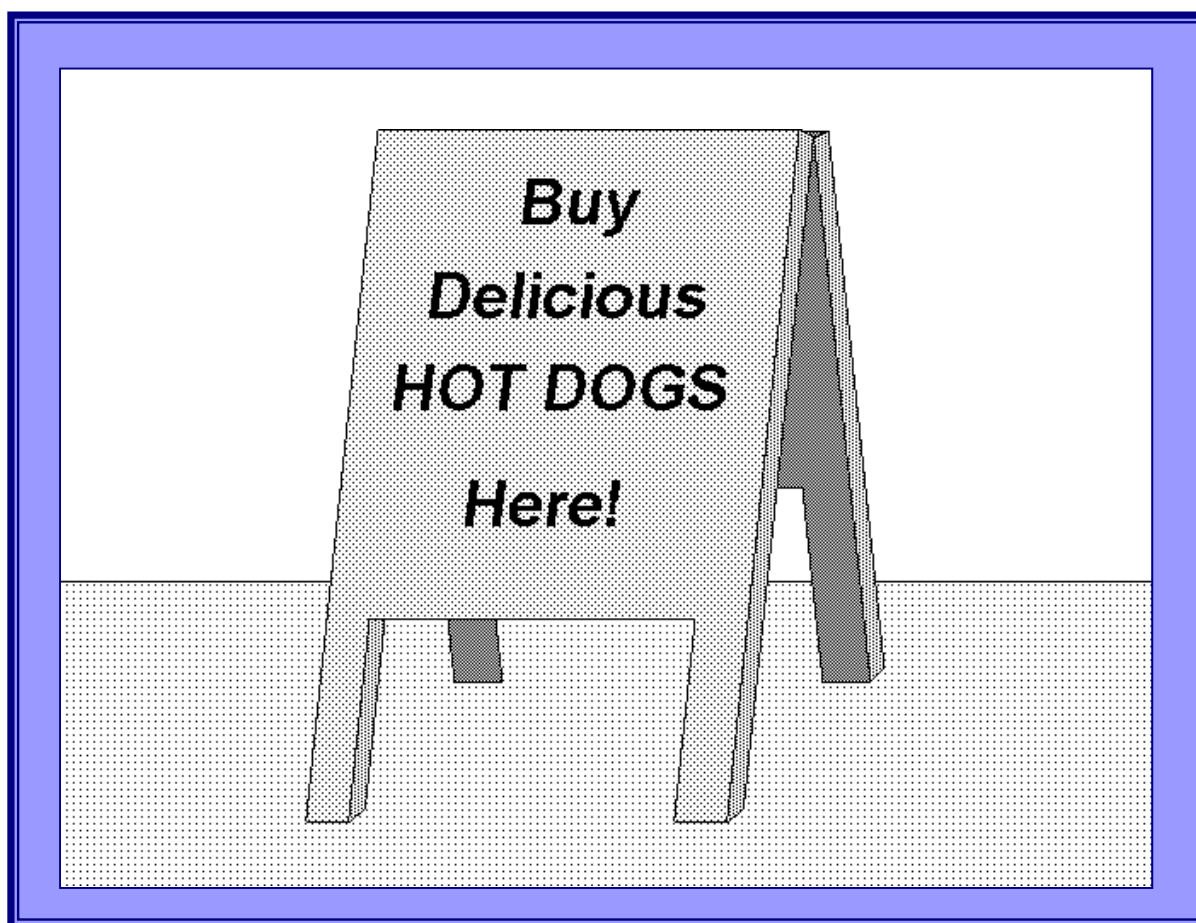
Figure 1.1
Delicious Hot Dogs 800 Metres Ahead



They would be placed the distance indicated, either side of the stall. It is very important to give passing drivers enough time, and thus distance, to react to the enticement to stop. It may be born in mind that a driver travelling at 80 kilometres per hour, even to stop in an emergency, is estimated to travel a full 15 metres in the time it takes for the brain to react to the emergency. Something like a further 38 metres of ground will be travelled, from the time the brakes are applied to when the vehicle can actually be brought to a halt. Sufficient warning needs to be given to allow for a far more leisurely halt than an emergency stop!

A third sign, opposite the place of vending, might say something along the lines illustrated in Figure 1.2.

Figure 1.2
Buy Delicious Hot Dogs Here!



In some circumstances it might be appropriate to use other signs and notices to draw attention to what is being sold. Generally, the more attractive these signs are the better. If vending within or near the grounds of a school or college, it might be possible to gain permission to place an advertisement on a notice board.

If selling produce with mobile equipment, a bell, horn or some other means of attracting attention, and thus custom, should be considered. Use of music, both for mobile and static vending, may also turn people's heads and encourage them to gather round.

Essentially, marketing is about presentation and the more appealing and convincing the method that can be found to draw attention to the business the better. Stylish presentation, the dress of the vendor, the appearance of the vending equipment can all be gimmicks that help to sell what is on offer. More is said about these particular aspects shortly. As a general maxim or rule (and a "secret"

of much high powered commercial advertising), it may well be worth remembering that the more likely the marketing ploy is to raise a smile the more effective it is likely to be.

With some types of Fast-Food vending it may be an advantage to have an assistant who can travel away from the base at which the food is prepared, with several of the items, to reach a wider customer catchment, and particularly to those whose mobility may be constrained. Other vendors of non-food items in a village market place, for example, also get hungry and they may appreciate food being brought to them!

There may be other marketing ploys that are worth considering, handing out "discount" vouchers, offering "free" salad with every hamburger, a "free" buttered roll with every bag of chips, "four hot-dogs for the price of three", and so on. These offers are not, of course, really free "give-aways". In their most effective form they are carefully calculated ways of actually increasing financial returns, through the extra custom they pull in and the increased customer satisfaction they generate.

Another aspect to consider is that of "panache". The *Longman Dictionary of Contemporary English* defines panache as "a manner of doing things that is showy and splendid, and without any seeming difficulty". If the seller exudes an air of confidence, the consumer is more likely to be attracted by, and have more confidence in, the product. There are other ways to give that "extra touch" to make what is being marketed more appealing. The main product might be embellished with such extras as:

- Salads
- Salt and Pepper and Other Seasonings
- Pickles
- Sauces
- Bread

Similarly, the food product might be served with:

- wooden or plastic spoons and forks, or
- on kebab sticks

or be served on or in:

- paper/plastic cups
- paper/plastic plates
- paper bags,
- polythene bags [*]
- cling-film
- paper cones [*]
- greaseproof paper
- PLAIN paper [**]
- banana leaves [**]
- a basket

[*] Figures 1.3 and 1.4 show:

How to seal a polythene bag using a hacksaw blade and a candle;

and

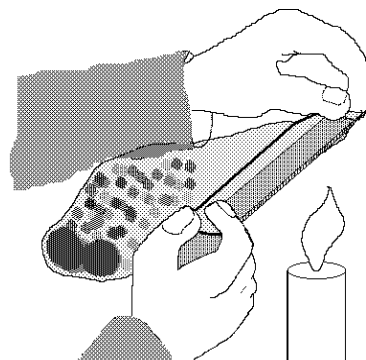
How to make a Paper Cone from a square piece of paper.

[**] HEALTH WARNING:

NEVER let PRINTED paper come into DIRECT contact with food. Many inks contain poisons. This warning applies especially to pages torn from newspapers and magazines. Printed paper can still safely be used as an outer wrapping, however.

Banana leaves are perfectly safe. While many other leaves are safe, too, leaves from some plants also contain poisons. Local knowledge should help here.

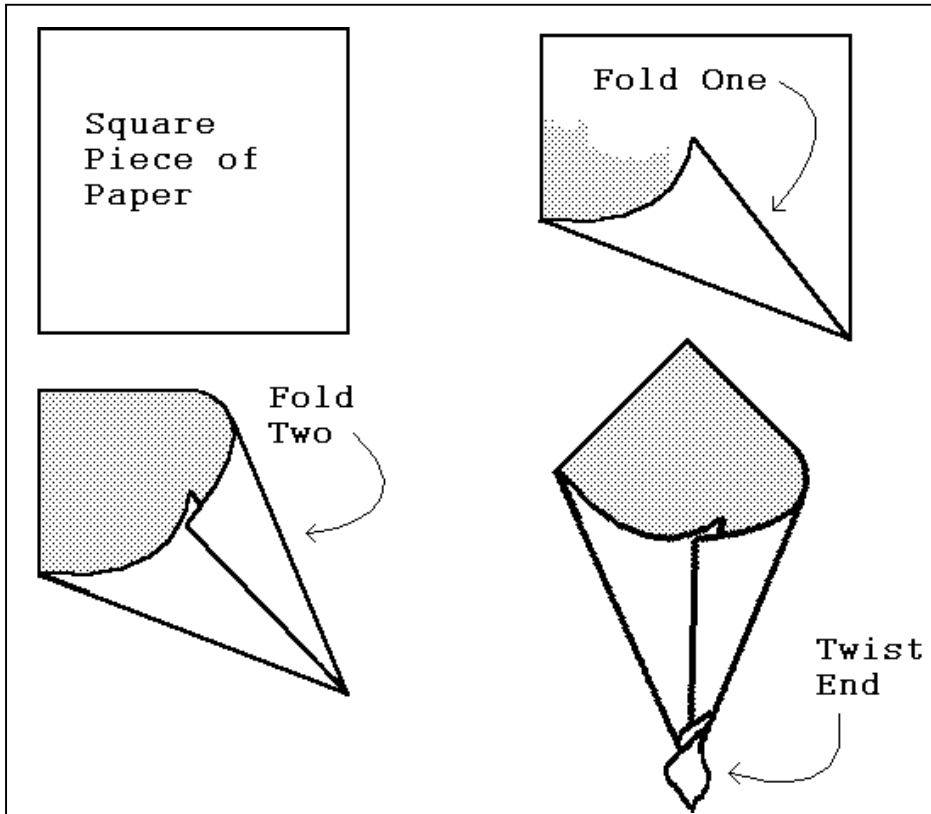
Figure 1.3
How to Seal a Polythene Bag
using a Hacksaw Blade
and a Candle



Fold the top edge of the plastic bag over the teeth of an old hacksaw blade and pass backwards and forwards over a candle flame, until sealed.

Source: Based on an idea presented in SANDHU, Ruby & SANDLER, Joanne (Comps) (1986) *The Tech and Tools Book: A guide to the technologies women are using worldwide* (London, International Women's Tribune Centre/Intermediate Technology Publications), p. 66.

Figure 1.4
How to Fold a Cone from a Square Piece of Paper



Depending on the setting, it might also be appropriate to provide chairs or benches and tables. These may only need to be very simple. With regard to the dress of the vendor, the most obvious and simple way to look professional might be to wear a white apron and chef's hat.

Instructions in the next Part of the book will show how to make a Chef's Hat and a Chef's Apron

Depending on the context and culture, other more novel ways of dressing might help to attract attention, create amusement, and thus draw custom. Dressing as a clown or in a bear suit, though it would take some courage, might make a business really famous and celebrated!



PART TWO

Materials and Equipment

Some Examples of Fast-Food Vending Equipment

What follows are illustrations of some sample designs for Fast-Food vending equipment. The examples vary in their degree of improvisation and sophistication. What will, or will not, be appropriate and acceptable to potential users and customers will clearly vary markedly, according to differing local circumstances. Chip frying equipment improvised from a pile of old car wheels will, for example, be completely out of place and unacceptable to consumers in some contexts, but not in others.

Some of the illustrations highlight possibilities for mobile equipment, and also draw attention to the consideration that Fast-Food vending need not only be thought of as a suitable activity for the able bodied. Mobile equipment can take hand-cart form, or, as the illustrations suggest, be pulled as a bicycle or wheelchair trailer.

Figure 2.1
Fryer Made From an Old Oil Drum

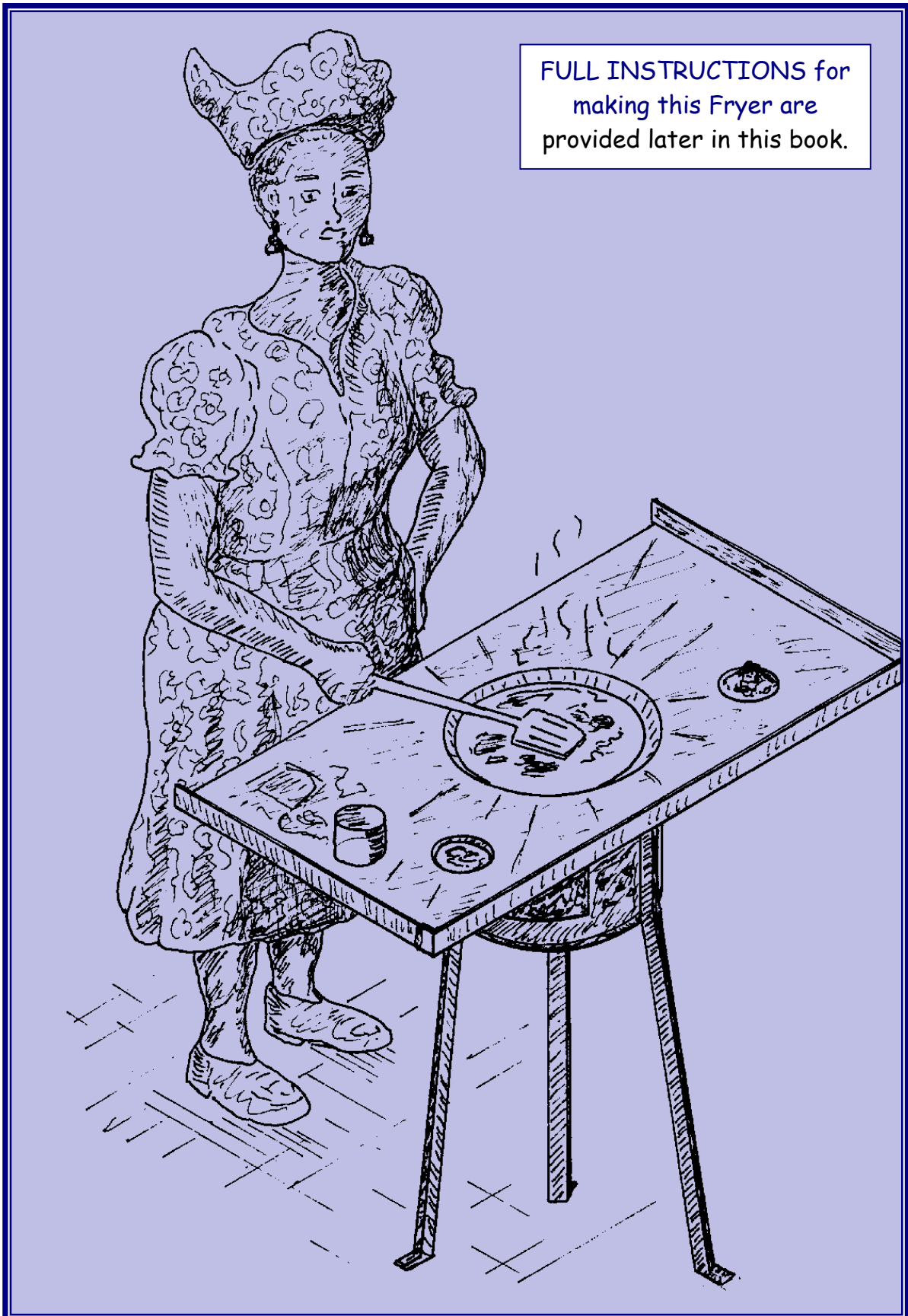


Figure 2.2
Double Fryer

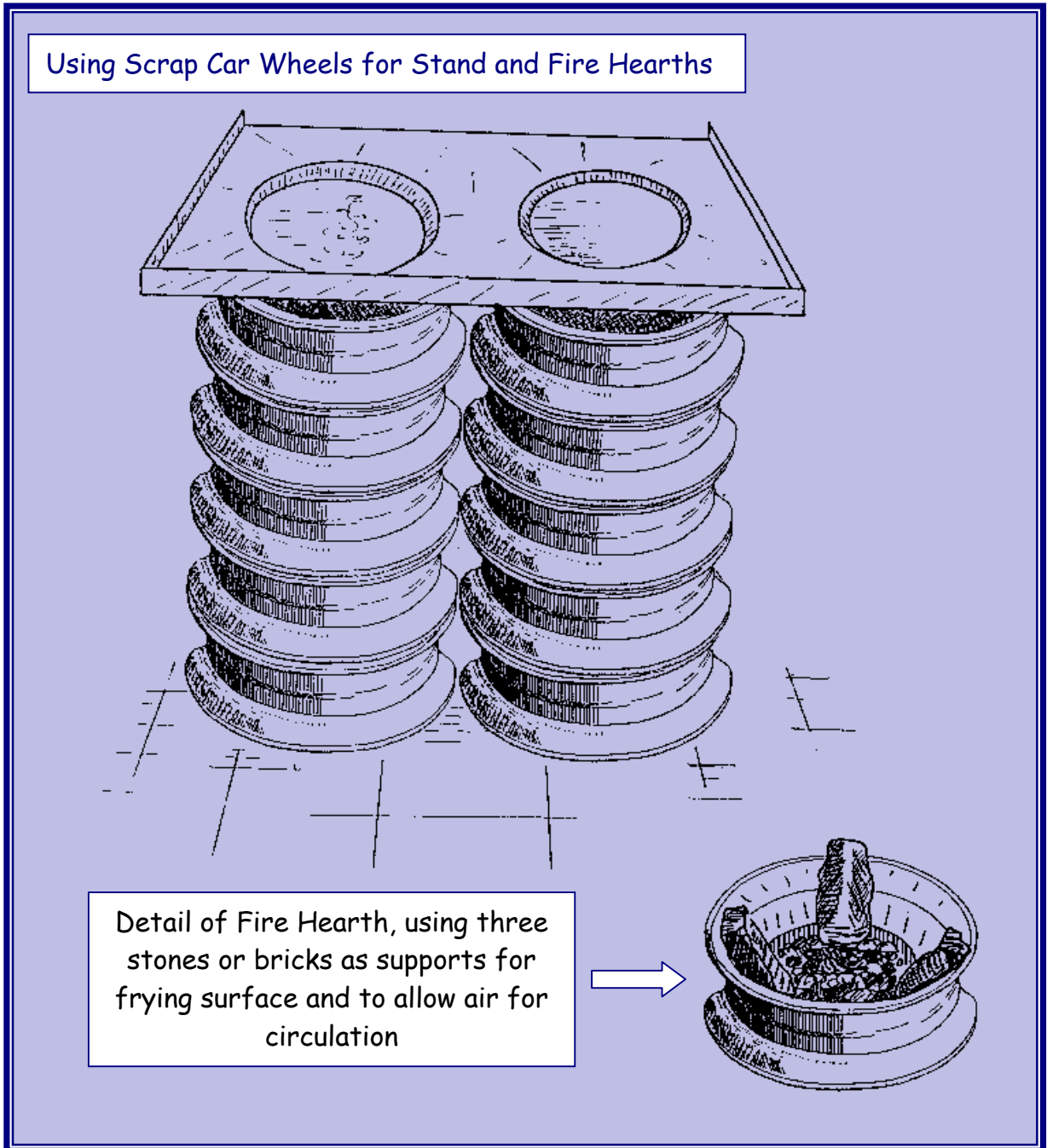


Figure 2.3
Twp-Pot Cooker Made from an Old Oil Drum

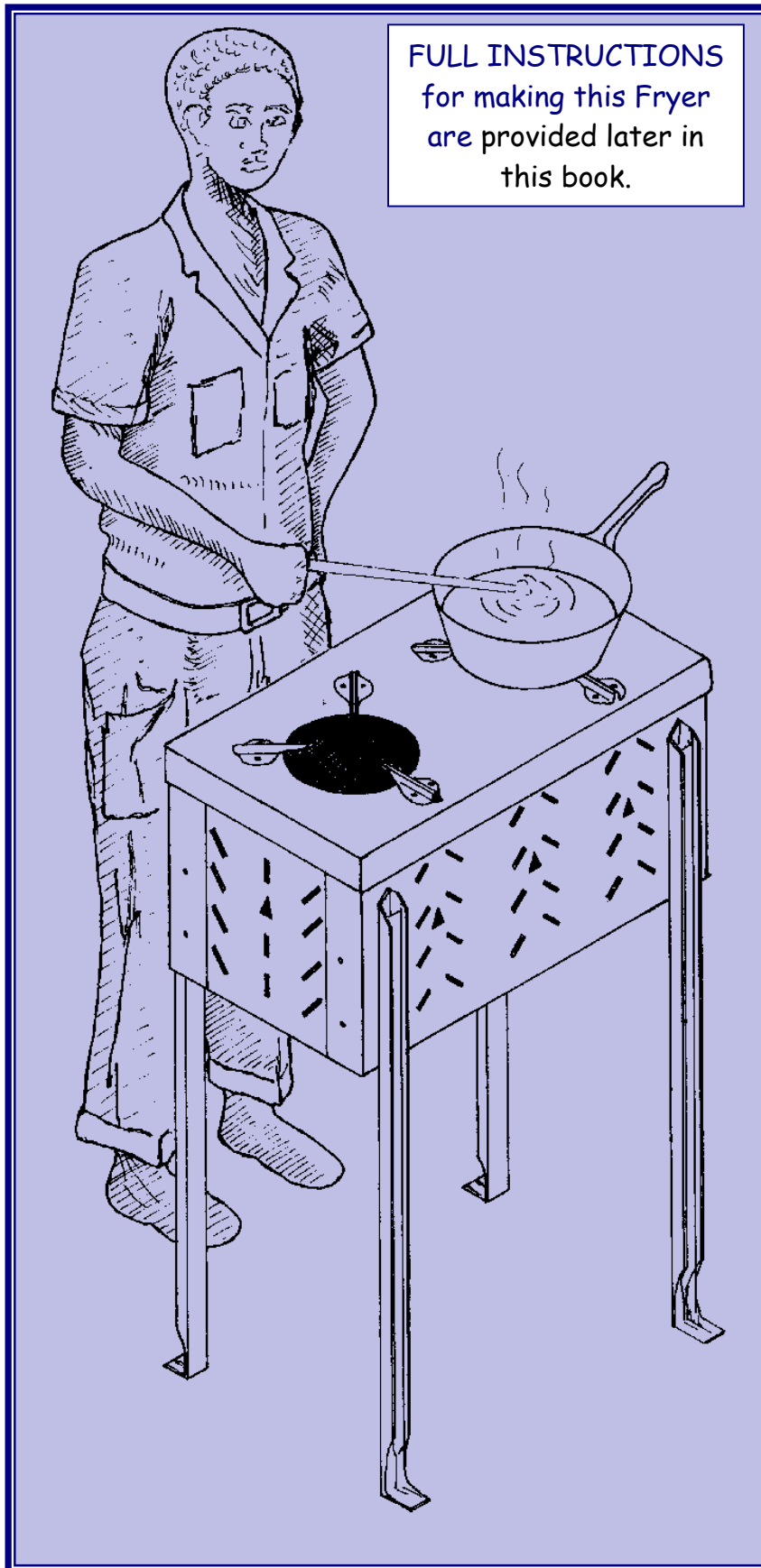


Figure 2.4
Barbecue Grill

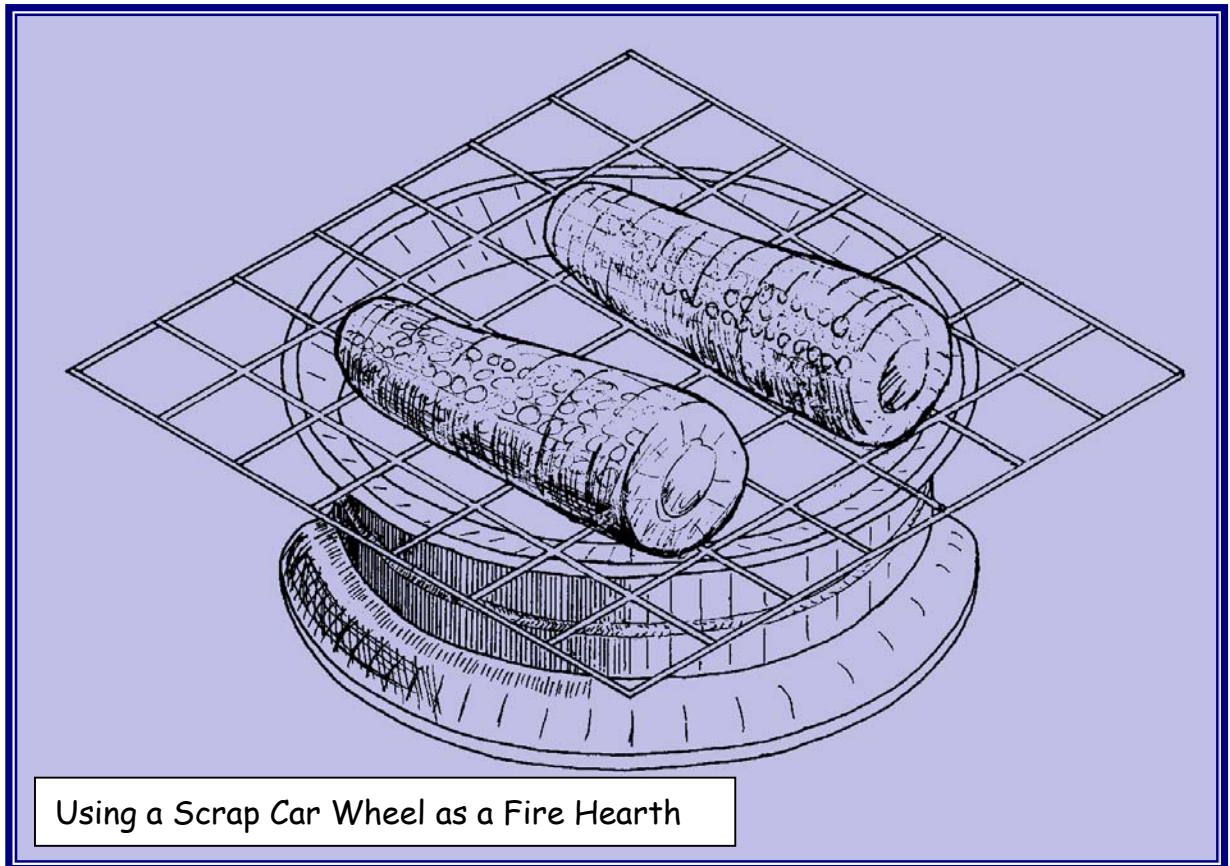


Figure 2.5
Variant of Grill

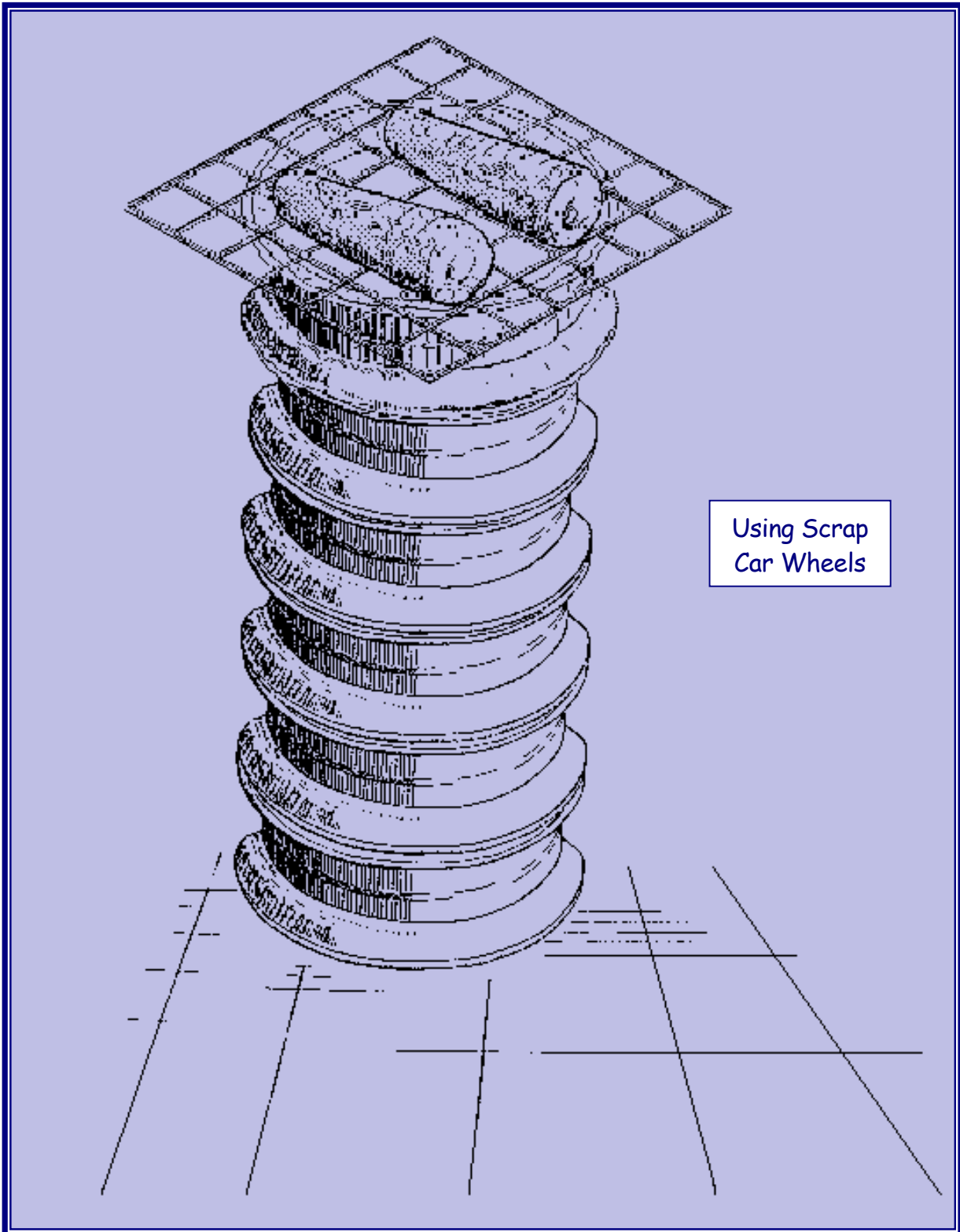


Figure 2.6
Simple Vending Appliance

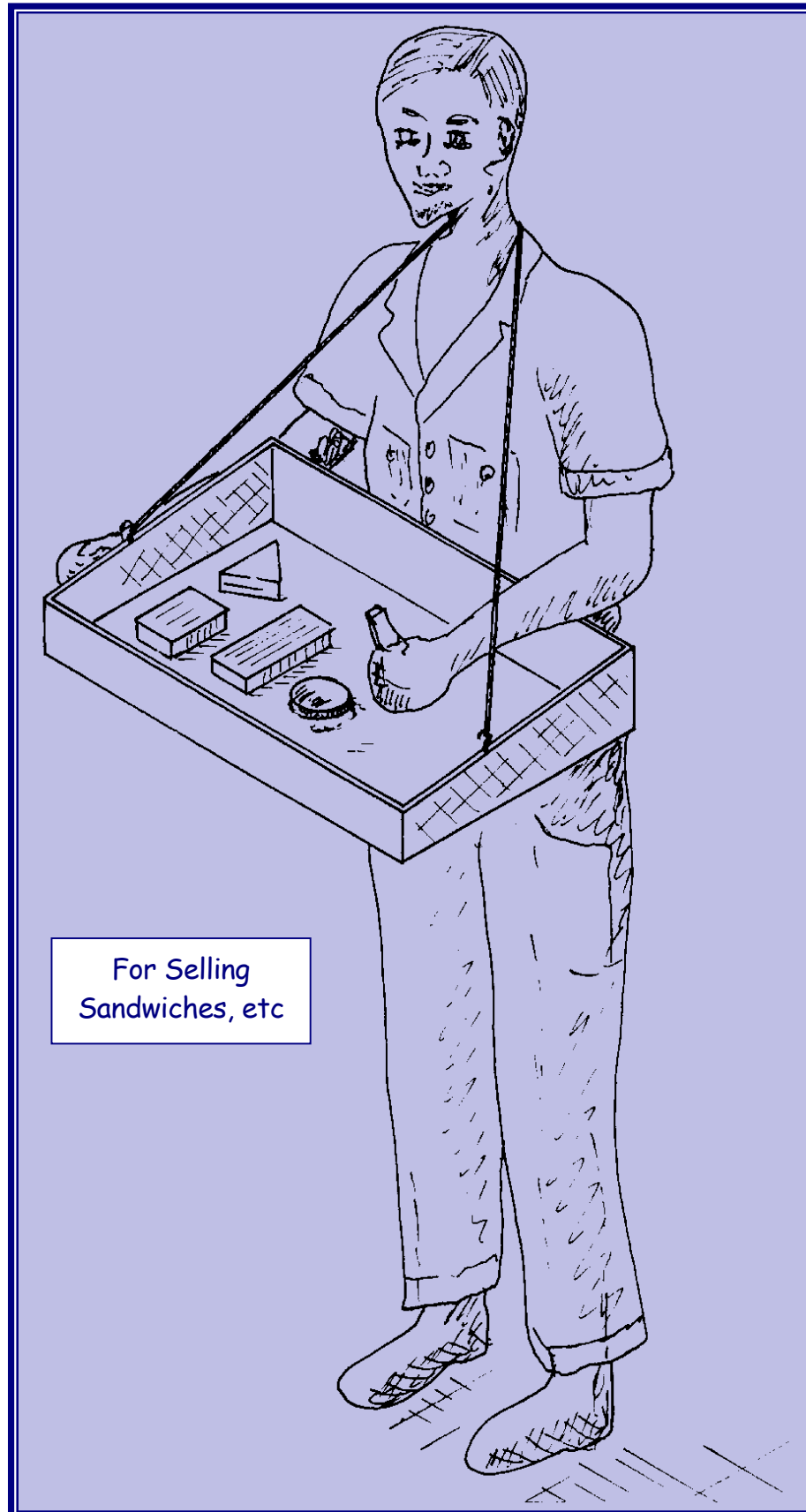


Figure 2.7
Mobile Chip Fryer

Bicycle Trailer Type

(The design could also be modified for use as a Handcart
or for use with a Wheelchair)

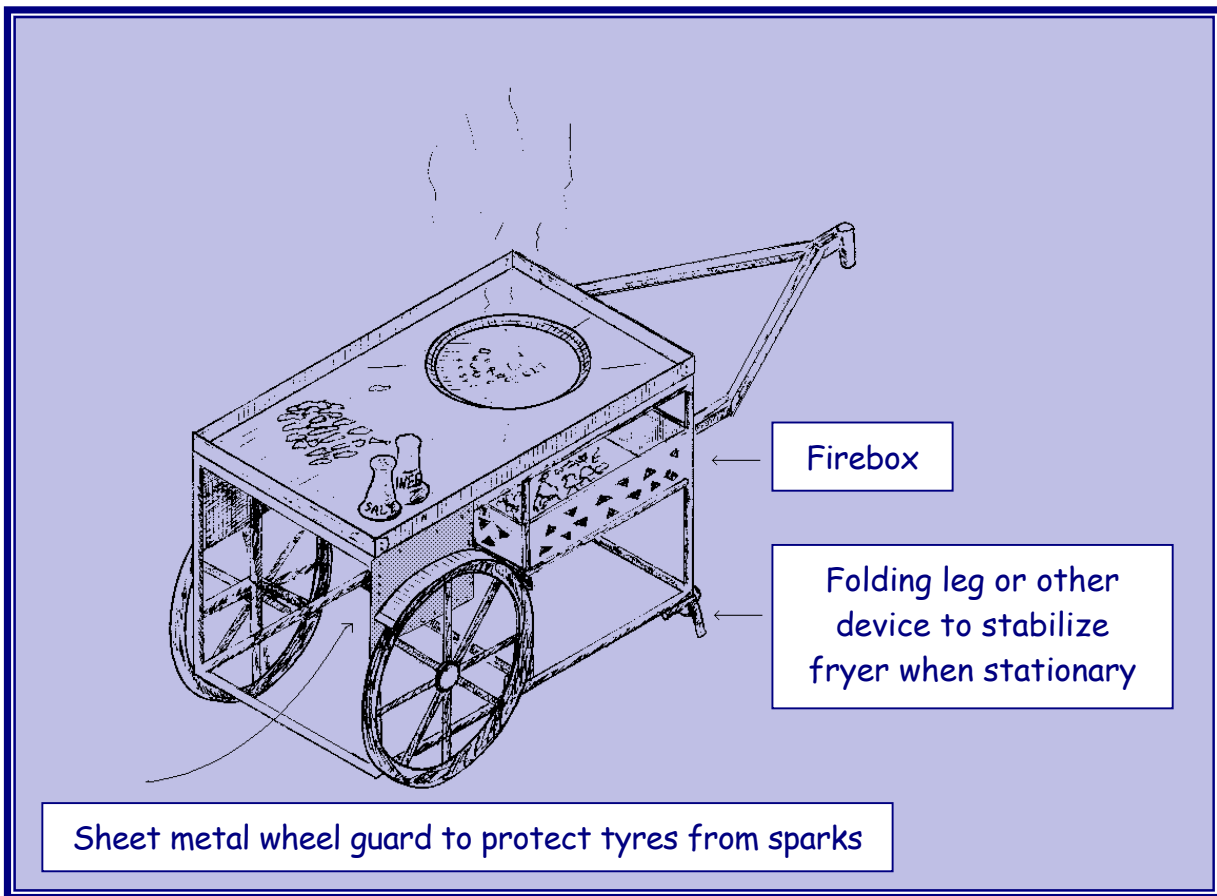
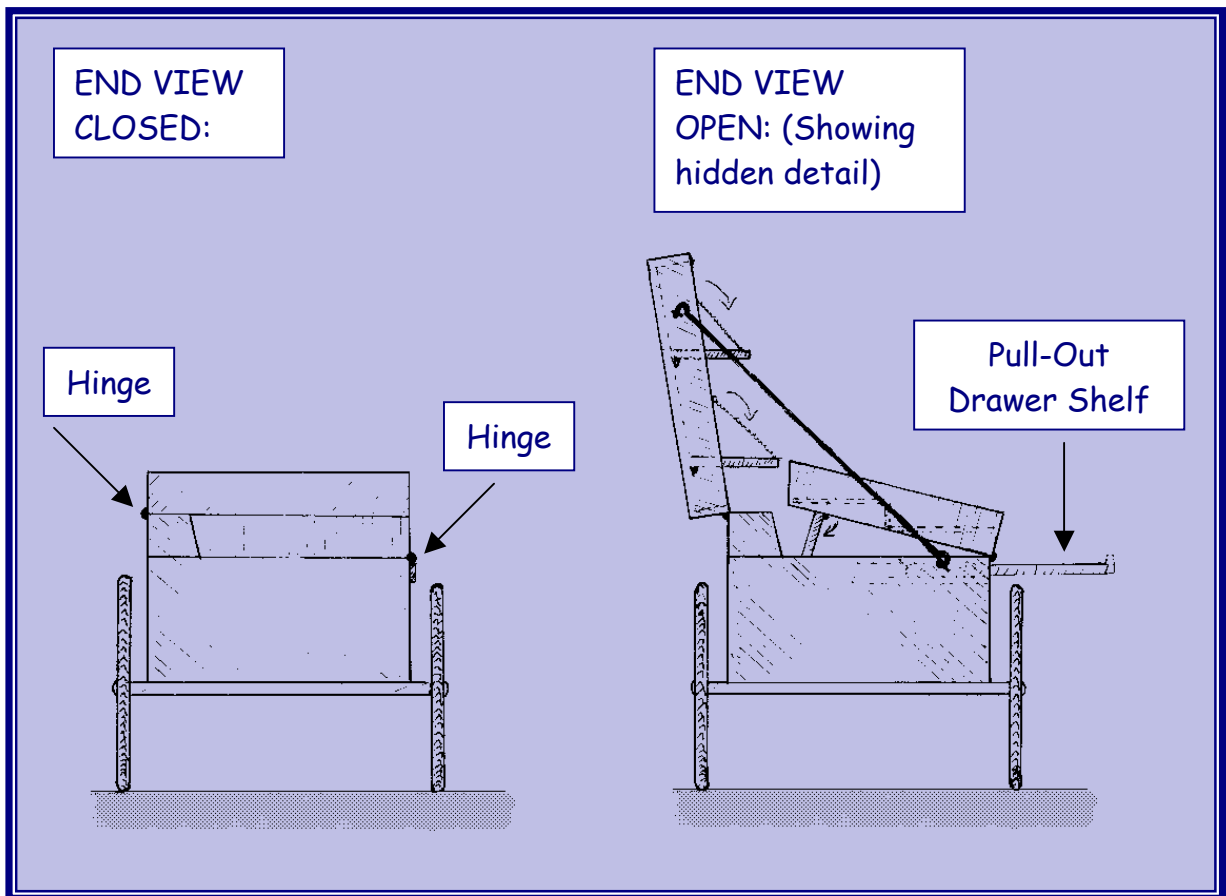


Figure 2.8
A Wheelchair or Bicycle Trailer
Fast-Food Vending Stall



Continued ...

(Figure 2.8 Continued)

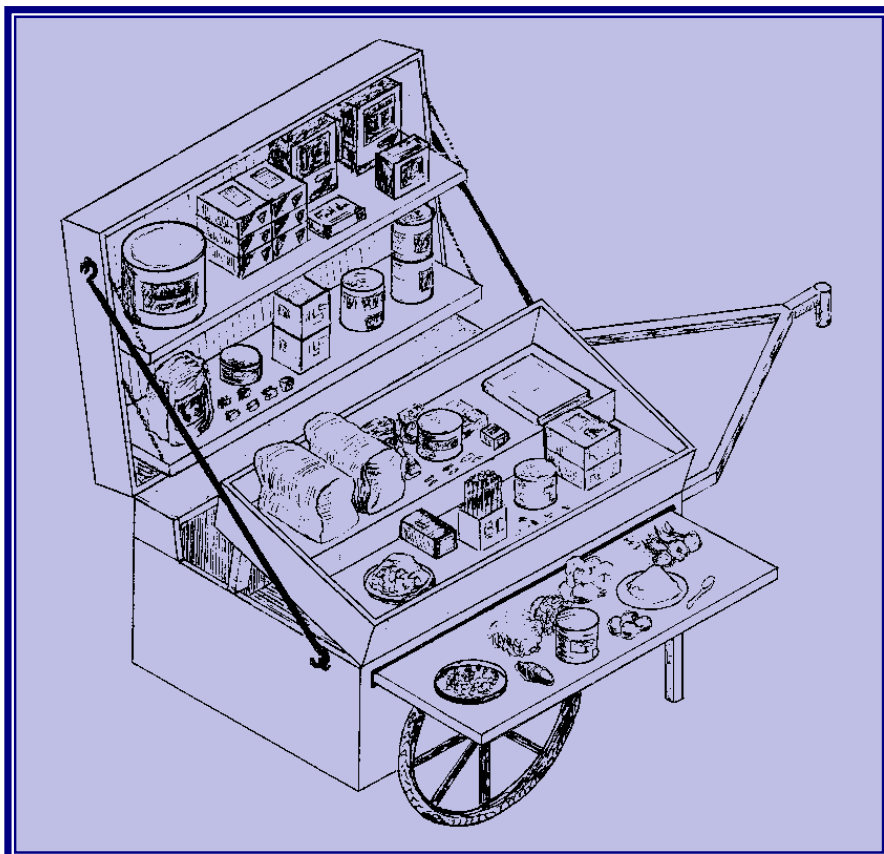
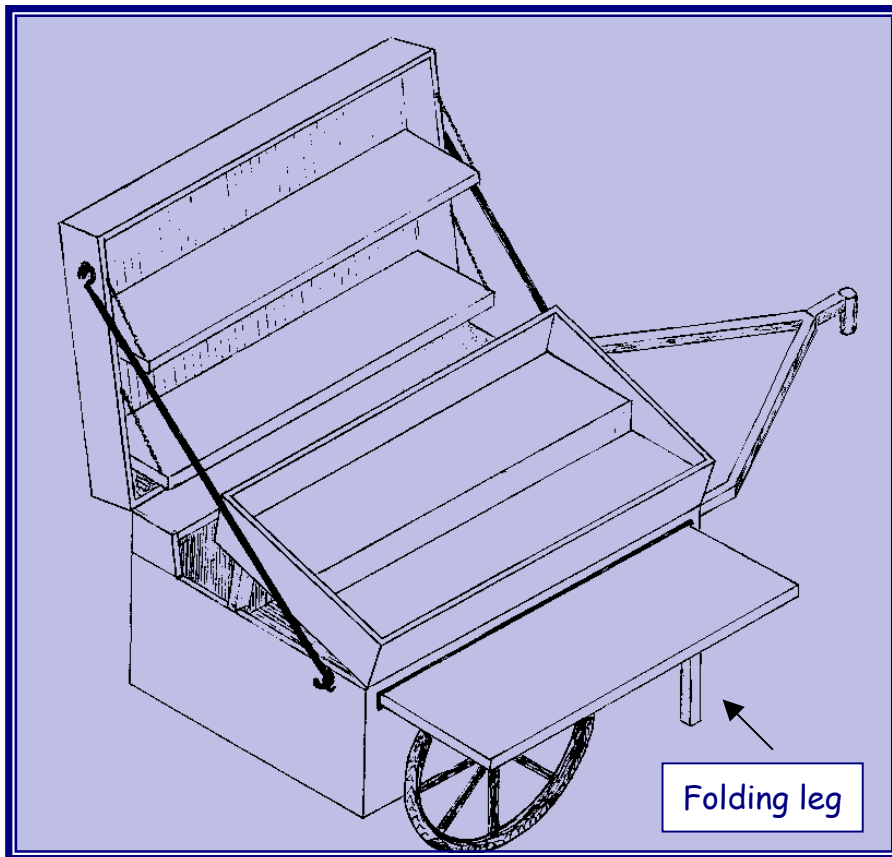
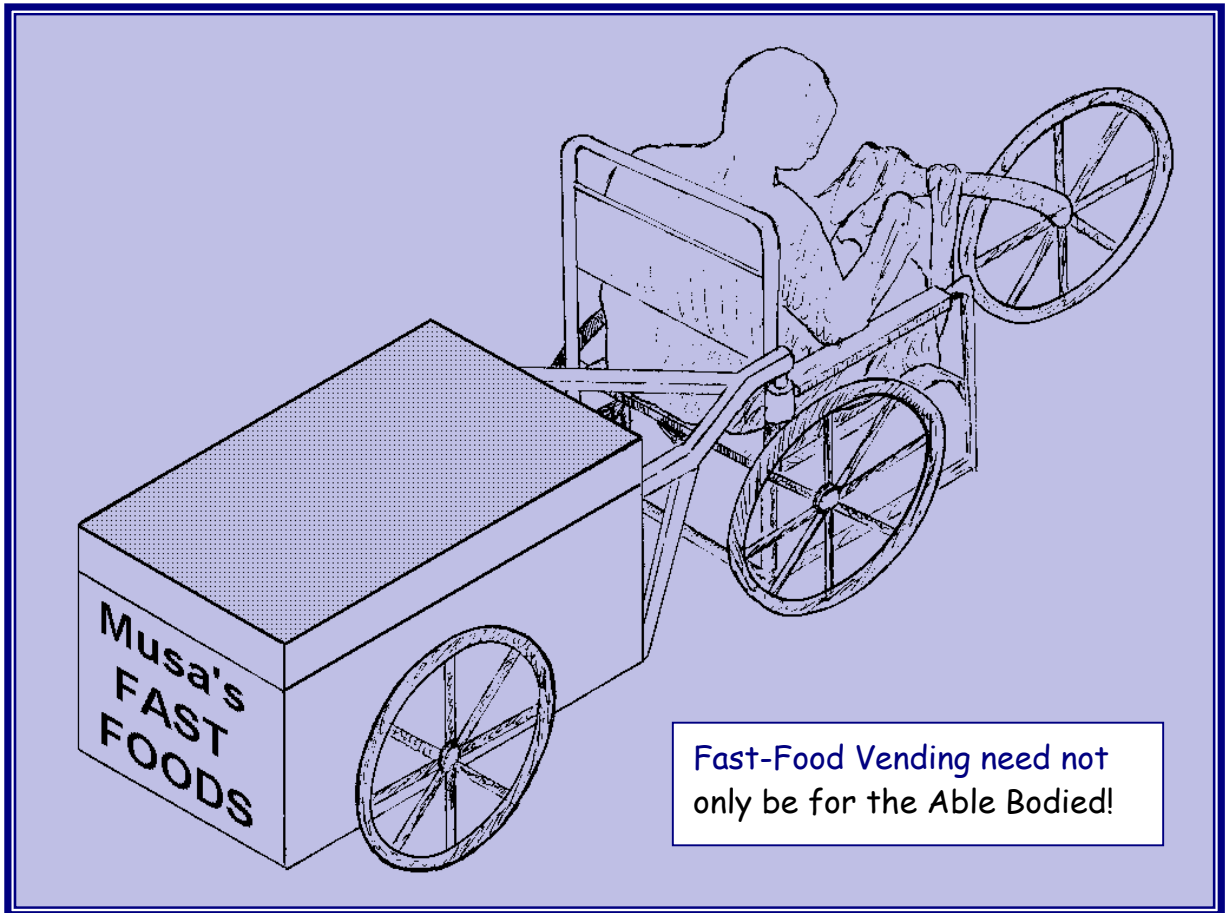


Figure 2.9
Wheelchair and Fast-Food Vending Trailer



How to Make Fast-Food Vending Equipment from Oil Drums

In this section detailed, step by step, instructions are provided showing how to make three pieces of vending equipment from old oil drums: one a fryer, the second a two-pot cooker, and the third a barbecue/grill cooker. An **Annex** at the back of this book provides some information on tinsmithing tools, skills and techniques associated with making the vending equipment detailed. This may be of particular interest to the development agency or worker planning to make, or have made, a number of fryers as part of a development project.

Although the tools and equipment required for making vending equipment out of an oil drum are very basic, and what is involved in construction is only very simple, for an individual who is seeking to produce only one piece of equipment, it may be more appropriate for that individual not to buy, improvise, or borrow the necessary tools, practice the necessary skills, and attempt the fabrication him or herself, but rather to commission a local tinsmith to make the equipment using the drawings and instructions provided. Use of an old, standard (i.e. 50 litre), oil drum is suggested merely as a notional, and obvious, scrap metal source. When the two ends of the drum are separated and discarded and the remaining cylinder is split and flattened (Steps 1 to 5 below), what remains, and is used, is a flat, rectangular, sheet of approximately 24 gauge [*], mild steel, roughly 1780mm long, by 865mm wide. Any alternative source of fairly similar metal will be just as satisfactory!

There is much scope to modify the design to individual circumstances and preferences and to take into account available materials. The equipment detailed is designed to burn wood or charcoal. It could, for example, easily be modified to house a gas or paraffin burner or one of the cylindrical, metal and ceramic, fuel-saving types of cooker, becoming common in many developing countries.

[*] The thickness of metal used in drums varies. Drums designed to contain a highly flammable substance, such as petrol, may be heavier gauge than those used for, say, diesel, oil, or other non flammable substances. Any type of drum will be satisfactory. Thinner gauge metal is easier to cut and bend into shape, but heavier gauge metal may be slightly longer lasting, especially in the case of parts exposed to fire.

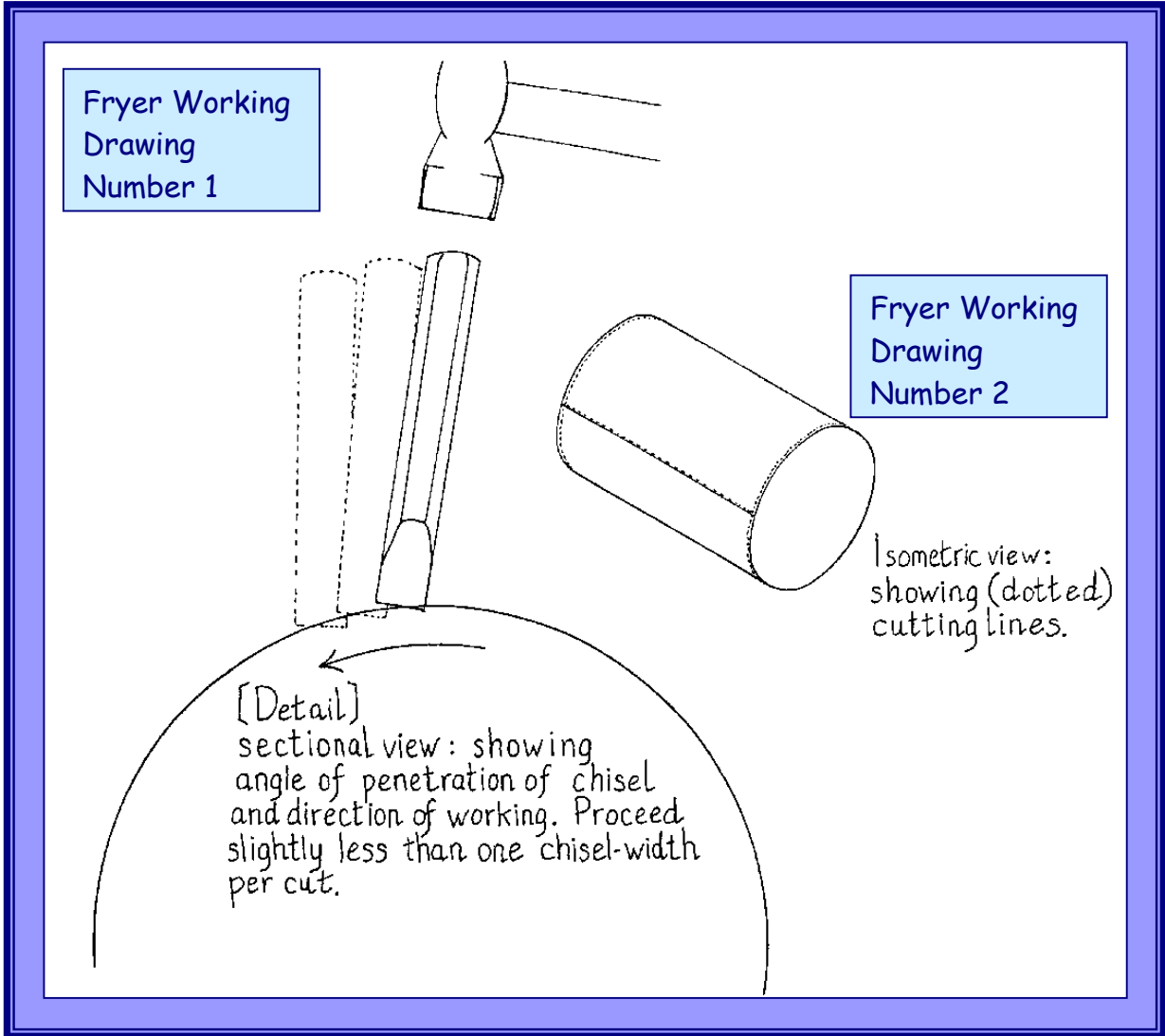
A Note on the Interpretation of Working Drawings:

Within the working drawings that follow: all dotted lines represent fold lines; all hatched areas are waste; and all dimensions are in millimetres. Where components are obviously symmetrical, dimensions have not been repeated.

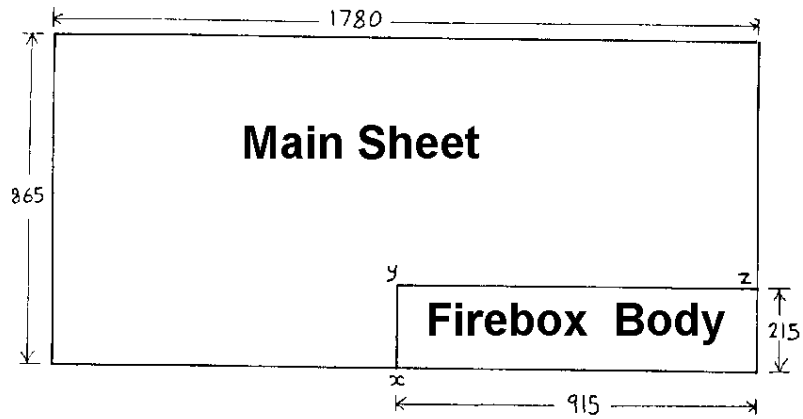
How to Make a Fryer

- Step 1: Using a medium hammer, and a chisel of about 25mm, cut off one end of the drum. See Fryer Working Drawings Numbers 1 and 2 and the **Annex** at the back of the book on tinsmithing tools and techniques. If the drum already has one end removed, Step 1 will not be necessary. Go straight to Step 2.
- Step 2: Cut open the drum by chiselling down its join. The join gives a good guide for a straight cut. Cut from the closed end of the drum to stop it shaking.
- Step 3: Cut off the other end of the drum as in Step 1.
- Step 4: Working on hard, flat, earth, pull open the drum with the hands and try to flatten it with the feet. Turn over the sheet and flatten with the feet. Beat out any pressed ridges on the sheet with a heavy hammer or mallet. Hammer out any dents left. You should now have a flat sheet, about 1780mm X 865mm.
- Step 5: Mark out the firebox body. See Fryer Working Drawings Numbers 3 and 4 for details. Lines can be scratched with a nail, or other pointed metal object.
- Step 6: With a hammer and chisel, or with snips, cut along lines as shown in Fryer Working Drawing Number 3, to separate the firebox body from the main sheet.



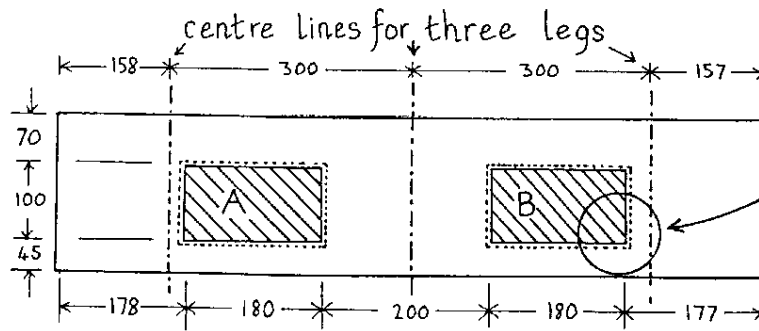
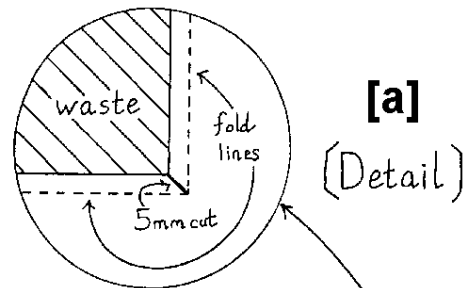


Fryer Working Drawing Number 3

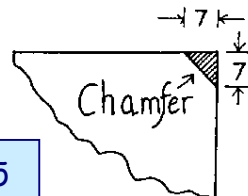


Fryer Working Drawing Number 4

Firebox Body



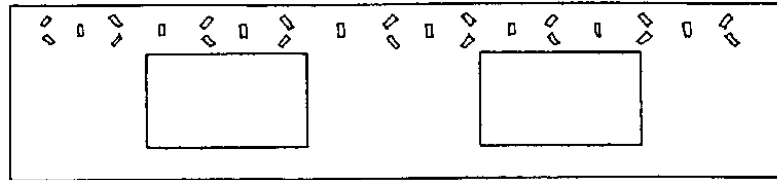
All Dimensions in millimetres



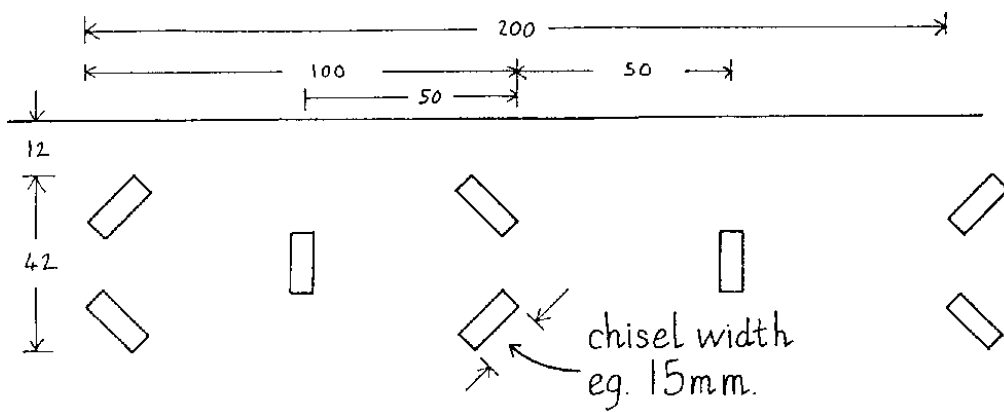
Fryer Working Drawing Number 5

- Step 7: Cut out, with a hammer and chisel, waste pieces A and B, to make holes for firewood or charcoal. The waste pieces can be cut out with a hammer and small chisel. As an alternative, a hole can be punched and snips used. Make four, 5mm, cuts, as shown, in Fryer Working Drawing Number 4(a). Then, on a straight anvil edge, make a 180 degree, hammered, fold on the marked line, on all the sides of each hole. This will add strength and make smoother, safer, edges. The **Annex** at the back of the book, on tinsmithing techniques, provides further details on how to hammer a folded edge.
- Step 8: Using snips, or a chisel, cut off the four corners of the firebox body. See Fryer Working Drawing Number 5. Hammer the sheet flat. Scratch marks on the sheet where the three legs will be attached. See Fryer Working Drawing Number 4.
- Step 9: Punch air holes through the firebox body before it is rolled into a cylinder. A hammer and 15mm chisel are used for this. The sheet can be placed on the hard earth or over a hole in an anvil. The places of the holes need not be exact. Fryer Working Drawing Number 6 shows one suitable pattern. Fryer Working Drawing Number 7 shows details of the spacing required for this. The flanges produced by making the holes should be hammered flat on an anvil, as shown in Fryer Working Drawing Number 8. Hammer in a diagonal direction so that each flange is hammered back into a 180 degree fold.
- Step 10: The two short sides of the firebox body must now be prepared for a folded joint seam. Using a hammer and an anvil edge, make a 10mm, 45 degree, fold on one short side. See Fryer Working Drawing Number 9(a). Then, on the same flange, make a 4mm, 135 degree reverse fold. See Fryer Working Drawing Number 9(b). Do the same on the other short side, but note that the folds are made in the opposite directions. See Fryer Working Drawings Numbers 9(c) and 9(d).
- Step 11: Shape the firebox sheet by hand, into a cylinder shape. Pressing against a pipe may help in making it round. Hook the folds together and hammer down the folded joint over an anvil. See Fryer Working Drawing Number 10. Turn the box over and hammer the seam from the inside. Press by hand, or hammer gently, to make the shape round again.

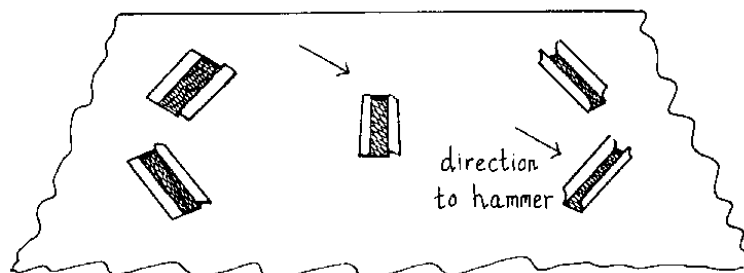
Fryer Working Drawing Number 6



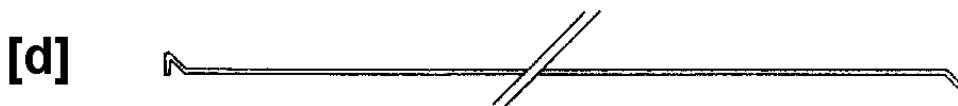
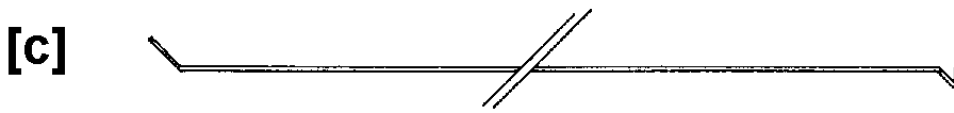
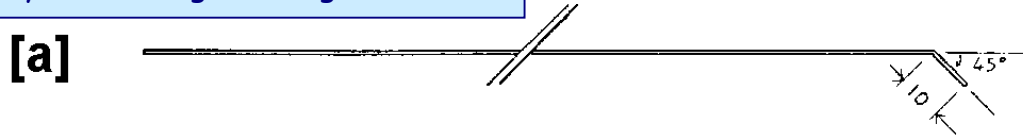
Fryer Working Drawing Number 7



Fryer Working Drawing Number 8



Fryer Working Drawing Number 9

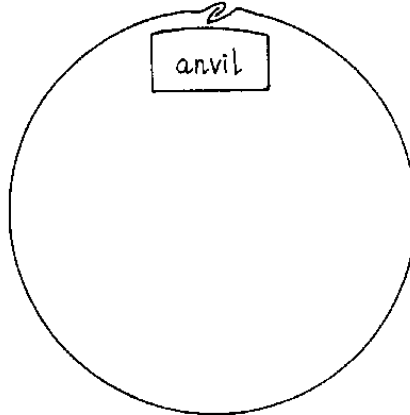


hammer down

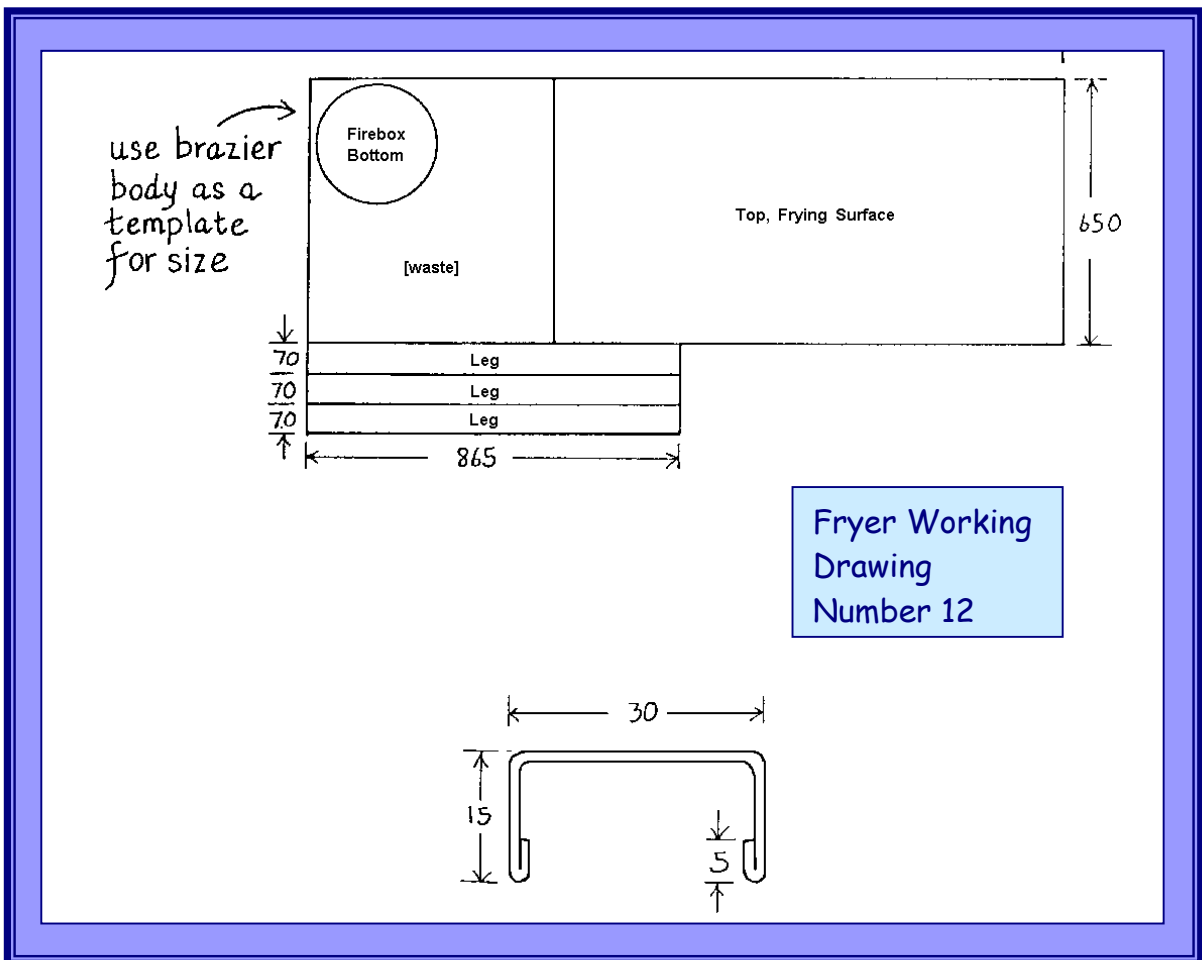
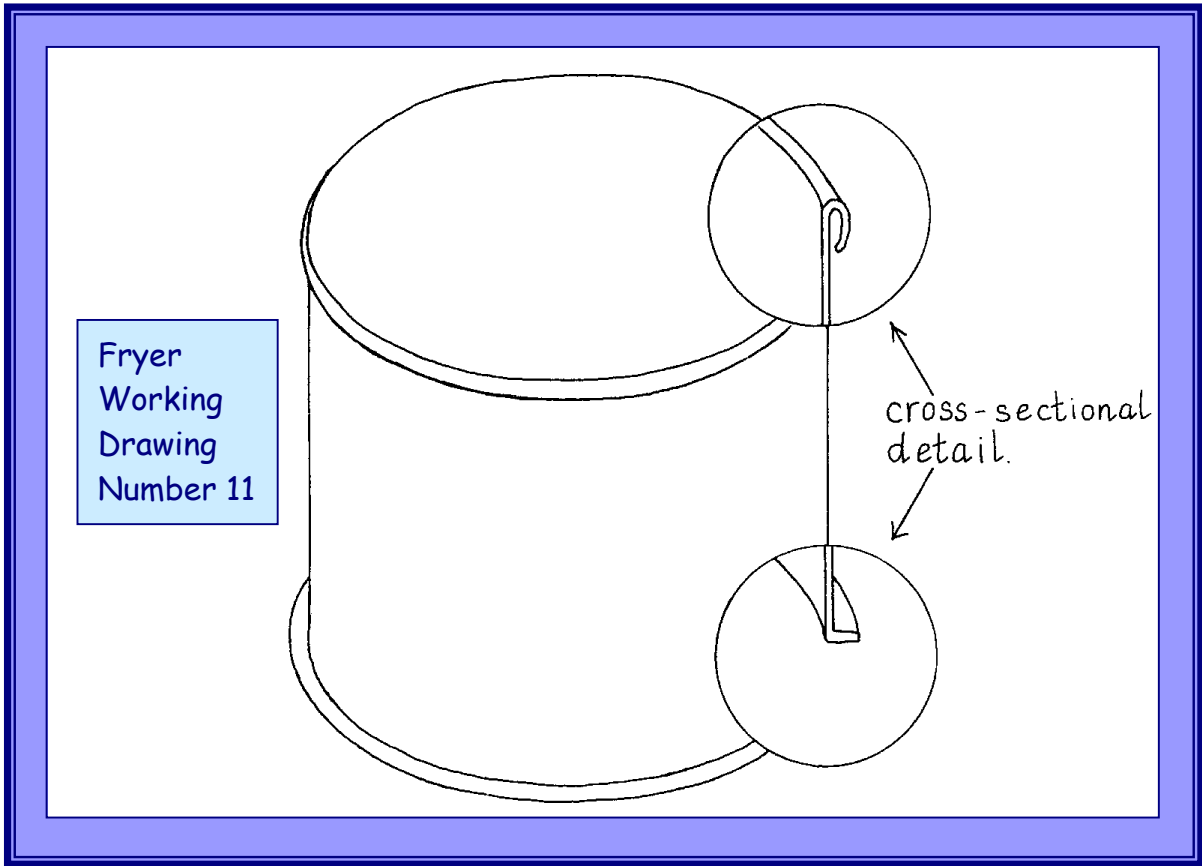


anvil

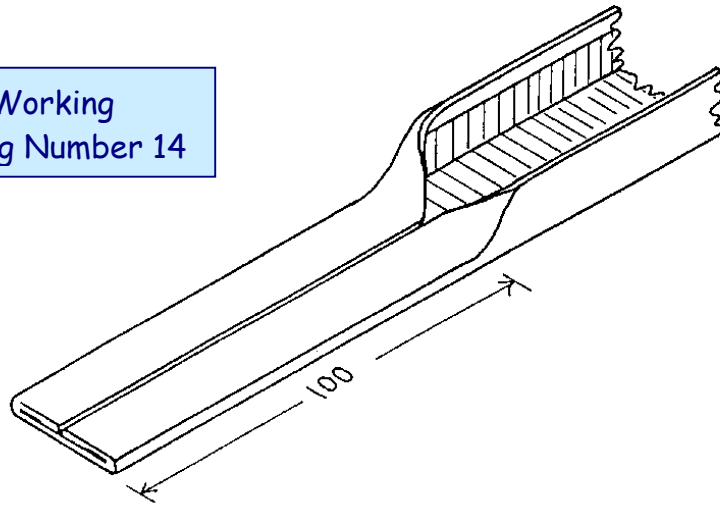
Fryer Working Drawing Number 10



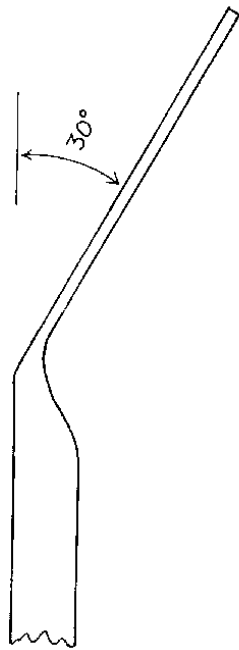
- Step 12: Using a hammer and anvil, bend out a, 6mm, 90 degree lip all round the top edge of the firebox body. Now hammer this lip further over to make a full 180 degree fold. See Fryer Working Drawing Number 11. In the same way, bend out a sharp, 6mm, 90 degree fold on the bottom edge. Leave this at 90 degrees. See Fryer Working Drawing Number 11. Make the firebox round again, if it has become misshaped.
- Step 13: To make the firebox bottom, place the firebox body within 10mm of the corner of the original sheet of metal. See Fryer Working Drawing Number 12. The bottom flange of the firebox should be against the main sheet. Scratch a line round the outside edge of the bottom flange. Using a hammer and chisel, or snips, cut 7mm OUTSIDE of the scratched line.
- Step 14: To join the firebox base to the firebox body, with the help of an anvil, hammer a 6mm, 90 degree flange, all round the edge of the base piece. Test fit the base to the body, and make any adjustments needed. It should be a "press fit". When this is done, hammer over the flange of the base the full 180 degrees to make a secure join.
- Step 15: The three firebox legs and the top frying surface can now be marked out and cut from what is left of the original sheet. See Fryer Working Drawing Number 12.
- Step 16: Each leg is hammer folded to give a cross section as indicted in Fryer Working Drawing Number 13. Make a 5mm, 180 degree fold along each long edge. Then make a 15mm, 90 degree fold along each of these edges. At both ends of each leg, for a length of 100mm, hammer over the edges to the full 180 degrees. See Fryer Working Drawing Number 14. On the top end only of each leg, hammer a 30 degree bend. See Fryer Working Drawing Number 15. At the bottom end only of each leg hammer a 90 degree bend for the feet. See Fryer Working Drawing Number 16.
- Step 17: Hammer the firebox base flange through 90 degrees to touch against the firebox body at the three marked places where the legs will be riveted. This will allow the to legs fit close to the side of the body. See Fryer Working Drawing Number 17.



Fryer Working
Drawing Number 14

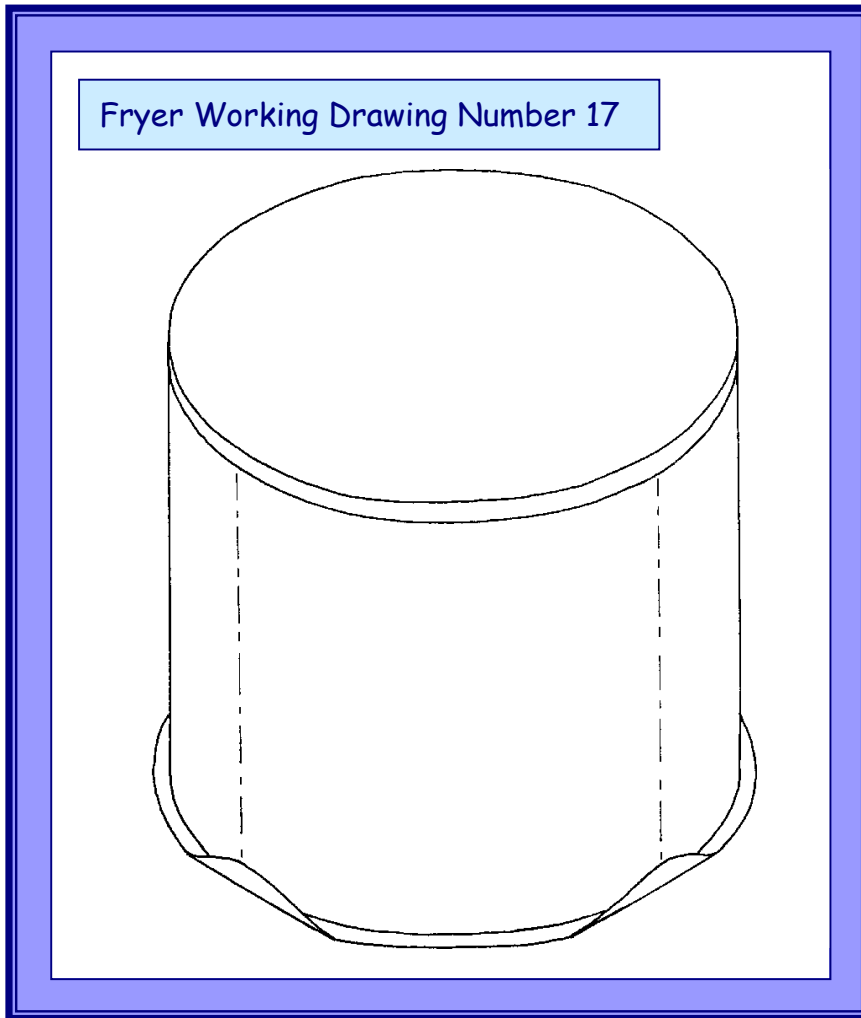


Fryer Working
Drawing Number 15

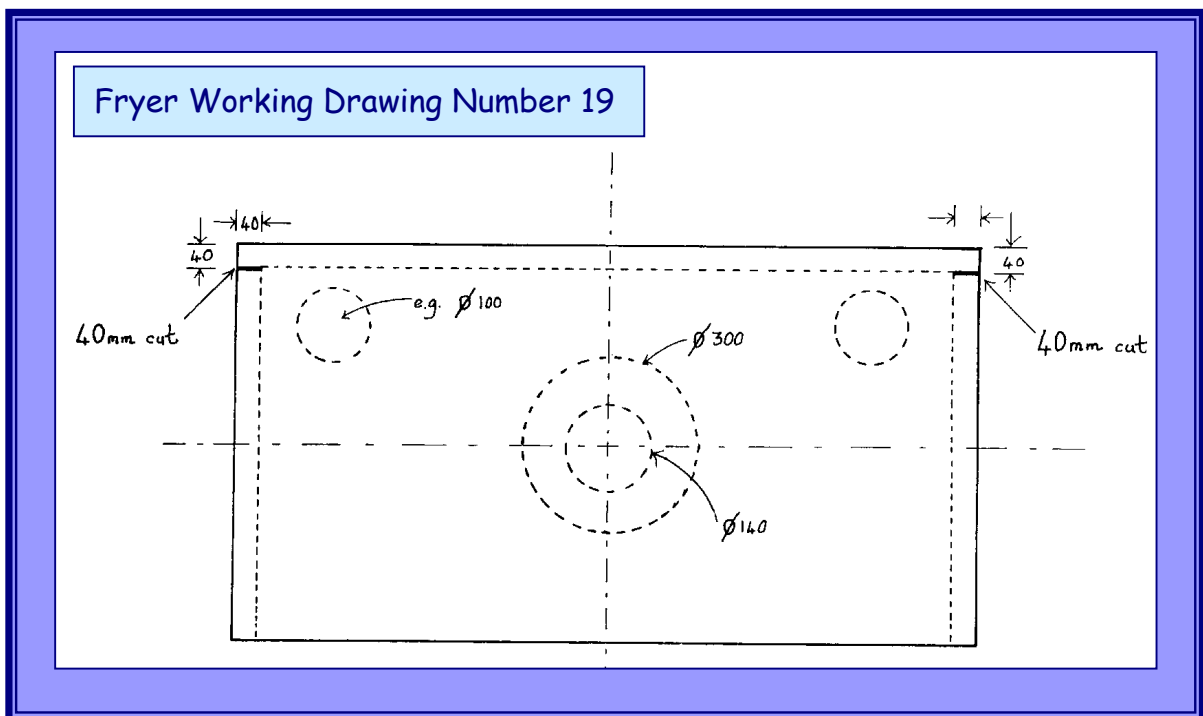
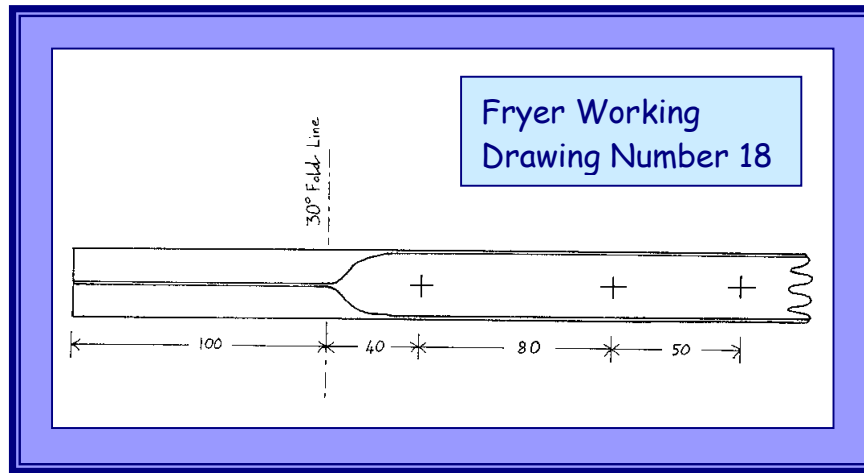


Fryer Working
Drawing Number 16





Step 18: Fryer Working Drawing Number 18 shows where three holes are to be punched in each leg to take rivets. It is recommended that, for each leg, only one hole be punched to start with. The leg should then be placed against the firebox body and a hole punched through into the firebox body. To get the legs the same length, the 30-degree fold line near the top of each leg should be placed against the top lip of the firebox body. In other words, the angled part of the three legs should protrude above the top of the firebox (to make a tripod stand for the top frying surface). After inserting and hammering the first rivet, the places for the second and third rivets can be checked and marked. Punch these holes and hammer down the rivets. Completely secure one leg at a time and place the rivets with their heads on the inside of the firebox.



Step 19: Hammer fold a 5mm, 180 degree, safety and strengthening edge on all four sides of the sheet that will make the top frying surface.

Step 20: Lightly scratch two diagonal lines to find the centre of the sheet. From this central point scribe two circles: one at 140mm diameter, the other 300mm diameter. Panel beat a concave dish, working from the centre to the first circle. Use of an old flywheel, or scrap lorry wheel with a hole in its centre, is good for this job. Continue panel beating outwards to the larger circle. Repeat the procedure, always working from the centre outwards, until a depth of pan of 50mm is obtained.

Step 21: Depending on what the fryer is to be used for, it may need one or two smaller depressions to hold salt, vinegar, or sauces. See Fryer Working Drawing Number 19. These can be panel beaten the same way as the centre dish.

Step 22: Scratch a fold line 40mm from the edge, on three sides of the sheet. See Fryer Working Drawing Number 19. Make two, 40mm, cuts as shown in Fryer Working Drawing Number 19. Fold up three of the sides of the frying surface along the fold lines. The two shorter sides should be folded first. The 40mm flaps on the longer edge should be hammer folded through 90 degrees, up against the shorter sides. These flaps may be riveted, though this is not necessary.

Step 22: Place the frying surface on the firebox. Make any changes needed to the angle of the top ends of the legs to give a good fit. See Fryer Working Drawing Number 15. Note the direction of drainage of the frying surface round the pan. Make whatever hammered and hand pressed adjustments are needed to drain the fat back into the pan. This testing is best carried out with water.

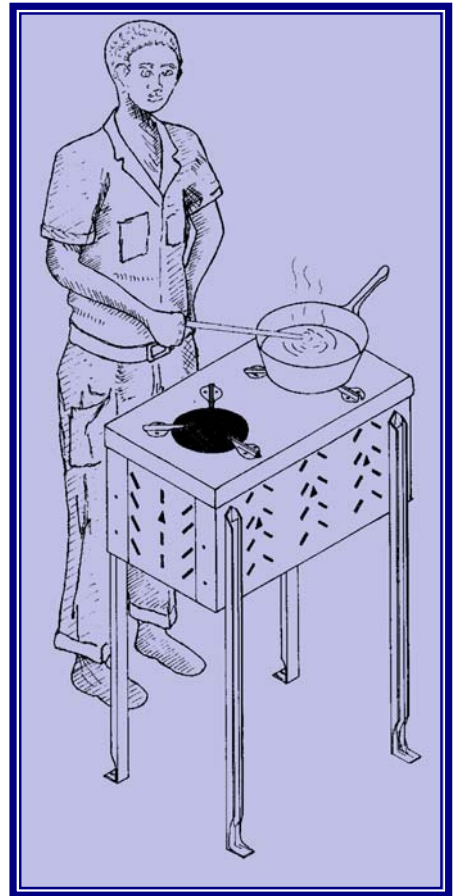
The fryer is now complete.



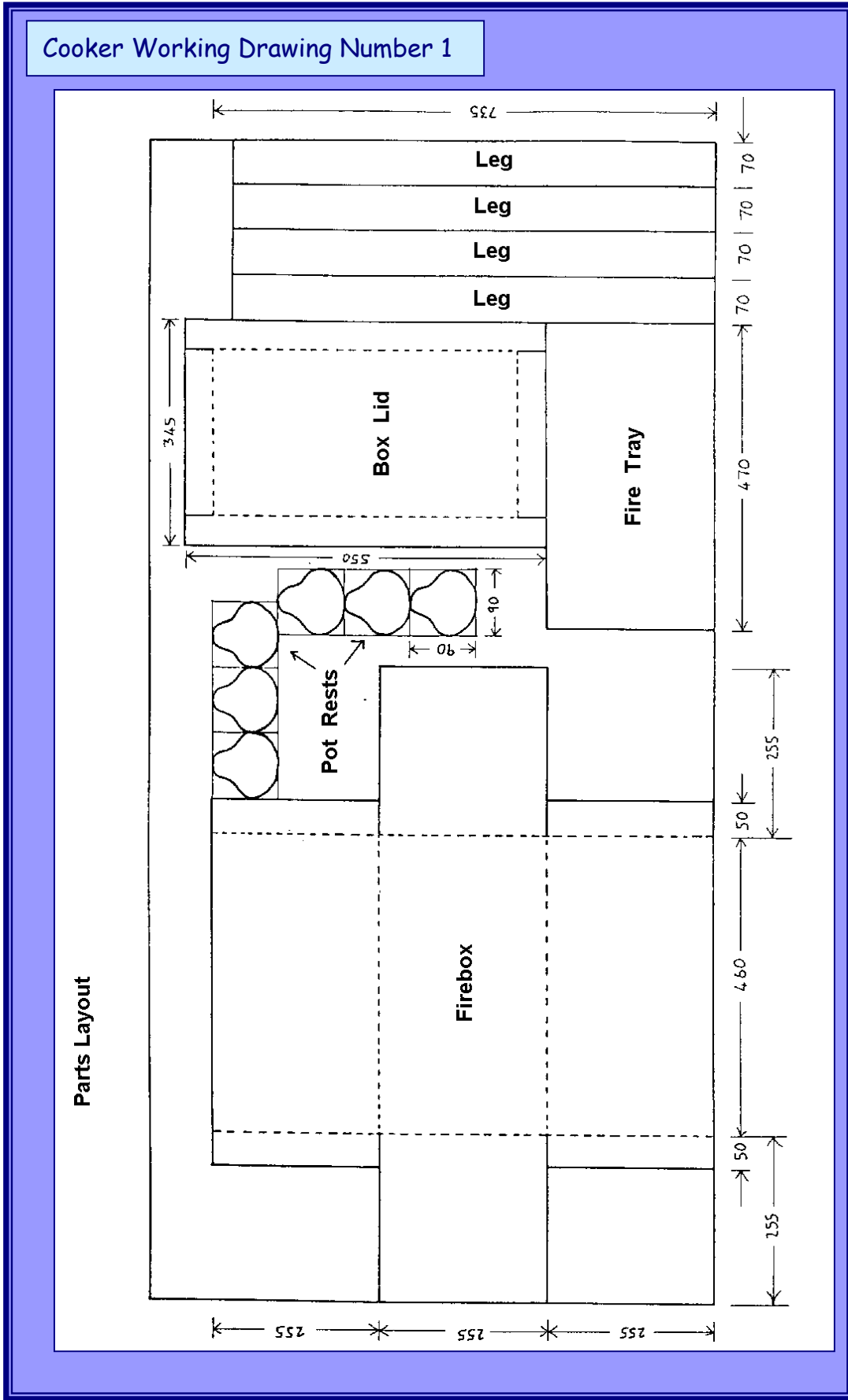
How to Make a Two-Pot Cooker

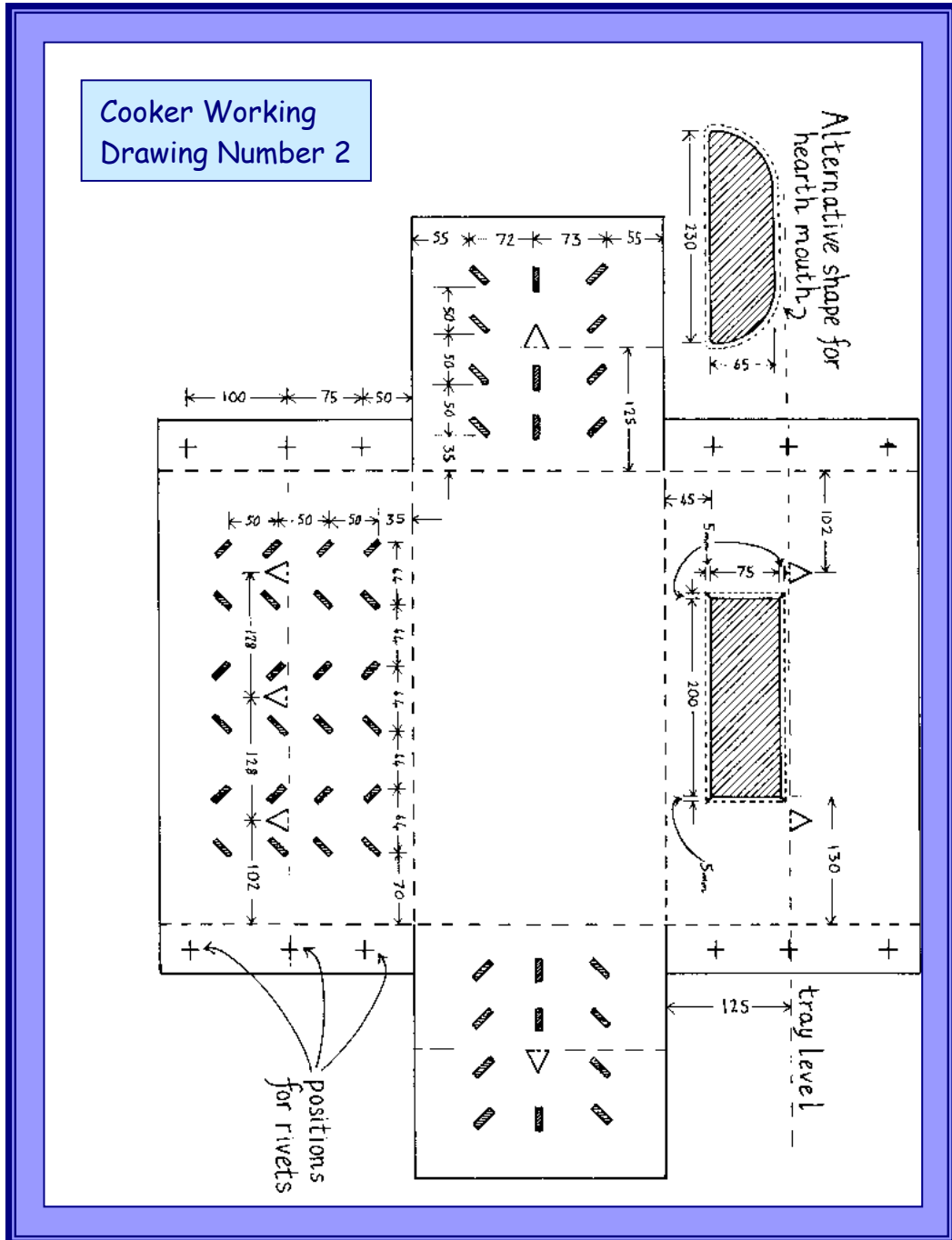
The two-pot cooker detailed can use either charcoal or wood as fuel. For burning charcoal the fire tray should be inserted to create an upper and lower compartment. The charcoal is placed on the fire tray. The lower compartment serves to provide upward ventilation and to collect ash. For burning wood, the fire tray should be removed: creating a single, large, combustion chamber.

To avoid undue repetition, it is presumed that a suitable piece of metal sheet has already been cut and flattened from an old oil drum, or otherwise obtained. For details of how to prepare a sheet from an oil drum, please refer to Steps 1 to 4 of the instructions for making a fryer.



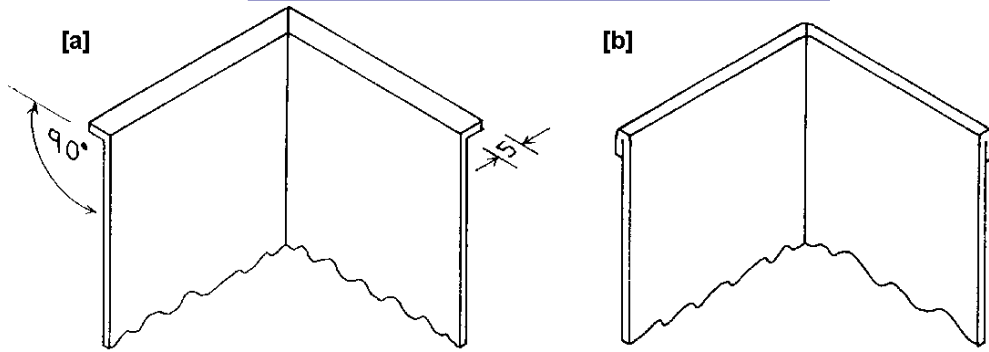
- Step 1: See Cooker Working Drawings Numbers 1 and 2 and scratch mark out the plan of the firebox body. Cooker Working Drawing Number 1 provides details of the layout arrangement for obtaining other parts from the main sheet: the fire tray; the firebox top; and the four legs. Do not mark out these parts at this stage. The reason for this will become clear later.
- Step 2: Cut out the plan of the rectangular box, using snips or a hammer and chisel. For more information on appropriate tinsmithing techniques, see the **Annex** at the back of the book.
- Step 3: Chisel punch air holes on the box sides. These can be to any pattern or to the one suggested in Cooker Working Drawing Number 2. For further information on making these holes, see How to Make a Fryer Step 9 and Fryer Working Drawings Numbers 7 and 8 in the section of the book on how to make a fryer.



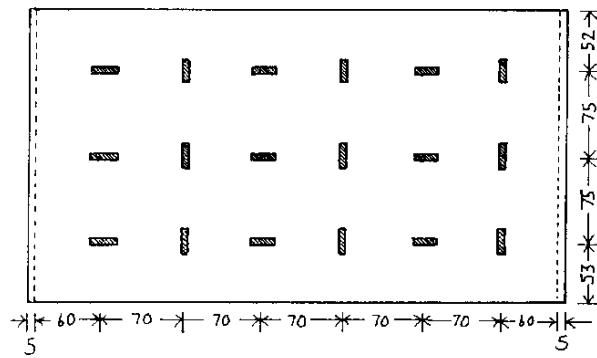


- Step 4: Cut out the firebox mouth and hammer fold four, 5mm, safe edges. For further instructions on how to do this, see Step 7 and the detail of Fryer Working Drawing Number 4 in the section on making a fryer. The **Annex** at the back of the book also contains information on producing safe edges. Cooker Working Drawing Number 2 shows an alternative design shape for a hearth mouth. The only difference is a visual one. Information on how to produce a safe edge on a curve is provided in Step 11 of these instructions.
- Step 5: Hammer fold up the plan into a rectangular box. Use three rivets to secure each of the four, folded, lap joints. Spacings for rivets are shown in Cooker Working Drawing Number 2. Insert the rivets from the inside of the box. Further information on riveting techniques is provided in the **Annex** at the back of the book.
- Step 6: Hammer fold, outwards, a 5mm, 90 degree, flange all around the open top of the firebox, as shown in the corner detail, Cooker Working Drawing Number 3(a). Now hammer this flange fully over to obtain a 180 degree, folded, safe edge all around the top of the box, as shown in the corner detail, Cooker Working Drawing Number 3(b).
- Step 7: Mark and cut out the fire tray. One approach to this task is to rely on the dimensions provided in Cooker Working Drawings Numbers 1 and 4. A better alternative is to use the firebox as a template and to scratch mark around the top. This way, any inaccuracies that crept into the making of the firebox will not matter. If using this method, allow an extra 10mm on the length of the long sides, for folding safe edges on the short sides. Chisel punch air holes in the tray. Any pattern will do, but one is shown in Cooker Working Drawing Number 4. Hammer fold two, 5mm safe edges on the short sides.
- Step 8: The fire tray is held in place by being seated on 7 triangular tabs. These now need to be marked out, cut and folded, on the firebox body. See Cooker Working Drawings Numbers 2 and 5.

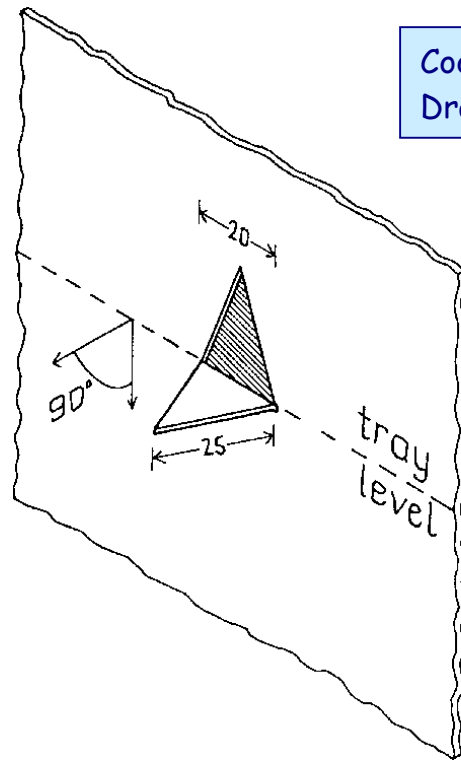
Cooker Working Drawing Number 3



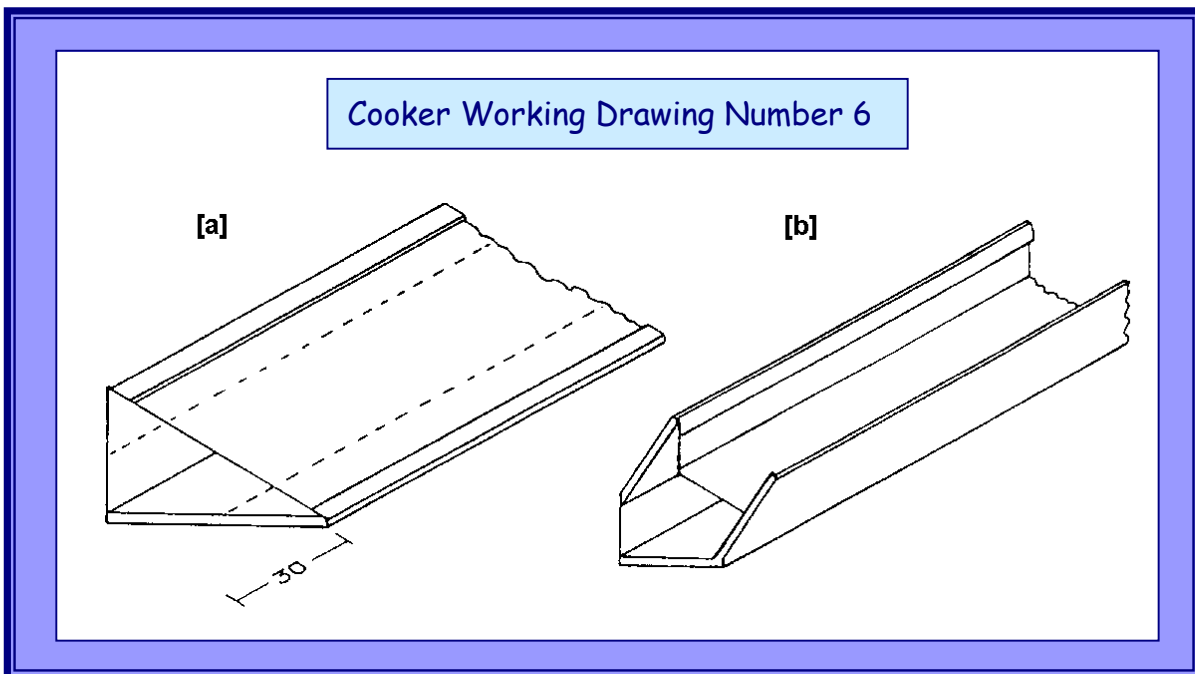
Cooker Working Drawing Number 4



Cooker Working Drawing Number 5

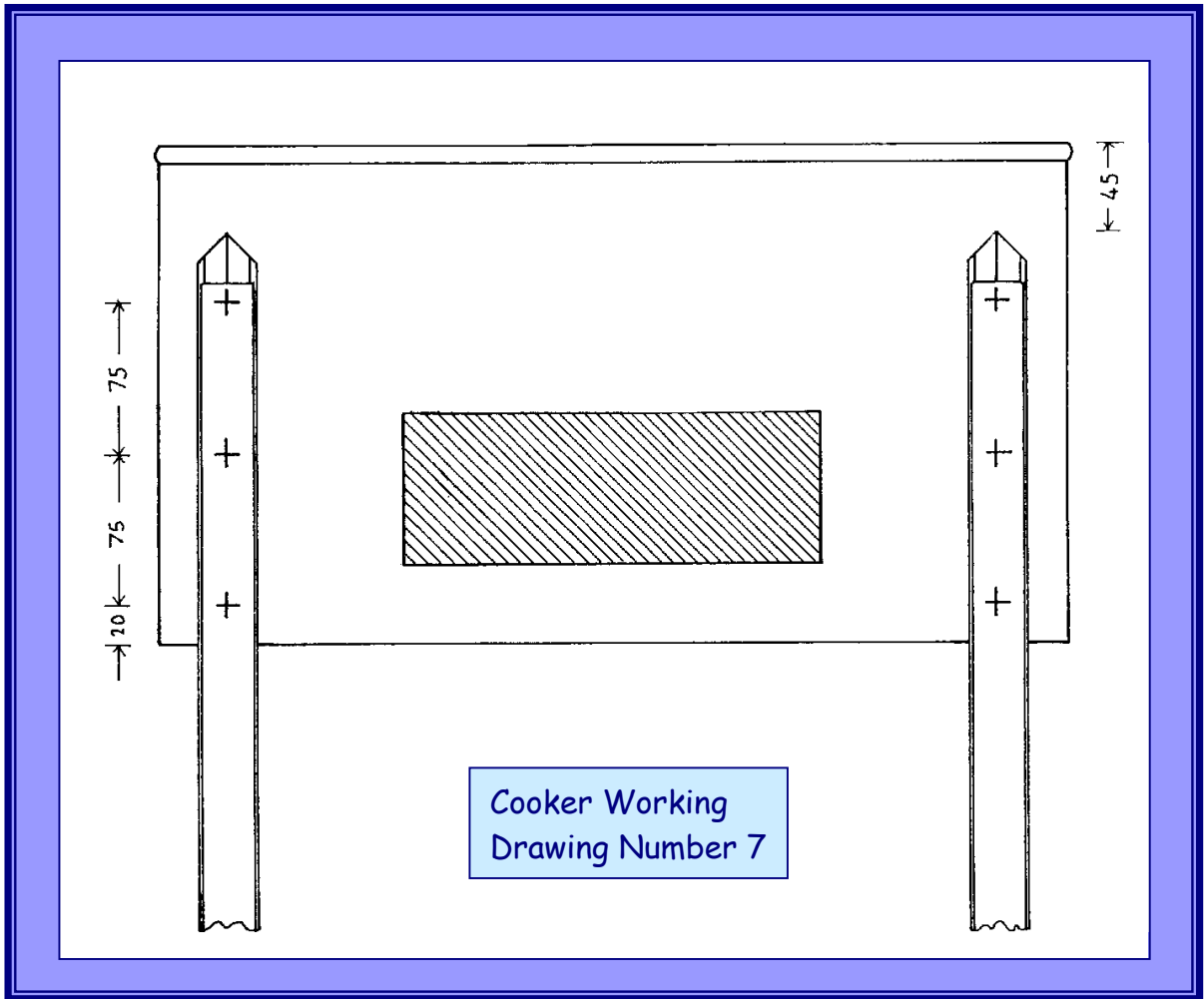


Step 9: The four legs should now be marked and cut out, and then folded up to give the correct cross-section. Dimensions are given in Cooker Working Drawing Number 1. The way to make the legs is identical, in all but one respect, to the fryer. See the instructions on how to make the legs for the fryer: Step 16 and Fryer Working Drawings Numbers 13, 14 and 16. The only difference in the legs of the two-pot cooker is at the upper end. A 45 degree fold is made across each top corner, after the 5mm safe edges are folded, but before the leg is folded into its final cross-sectional shape. This is shown in Cooker Working Drawings Numbers 6(a) and 6(b).

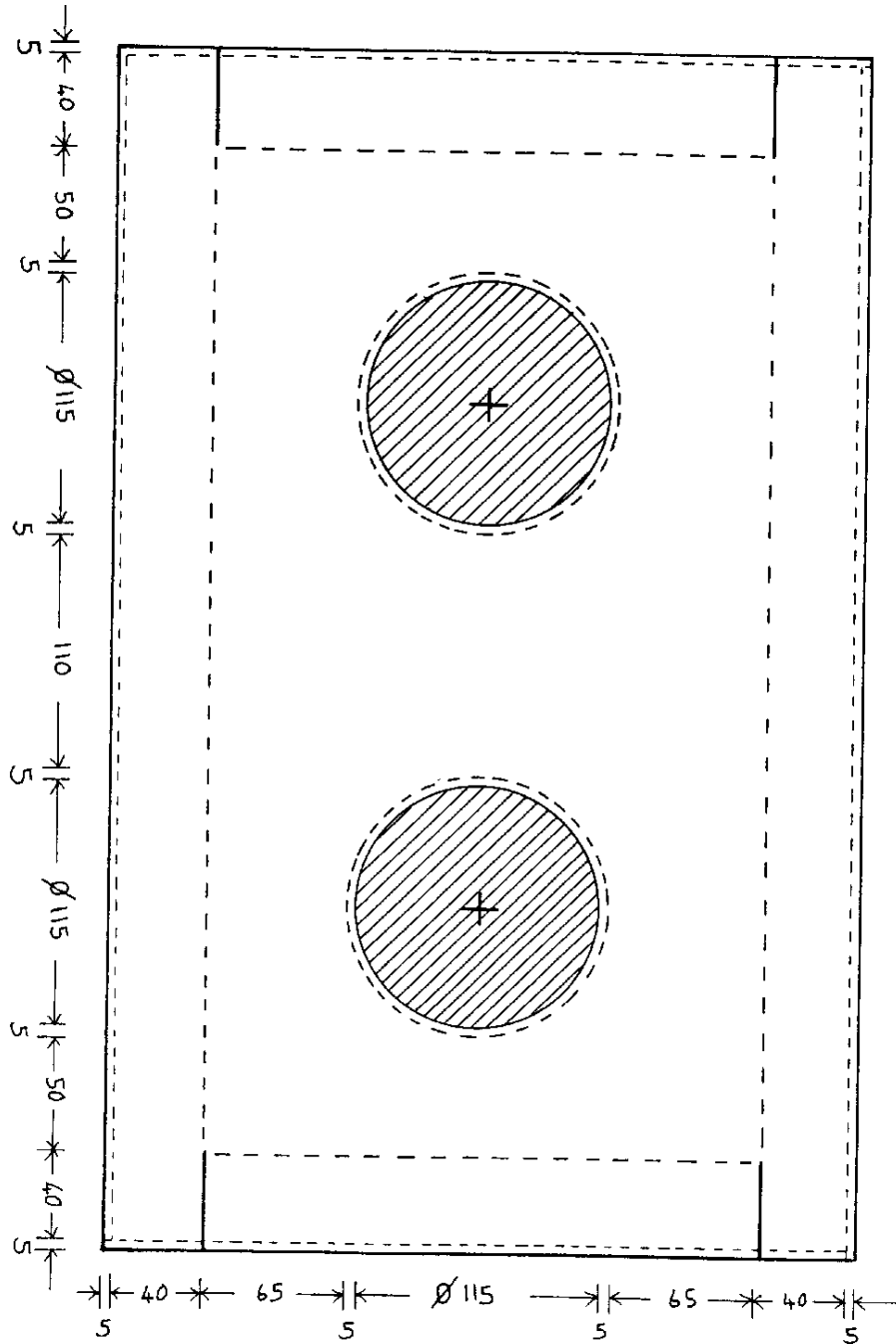


Step 10: The four legs can now be riveted to the cooker firebox. Two legs should be attached to each longer side, as shown in Cooker Working Drawing Number 7.

Step 11: Mark and cut out the box lid. Again, rather than working to the theoretically correct dimensions provided in Cooker Working Drawings Numbers 1 and 8, the firebox may again be used as a template for the outline. If this method is used, a 45mm border needs to be added to allow for the folding up of 5mm safe edges and 40 mm, vertical, lid sides.



Cooker Working Drawing Number 8



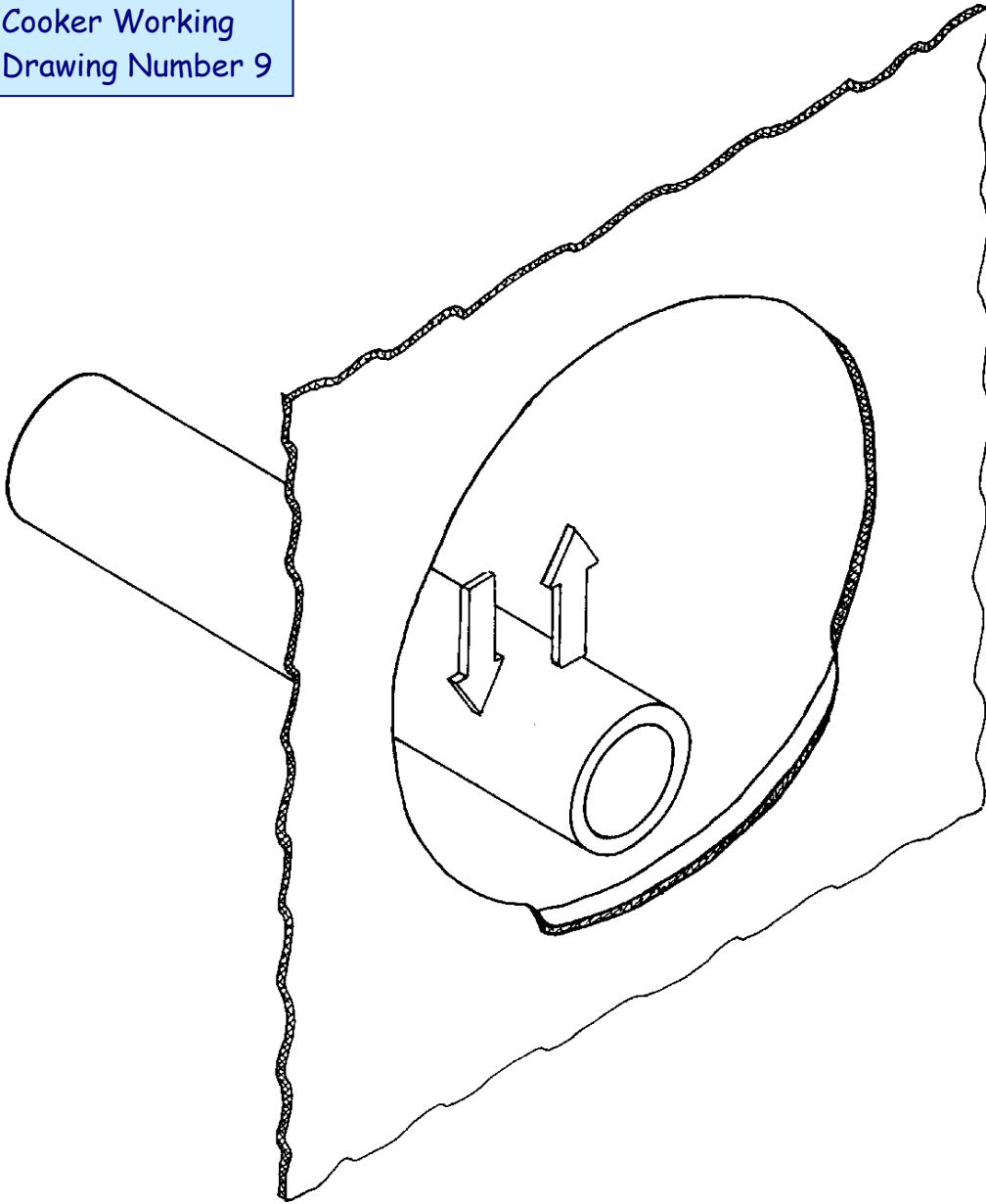
- Step 12: The two, circular, heat outlet holes, shown in Cooker Working Drawing Number 8, should now be marked out and cut. A recommended method of obtaining the 180 degree, 5mm, folded safe edge around the holes, is to start off the first 90 degrees of the fold using a round bar as a hammer, as shown in Cooker Working Drawing Number 9. The remaining 90 degrees of the fold can be hammered back, against an anvil, with an ordinary hammer.
- Step 13: 5mm, safe edges on all four sides of the lid should now be hammer folded and the lid itself then folded up into shape. The lid should be folded in such a way that all safe edge folds are hidden on the inside of the lid.
- Step 14: Lastly, the six lugs, that will comprise feet on which to stand pots during heating (3 per heat outlet), should now be marked out, cut out, and folded into shape. Cooker Working Drawings Numbers 10 and 11 provide necessary details. Once made, the lugs may be riveted into position on the lid, in a 120 degree tripod arrangement. The ends of each lug should stick out approximately 30mm over the heat outlet hole.

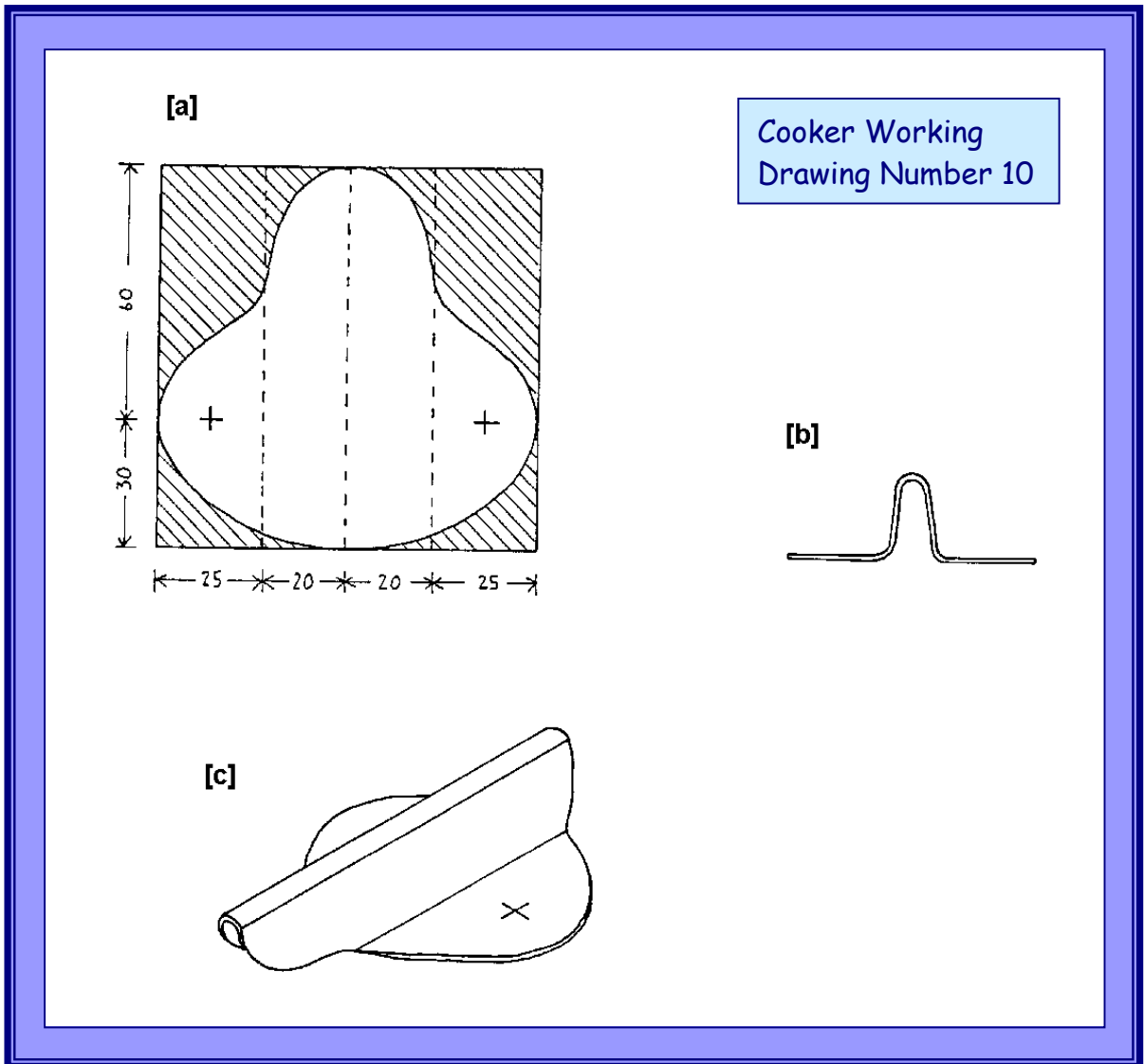
The cooker is now complete.

If a gridiron is made, and instructions for doing this are provided in the next section, the two-pot cooker can also double as a barbecue/grill.

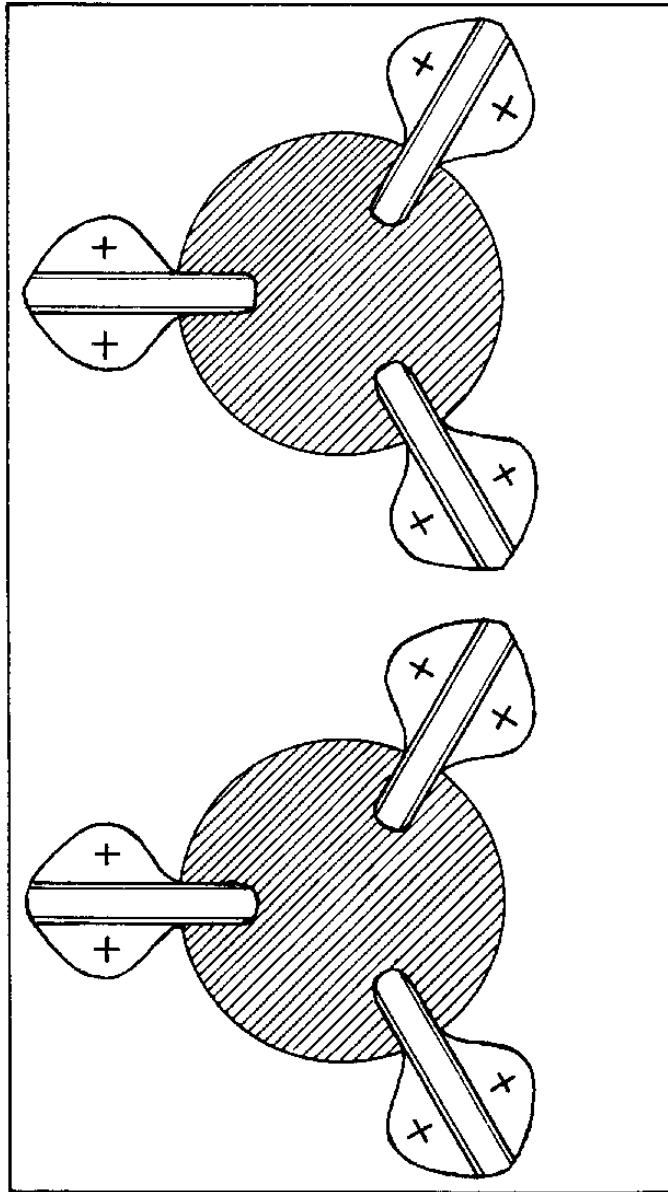


Cooker Working
Drawing Number 9





Cooker Working Drawing Number 11



How to Make a Barbecue/Grill

The procedure for making a barbecue/grill is identical to that of the two-pot cooker, except that the lid is not used. Steps 1 to 10, in the last section, explaining how to construct the two-pot cooker, should thus be followed.

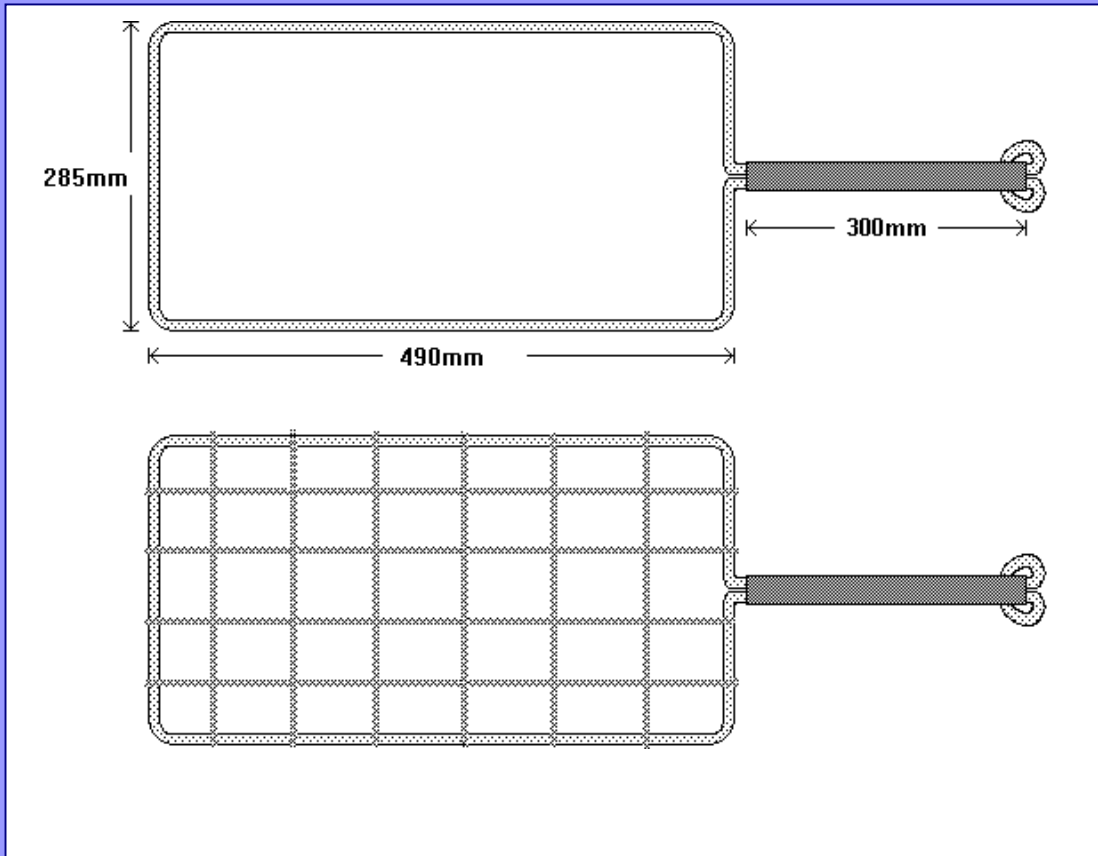
Accordingly, therefore, the two-pot cooker can double as a barbecue grill if so desired (or vice versa if the lid is made as an extra). Charcoal should be used as fuel. The only component that needs to be additionally made for the barbecue/grill is the gridiron. It is suggested that this could be made as follows.

Use a piece of very stiff wire, approximately 6 in diameter (4 gauge), and 2,210mm long. Bend this to the shape shown in *Gridiron Working Drawing Number 1*. For the gridiron handle use a piece of box section or round section tube that has an internal dimension that will give a snug fit when the ends of the grid iron frame are pushed through. The length of this tube should be 300mm.

The ends of the frame will stick out of the handle approximately 30mm. These ends should now be bent back, to secure the handle, as shown in *Gridiron Working Drawing Number 1*. The mesh for the grid iron can now be woven on to the frame using lengths of any suitable thin wire, for example, 3mm in diameter (10 gauge). Any pattern will do, provided the spaces between the wires are not so large as to let whatever is being cooked drop through. A suggested pattern is shown in *Gridiron Working Drawing Number 1*.



Gridiron Working Drawing Number 1



How to Make a Chef's Hat

Chef's Hat Working Drawing Number 1 shows how to make a Chef's Hat. White cotton is ideal, but other white material may be used. The sizes given in the instructions are for a medium sized hat. To make a hat to measure, take a tape measure and measure the distance around the head. The hat in the diagram fits a head with a circumference of 600mm. Adjust the pattern sizes to allow for any difference in head measurement. For example, to make a hat to fit a head measurement of 620mm, add 2.5mm to each side of the four side panels and add 200mm to the length of the head band.

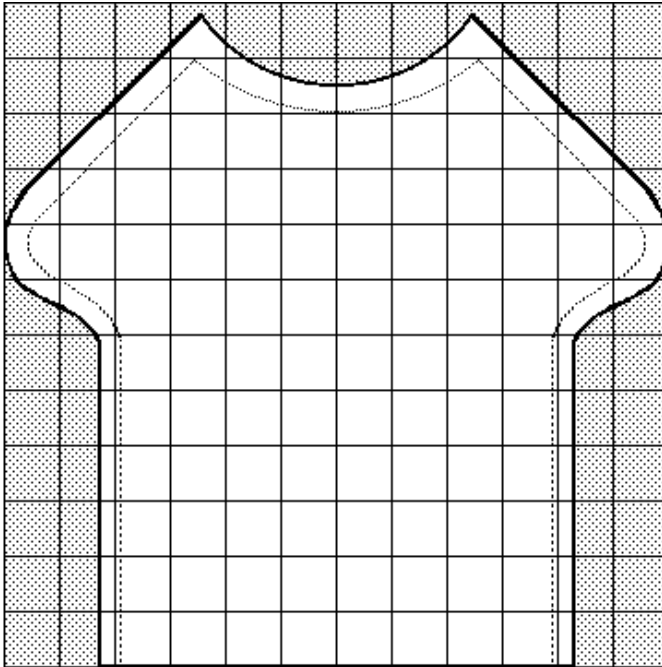
If wished, the hat can be stiffened by using starch. The hat can also be stiffened by inserting a paper or card lining or other stiffening material.

How to Make a Chef's Apron

Chef's Apron Working Drawing Number 1 shows how to make a Chef's Apron. White cotton is ideal for this garment, too, but other white material may also be used. The sizes given in the instructions are for a man of average height and weight. They could be adjusted slightly if required.

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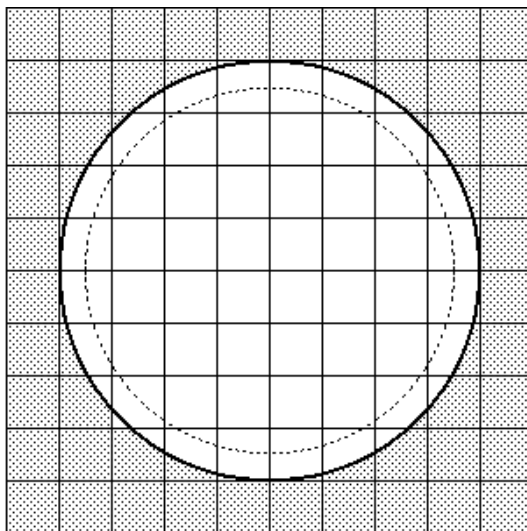
Chef's Hat Working Drawing Number 1



**Template for Chef Hat
Side Panels (4)**

Each Square 20mm

**Dotted Line shows
seam for stitching
(10mm in from edge)**



**Template for Chef Hat Top
Each Square 20mm**

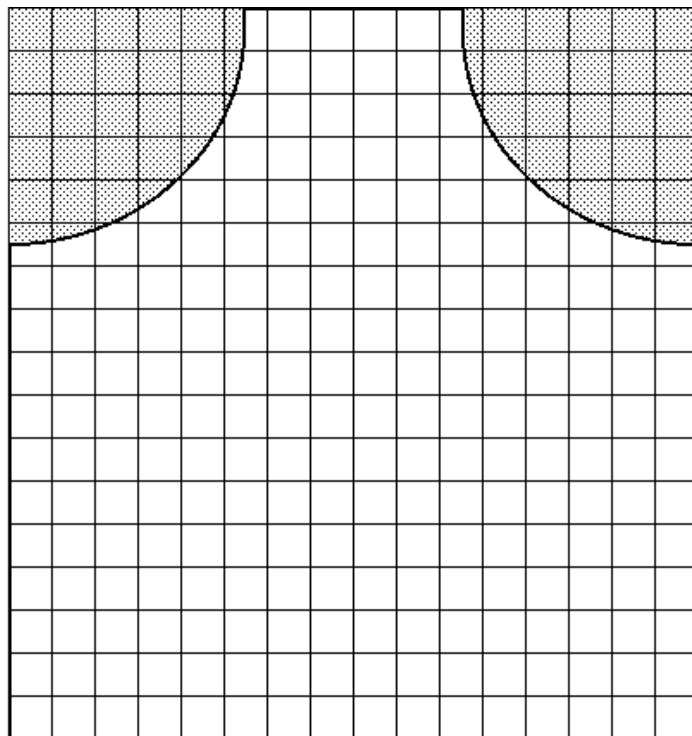
**Dotted Line shows
seam for stitching
(10mm in from edge)**

Bottom band also required:

**Cut Piece 600mm x 120mm. Fold along length. Turn in seams.
(10mm allowed on each edge for folding in).**

- STAGES:** 1. Cut out and sew together four side panels.
2. Cut out and sew on top part. 3. Cut out and sew on bottom band.

Chef's Apron Working Drawing Number 1



Chef's Apron

Each square represents 50mm.

Fold and sew 10mm seams on all edges.

For neck and waist ties: use suitable tape, or fabricate straps from similar material to Apron.



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PART THREE

Safety and Hygiene

In this Third Part of the book, the important subject of Safety and Hygiene is discussed. Hygiene, safety, and successful business activity in Fast-Food vending, are crucially inter-linked, as will now be explained.

Why is Food Hygiene so Important?

There are three main reasons why Food Hygiene can be considered so crucially important:

There are moral grounds for not doing anything that could make someone else ill or even kill them.

The practice of bad Food Hygiene involving the general public is likely to be in breach of the country's laws.

If customers become ill after eating what they purchase, the reputation of a business will be ruined.

Bad Food Hygiene, therefore, can lead to sickness, and even death, and destroy any chance of running a successful Fast-Food vending business.

What is Food Hygiene?

In beginning to try to answer the question "What is Food Hygiene?" (and "Good" practice as opposed to "Bad" practice), it might be useful to think of Food Hygiene as having two major elements to it: one to do with prevention of problems and the other to do with their treatment. There is a part of Food Hygiene that is concerned with preventing health dangers occurring: keeping food covered, for

example, to prevent it being contaminated by flies. There is a part that is concerned with cure: including, for instance, cooking food at an appropriate temperature and for an adequate length of time to destroy any bacteria present, and washing hands thoroughly to remove sources of contamination.

Food Hygiene and Health

It is necessary to develop an understanding of the relationship between Food Hygiene and health. For example, some forms of illness and disease are "food-borne". In other words they can be passed from one person to another through food. It is particularly important to understand that a person can carry on or inside his or her body the micro organisms that cause these diseases, without actually being ill him or herself. Typhoid and Dysentery are examples of food-borne diseases. Uncooked food products can themselves be covered in invisible bacteria that can cause serious illness. These bacteria need to be killed or be prevented from spreading. The sections below will explain how.

The Importance of Hand Washing

If any hygiene measure had to be singled out as being especially vital it would be that to do with washing of the hands. One reason why this is so is as follows. Tiny bacteria, invisible to the naked eye, that cause "food-borne" diseases live inside the intestines. Bacteria around the anal region are passed on to the hands during itching or scratching and especially when wiping that area of the body after going to the toilet. A "chain of events" leading to illness occurs when contaminated hands then touch food and the food is then consumed by another person.

Keeping hands scrupulously clean, paying particular attention to dirt that can be trapped under the finger nails is thus an essential hygiene measure to take. Always thoroughly wash hands before touching or preparing food and after every time hands touch something else that could be contaminated with germs. In a food vending situation it is especially important to recognize that even the acts of handing over items to a customer and handling money lead to contamination of the hands.

Avoiding Unnecessary Hand Contact with Food

After basic preparation of ingredients has taken place, in the vending situation, a lot of handling of food can be avoided if appropriate care is taken. Food items can be picked up and handed to the customer using a serviette or moved about with tongs or other similar utensils. If certain food items such as rolls or pasties are to be placed in bags, a good technique is to pull the bag over the hand rather like putting on a glove, but at the same time turning the bag inside out. The hand picks up the food item, with the bag preventing actual contact. The bag is then re-rolled over the food item, "the right way round", and hand contact is thus avoided.

General Personal Hygiene

If regular washing of hands is the "number one" rule there are still other areas of "Personal Hygiene" that are very important. Cuts and skin sores, especially on the hands, should be covered with a proper dressing, preferably a waterproof one. Hair and other tiny skin deposits that drop from the head are important food contaminants. This is why basic hygiene rules always include having the head covered.

Protective Clothing

Protective clothing should also be worn. Yes, this does protect every-day clothes. However, as far as hygiene is concerned the protection works the other way round! The protective clothing shields from the food the dirt and germs in the fabric of normal clothing. This can only happen, of course, if the protective clothes are themselves washed regularly!

Cleanliness of Equipment and the Working Area

Just as invisible harmful organisms live on the body, they can also be present on the utensils and surfaces with which food comes into contact. All surfaces and equipment must be cleaned scrupulously before food preparation takes place and must be kept clean. Any cloths or sponges used to wipe down and clean working

surfaces should themselves be suitably sterilized regularly. Boiling a cloth is one way of sterilizing it. Towels, for drying the hands, should be washed and sterilized regularly, too.

Using Safe Water

It is also important to recognize and remember that the water that is used for washing, if it is sewage contaminated, can itself be a key source of danger. Water can appear clean, but still be full of germs. In towns where there is a "treated" water supply, water is usually made safe by adding certain chemicals to it: particularly chlorine. Other sources of safe water are protected wells and springs.

Disinfectants will kill germs if added to water for general cleaning purposes. For the actual washing of food items that will not be cooked, such as salads, a proprietary sterilising solution could be used. Another alternative is to use previously boiled water. Boiling water kills any living organisms present in the water and makes it safe.

Other Sources of Contamination of Food

As well as the invisible viruses and bacteria that can make food unfit to eat, food can be contaminated by chemical and physical means. Poisonous chemicals such as bleach and paraffin must be kept well away from food. Effort should also be made to ensure that no foreign bodies such as stones, body hairs, or fragments of glass after a breakage, get into food.

Especial mention was made earlier in this book about the dangers of wrapping food in newspapers and other printed paper. Some inks contain very harmful poisons. That some plant leaves may be unsuitable for wrapping, because of the poisons they contain, was also highlighted.

Killing Bacteria

Many foods, and especially meat and dairy products, will already have dangerous bacteria on them. Animals, like humans, have many bacteria living in their intestines. These bacteria are invisible to the naked eye and do not usually affect the appearance of the meat.

Fortunately, APPROPRIATE COOKING MEASURES NORMALLY KILL THESE BACTERIA. However, the time a food item is cooked for, and the temperature to which it is cooked are both critical. Food must be fully cooked. It is safer to over-cook food than to under-cook it.

It is equally important that a food item is cooked all the way through and not just around its outer edges. Some food products are more danger prone than others. Poultry, pork, and dairy products, for example, generally need more care than beef, fish or vegetables. Frying tends to be one of the safest methods of cooking food because of the high temperatures involved.

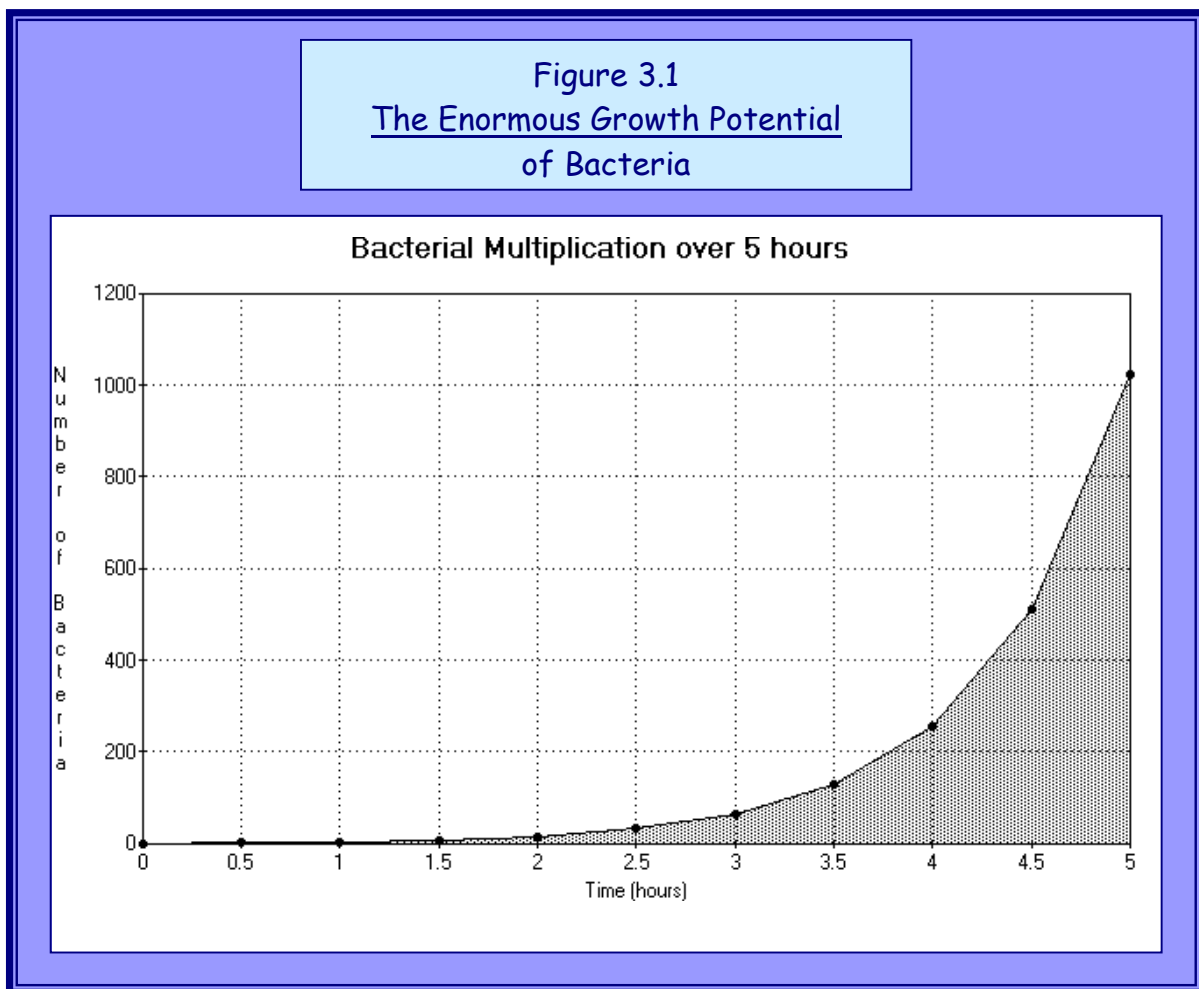
Cross-Contamination of Food

Because raw meats do already have bacteria on them, it is very important not to "cross-contaminate" cooked food by handling raw meat and then handling cooked food without again washing the hands. Because cross-contamination can so easily occur, it is very important that cooked and raw food should be kept well away from each other at all times.

Food Storage

With good cooking, then, the bacteria that exist on food will not normally present a health problem. However, there does remain an important danger. This is related to food storage. While extreme heat kills bacteria (the boiling temperature of water is generally sufficient), mere warmth makes bacteria multiply. In the "right" conditions, some bacteria will divide into two every twenty to thirty minutes. Body temperature is an "ideal" temperature for bacteria growth. Figure 3.1 shows how one single bacterium can multiply in a five-hour

period. If food has been incorrectly stored, so many bacteria will be present that the slightest inadequacy in cooking procedure will have dire consequences.



There are two temperature ranges within which bacteria growth can be kept under control. The first is to keep food below 5 degrees centigrade. This temperature is quite close to the freezing point of water: 0 degrees Centigrade. At this freezing point all bacteria growth is retarded. The second safe range is to keep food above 65 degrees Centigrade once it has been cooked. Food that is safely over 65 degrees in temperature will not actually be hot enough to continue cooking but will feel HOT to touch rather than warm.

Dust blowing in the wind, coughs and sneezes, and flies will all contaminate food. Every effort should be made to keep food covered, wrapped, or otherwise protected at all times. Food should be protected, however, in a way that does not raise temperature into the danger zone, or increase its moisture content. This will only help existing bacteria to multiply.

Food Storage and Practical Fast-Food Vending

For practical Fast-Food vending, if no refrigeration facilities are available, to be safe, fresh meat should be cooked within an hour and a half of being obtained. Items once cooked, such as pies, beef burgers and sausages can be kept safe during the vending session provided they are kept heated at a temperature above 65 degrees.

For some foods, there are of course "traditional" methods of preservation that the Fast-Food vendor will be able to exploit. Food can be preserved in salt, sugar, syrup or vinegar. These substances retard bacteria growth. Because bacteria need moisture to live, dried food will also stay safe for long periods.

Foods that have been properly sterilized or pasteurised (heat treated to kill the bacteria) will also stay safe longer. Another option to the Fast-Food vendor is to use products that are canned or vacuum packed and which will stay fresh until the seals are broken.

Food Hygiene: a Summary

All that is contained in this section represents only the barest minimum information on food safety. It is strongly recommended that any prospective Fast-Food vendor does all that he or she can to avoid health risks. There are many books that cover basic Food Hygiene in far more detail than has been entered into here. In making preparations for starting a Fast-Food vending business, try to learn as much as possible about safe food practices and to understand more about food-related diseases and how bacteria spread. Find out about the legal regulations in force in your own country concerning Food Hygiene and make sure that you comply with these.

All of this sounds very serious, and it is. On the other hand, as has been mentioned in an earlier section, good hygiene practice should not only be a defensive measure. Plan to make a show of good hygiene practice: it can be an excellent way of building up your image as well as customer confidence in yourself and what you sell.



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PART FOUR

To the Development Agency or Development Worker

It is anticipated that among the users of this book a significant number will be development agencies and development workers looking for good or new ideas to try out in order to provide poor people with a means of income generation. With these readers in mind, attention is turned in this section to possible modes of approach.

If a development agency would like to promote Fast-Food vending as an income generating activity, a first obvious question to ask and to try to answer is "who should be target beneficiaries?". Two criteria will probably be of especial importance in selecting beneficiaries. These concern the desirability of reaching:

- a) those who are in greatest need; and
- b) those who could benefit the most by being assisted. This may involve giving priority to those who have already demonstrated entrepreneurial qualities or potential. Motivation may be another key factor.

Recognizing and trying to accommodate these two considerations can, however, complicate rather than simplify matters. The two goals may conflict with each other in that the group of people in greatest need may not necessarily be the same group of people with the greatest intellectual or motivational capacity to benefit, or vice versa. In such circumstances compromise may be necessary, or other factors may determine which particular consideration should carry the greater weight. Much is also likely to depend on an individual organisation's mandate. It may already have particular guidelines concerning the targeting of youths, gender, or the disabled, for example.

In the country in which ideas for Fast-Food Vending were developed, traditionally, food vending activity was associated with men rather than women. Through project intervention it became possible to launch women into very successful vending activity. Additionally, there is certainly no reason why the disabled should not be targeted, as possibilities illustrated earlier in this book have also

highlighted and previous project experience has also confirmed. If no clear guidelines already constrain freedom of choice in the selection of beneficiaries, it is certainly recommended that particular thought should be given to an organisational position not only with regard to the participation of women and the disabled, but possibly to young people and other vulnerable and needy groups such as single heads of household. If desired, quotas could be instituted to make sure these categories of beneficiary are adequately represented within the total number it is intended to assist.

On the technical side of any training associated with launching individuals in Fast-Food vending activity, for obvious reasons, the greatest concern must be with standards of Food Hygiene. Basic principles have been covered in this text. Levels of background education will have an important bearing on how easily individuals will be able to absorb associated knowledge and practice and how teaching should be approached. There are plenty of sources of good information for teaching about basic Hygiene. In addition to using available publications, it will probably be worth contacting the government Ministry of Health and the Ministry, which has Food and Agriculture as all or part of its remit. Find out, too, what relevant knowledge and experience exists in any of the further education institutions in country. It is also possible that other development agencies may be undertaking work concerned with food technology, such as food preservation and processing. If so, there will be available expertise to tap. It will obviously be necessary to find out what health legislation may encompass or impinge upon any activity that is being planned and also to be aware of what licensing arrangements, if any, need to be made.

Other teaching components may involve creating an awareness of the type of foods that can be prepared and sold and specific instruction as to how they can be prepared. Do not discard local knowledge, particularly as to what might be possible and realistic in the way of methods of food preparation and preservation. There may be much traditional practice that can either be adopted or adapted.

This last comment leads to other questions relating to the mode of developmental approach in introducing Fast-Food vending activity: should it be "top down" or "bottom up"? In other words, should ideas for Fast-Food vending activity come from the organisation ("top down") or the intended beneficiaries ("bottom up"). The latter approach could perhaps fairly be represented as generally being in the greater current favour. However, there are dangers in applying it too simplistically. If intended beneficiaries have never heard, say, of how to seal a plastic bag using a candle and a hack-saw, solar drying equipment, or other food processing machinery, they cannot possibly recognize any of the possibilities

associated with the applications of the technologies. This is irrespective of how relevant or not to the local situation such technologies might be. It is the belief of this writer that the most desirable position to adopt is one of compromise between the two extremes: not, for example, the evolution of ideas for the community, nor by the community, but with the community. Such a position allows for an organisation or institution to share, rather than impose, expertise and ideas for development with the community in the first instance, thus allowing that community to make an informed choice.

"Brainstorming" sessions tend to lend themselves well to introducing ideas for Fast-Food vending and identifying possibilities as to location and what types of food could be sold. A starting point could be the organisation introducing a piece of food vending equipment to a group of individuals and letting the group suggest how and where it might be used.

On the entrepreneurial and marketing side, a number of ideas have been detailed in this book and could be used as a basis for teaching content. What has not been entered into in any detail has been basic instruction on actual business management: how to keep records, calculate profit and loss, save for business expansion and reinvestment, and so on. This will be absolutely essential, but there is a wide range of literature that can support teaching of this kind.

As to how activity of the kind envisaged may initially be financed is another important point to consider. There is likely to be a need for some initial material or capital inputs, especially when it is the most needy that are being assisted. These will be beyond the means of some individuals. To launch a chip fryer into business, for example, the assistance may need to include the provision of the frying equipment and frying utensils; the first can of cooking oil, bag of charcoal, and bag of potatoes. Subsequent business inputs can then be paid for out of profits. While particular local circumstances may influence any final decision, generally, a loan tends to be more preferable to a grant. If a business is going to be viable, paying off any loan should not be a problem. Loans allow for the operation of a revolving fund and more people can eventually be helped with the same resources. When a loan is paid back, someone else can be assisted with that money.

It may also be worth instituting some kind of "hire-to-buy" scheme, especially if more expensive mobile vending equipment is considered being used. "Hire-to-Buy" can work in the following way. The project agency makes available the needed Fast-Food vending equipment, say, a set of mobile hot-dog stands. This is available for hire. Unlike conventional hire schemes, however, the rental fees paid

are not kept as profit by a hire centre owner, but banked by the project agency in the hirer's name. When the person hiring the equipment has paid, over a period of time, what the equipment is worth, it becomes the hirer's to keep. There is, therefore, again a rotating fund principle involved. Consequently, over a period of time, many people can potentially be launched into income generating activity with only limited organisational inputs.

A final point is a specific, technical, one, to do with mobile Fast-Food vending, including trailer design and modifications to wheelchairs. Development agencies interested in technical aspects of appropriate transport, could usefully contact Intermediate Technology Transport Ltd, the Old Power Station, Ardington, near Wantage, Oxon, OX12 8QJ, England. This is an organisation that has a lot of expertise and experience to offer in this area.



ANNEX

Tinsmithing Tools and Techniques

The minimum basic tools required for making the Fast-Food vending equipment detailed in PART TWO of this book are as follows:

- a hammer (if only one is to be obtained this should be at least 11lb in weight and preferably of the ball-pein type; a 1½lb hammer is recommended);
- a chisel (if only one is to be obtained, this should be ½" size);
- improvised anvils (such as a short length of girder section or railway line, a scrap vehicle flywheel, scrap car and lorry wheels, and metal pipes);
- a tapered hole punch (easily improvised);
- a ruler or tape.

Tools that are not strictly necessary, but may make some tasks easier or quicker to accomplish, include: a hacksaw and a large pair of tinsnips. An additional, larger, chisel (e.g.: 1") and a larger hammer (e.g. 2lb) would also be useful.

The riveting tool illustrated in Figure A.1, which can easily be improvised from, a scrap bolt, will be useful, too. It provides a very convenient way of settling flat, surfaces being riveted: thus allowing sufficient protrusion of the end of the rivet for hammering.

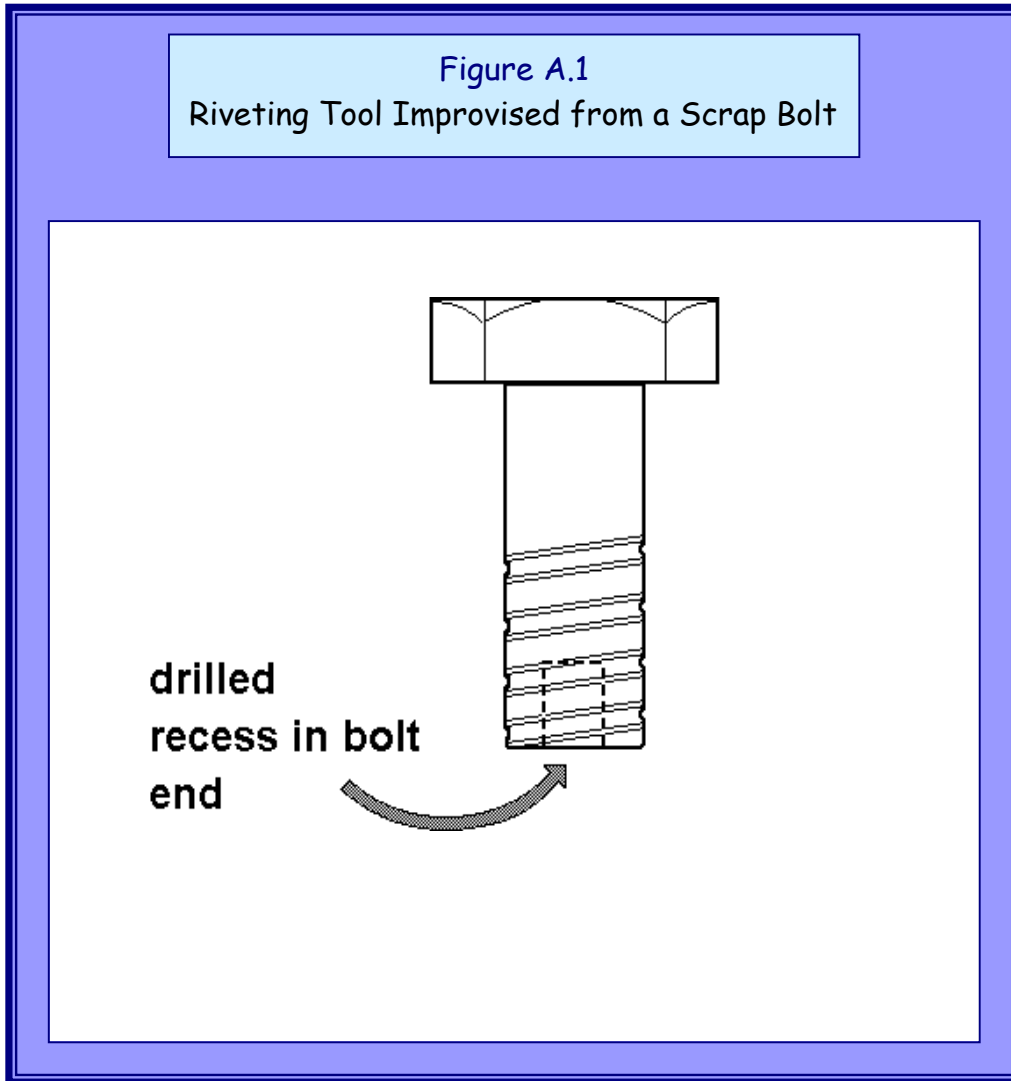


Figure A.2 shows an improvised anvil arrangement, using a scrap lorry wheel and piece of girder or railway line section, which can be convenient for a number of tasks. The worker sits on the wheel, to give the anvil stability, with legs astride the protruding girder. The bottom of the girder and the bottom of the wheel rim may also be embedded partly in the earth.

Figure A.2
Use of an Improved Anvil



Holes in sheet metal may easily be punched if the point to be pierced is placed over a slightly larger hole in, say, an old flywheel, wheel rim or girder. Hammered folds, for joining, reinforcing and to provide safe edges, are used frequently in the designs. To achieve these, the fold line on the sheet metal should be placed directly over an anvil straight edge in the first instance. Hammering directions,

and subsequent placing of the work in relation to the anvil, are illustrated in Figure A.3 for both 90 degree and 180 degree folds. Each stage of the bending process is clearly shown.

