SRI LANKA STANDARD 1003 : 1993

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CODE OF PRACTICE FOR

PROCESSING OF CASHEW NUTS

SRI LANKA STANDARDS INSTITUTION

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SLS 1003 : 1993

Gr. 7

SRI LANKA STANDARDS INSTITUTION
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Sri Lanka.

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This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD

CODE OF PRACTICE FOR PROCESSING OF CASHEW NUTS

FOREWORD

This standard was finalized by the Sectoral Committee on Spices, condiments and allied products and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1993-11-17.

Cashew kernels are one of the more important dessert nuts.Other dessert nuts usually have brittle shells which can be cracked easily. The mechanical devices for shelling is not applicable to cashew nuts by virture of the characteristics of the cashew shell.

The objective of cashew nut processing is to remove the whole kernel from the nut without affecting the kernel in any way. This objective can only be achieved by adopting certain recommended practices during processing. This code includes such recommendations and relevant technical information as far as possible.

In the preparation of this code,the valuable assistance derived from the following publication of the Food and Agriculture Organization of the United Nations is gratefully acknowledged:
Agricultural services bulletin No.6: Cashew nut processing.

1 SCOPE

This standard recommends a code of practice to be adopted for processing of cashew nuts (fruits of the tree *Anacardium occidentale* L.).

2 REFERENCES

SLS 143 : General principles of food hygiene.
SLS 245 : Cashew nuts.
SLS 405 : Cashew kernels.

3 RAW MATERIAL

3.1 Cashew nuts

Morphology and anatomy of a cashew nut is given in Appendix A.

3.2 Harvesting

As the main damage to quality of kernels usually happens at farmer's level and as the deterioration is irreversible, it is important that the farmers are adequately instructed of recommended practices.

3.2.1 Harvesting consists of reaping the mature nuts that have dropped to the ground. This practice is desirable as it assures a mature nut.

3.2.2 The surface under the tree should be kept clean and free from weeds.

3.2.3 Cashew apples should be detached and only the nuts should be collected.

3.2.4 The interval between fall and collection should be minimized.The nuts should be frequently collected specially under conditions of high relative humidity or occasional rainfall.

3.3 Drying

The moisture content of collected cashew nuts can be as high as 25 per cent. High moisture level may cause deterioration of the kernel due to mould or bacterial attack or enzyme action. Drying the nuts immediately after collecting is therefore essential to preserve the quality.

3.3.1 Storing the collected nuts in a heap before drying should be avoided as the nuts in the inner part of the heap are adversely affected.

3.3.2 Nuts should be dried in the sun immediately after collecting. Artificial drying of cashew nuts at this stage is not recommended.

3.3.3 Drying floors should be flat, gently sloping and should have a waterproof, easily cleanable smooth surface. The surface should be treated with a bituminous spray as black surfaces absorb heat quicker and assist in drying.

3.3.4 The drying floor should be allowed to warm up in the sun before spreading the nuts.

3.3.5 Where the drying floors are not available, mats made of bamboo or palm leaves or other similar material may be used.

3.3.6 The layer of nuts should be not more than 100 mm thick.

3.3.7 The layer of nuts should be constantly racked for even drying.

3.3.8 Wooden tools are recommended for manipulating the nuts during drying, heaping, sweeping the nuts in to rows, or filling into bags. (see Figures 1 to 3 of Appendix B).

3.3.9 Dried nuts should be heaped and covered at the end of the day.

3.3.10 Well dried nuts are greish brown to black in colour and when shaken together will make a sharp rattle. No impression can be made with the thumb nail.

3.3.11 Dried cashew nuts should be graded as given in SLS 245 and stored.

3.4 Storage

3.4.1 Cashew nuts can be safely stored at a moisture level of 8 per cent or less either in bulk or in bags.

3.4.2 The store room should have a clean dry floor and roof with sufficient head room allowing manipulation of bags in a stack. The store room should have adequate ventilation.

3.4.3 The bags should be stacked on dunnage to prevent uptake of moisture through the floor and should be well away from the walls. Pests can be discouraged by using a pesticide from time to time when the stack is being made.

3.4.4 Bags can be stacked in such a way that they taper inwards from the base to form a tank leaving an inner space that can be filled with nuts. The mouths of bags should be open and facing inwards to the tank. Stacking should be done carefully to withstand the pressure of loose nuts inside. (see Figure 4 of Appendix B).

4 ROASTING/STEAMING

Roasting or steaming is a process of application of heat to clean raw cashew nuts to release the liquad in the pericarp facilitating easy removal of the kernel.

5 SHELLING

Shelling is the removal of the kernel from the shell by striking the nut with a wooden batten and splitting the nut along its natural line of cleavage. The objective is to produce whole kernels free of cracks, without being contaminated by Cashew Nut Shell Liquid (CNSL).

5.1 Manual method

5.1.1 Shellers may work at the floor level or on tables. Each sheller should be provided with the following :

a) shelling mallet;
b) containers for kernels and pieces;
c) shelling tables with striking points or bench and a striking post;
d) adequate quantity of wood ash; and
e) a scraper to clean mallet and the striking post periodically.

5.1.2 The place of shelling should be cleaned well before starting the shelling process.

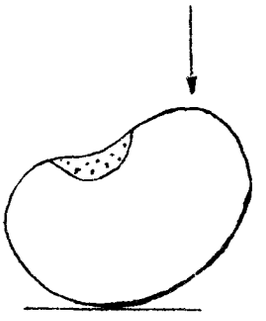
5.1.3 The sheller should be comfortable in the working position. Nuts for shelling should be correctly placed and readily accessible.a For a right handed sheller (ie, holds the mallet by the right hand) the nuts for shelling should be placed on the left hand side and vise versa for a left handed sheller.Containers for kernels and pieces should be correctly positioned so that a minimum effort is needed in the shelling procedure.

5.1.4 Nuts should be delivered to shellers in quantities large enough to give them continuous work for 1 hour to 2 hours and small enough to avoid despondent or sickening of the shellers by the sight of the large heap.

5.1.5 The shelling mallet, the striking post, the hands and the nuts should be dusted thoroughly with wood ash.This is to protect fingers from the action of CNSL and to produce a cleaner kernel/piece since ash will not adhere permanently to the kernel but the CNSL will.

Use of wood ash frequently and regularly is important and should not be neglected.

5.1.6 Properly dried nuts will break along the natural line of cleavage when struck at the broad end when the nut is placed with its convex side on the striking post and the plane of cleavage at right angles to the surface of the striking post. (see the Figure.)



It is not only the strength of the blow that cracks the nut but also the positioning. Occasionally a nut may require further blow(s) on the narrow end or on the reverse side. Experience plays an important role in making a skilled sheller.

5.1.7 Shelling should be carried out to eliminate or minimize pieces, broken wholes, cracked kernels, kernels/pieces contaminated with CNSL and shells going out with kernels or pieces.

5.1.8 All extraneous matter should be separated from the shelled kernels. Blowers and shakers may be used for this purpose.

5.1.9 Work place should be well cleaned after each shift.

5.1.10 At the end of each shift random inspection of shells should be carried out to detect unshelled nuts or partially shelled nuts (shells containing kernels/pieces). Inspection of kernels should also be carried out to upgrade the work output and quality.
The moisture content of kernels should be determind at the end of each shift.

5.1.11 Once the kernel has been removed from the shell, subsequent processing upto the final packing stage should proceed as quickly as possible. At the interim stages the kernel is exposed (with a moisture content over 6 per cent) and is highly susceptible to fungal and/or insect attacks.

5.2 Mechanized methods

5.2.1 Semi-mechanized process uses a pair of knives shaped in the contour of half a nut. When the knives come together by means of a foot-operated lever, they cut the shell all around the nut leaving the kernel untouched. Separation of the kernels from the shell is done manually.

5.2.2 First mechanized shelling system was also based on two nut shaped knives. Nuts are brought to the knives on a chain in a position to fit and pushed between the knives. After coming together, knives make a twisting movement separating the shell halves.

6 DRYING OF KERNELS

Shelled cashew kernels, having a moisture content of above 6 per cent, are dried around 70 °C for about 6 hours to reduce the moisture content to around 3 per cent. Drying prevents pest and fungal attacks and facilitates peeling.Excessive drying should be avoided as it will make the kernels very brittle resulting in a high percentage of breakages.

6.1 Common method of drying is to use an oven. Kernels are spread in layers of about 50 mm thick on trays and placed in the oven. Trays are shaken and moved from bottom to top during drying to avoid scorching.Disadvantages of this drying method are (i) variation of the temperature within the oven (ii) no control of temperature and (iii) no escape of water vapour preventing uniform and effective drying.

6.2 Improvements of the oven drying method could be made using forced hot air circulation through the kernel layers. A sketch of such a dryer is given in Figure 5 of Appendix B.

6.3 Capacity of the dryer should be well in excess of the shelling capacity.

6.4 The dried kernels should be handled carefully to avoid breakages.

7 PEELING

Peeling is the removal of testa from the dried kernel.

7.1 Peeling should be carried out on a clean surface above the floor level. Manual peeling is by gentle rubbing with fingers. Parts of testa still adhering should be removed by means of a bamboo knife. Care should be taken not to scratch the kernel surface. Handling should be done carefully to prevent breakages.

7.2 Strict cleanliness in the peeling room and personnel involved in peeling is essential. It is recommended to have only one entrance to the peeling room. All workers should wash and dry their hands before entering the peeling room.

7.3 Separation of the peeled kernels into the following groups also should be done during/after peeling.

a) white wholes without pasting or adjoining
b) scorched wholes
c) white pieces
d) scorched pieces
e) refuse:very fine pieces which connot be peeled or diseased pieces.

7.4 Kernels should be packed immediately after peeling. If storage of peeled kernels is to be done before packaging it should be borne in mind that the kernels are at a most susceptible state for pest and fungal attacks. Every precaution should be taken to prevent contamination of the kernels.

7.5 The peeling room should be thoroughly cleaned after each shift of work.

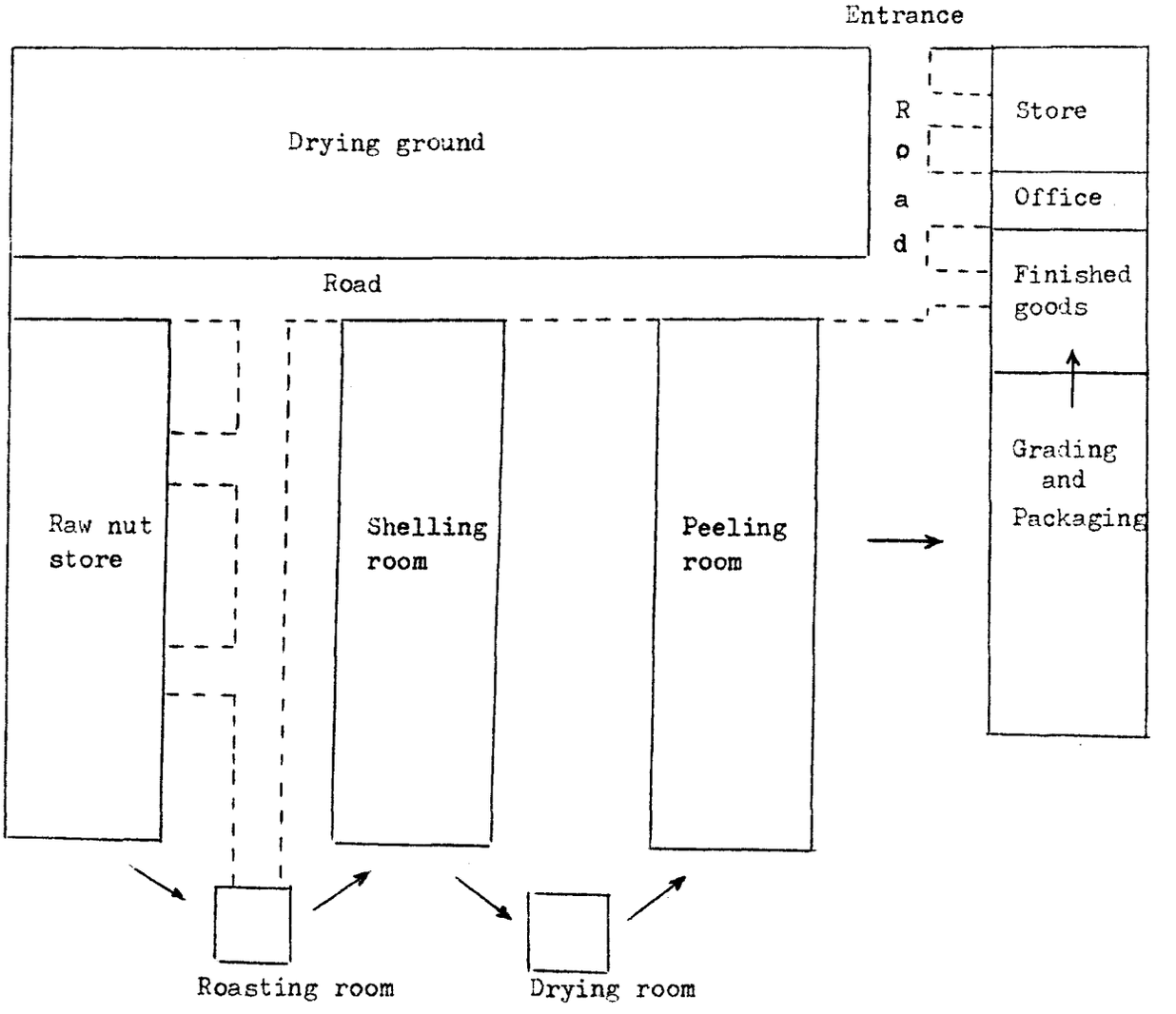
8 GRADING AND PACKAGING

Grading and packaging of cashew kernels should be in accordance with SLS 405.

9 PLANT LAYOUT

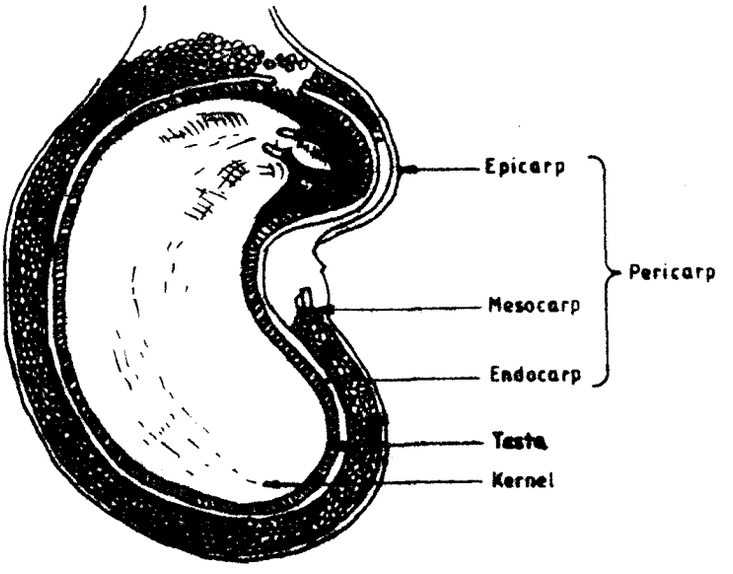
9.1 The requirments prescribed in **SLS 143** should be followed in constructing and maintaining the plant. Rooms housing the drying equipment should be constructed of fireproof material and should be located apart from the work rooms, but at a convenient distance from them. Shelling and peeling rooms can be with half walls so that good light and ventilation are available.

9.2 Layout of the plant where processing of cashew nuts is carried out should be such that a smooth and convenient flow of material is facilitated. A plan of an ideal plant layout for manual operations is given below:



FLOW OF MATERIAL

APPENDIX A
THE CASHEW NUT

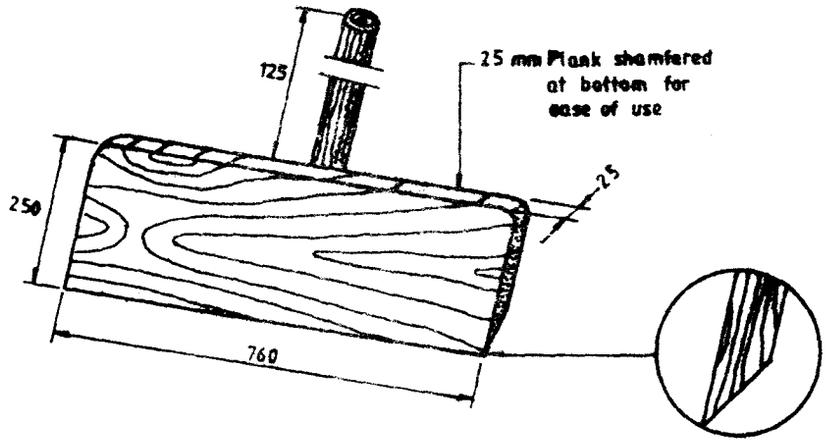


Cashew nut is the fruit of the cashew tree *Anacardium occidentale* L. The kidney shaped nut which is the true fruit of the cashew tree is attached to false fruit known as 'cashew apple'. This is the juicy swollen pedicel of the flower.

The shell of the nut consists of an leathery outer layer, epicarp, greenish to pinkish brown in colour.
Mesocarp has a honeycombed structure and the cells secret a natural resin commercially known as cashew nut shell liquid (CNSL). CNSL has vesicant properties and blisters the human skin.
The inner part of the shell is the endocarp which is hard and brittle. It protects the kernel from the natural resin.
The three layers together is called pericarp.

The cashew nut has a single seed - the cashew kernel - white in colour having a wrinkled surface. The kernel is covered by a reddish brown to pink coloured thin membrane called testa.

Appendix B



Dimensions in millimetres

FIGURE 1 - Wood pusher
(for heaping/spreading nuts on the drying ground)

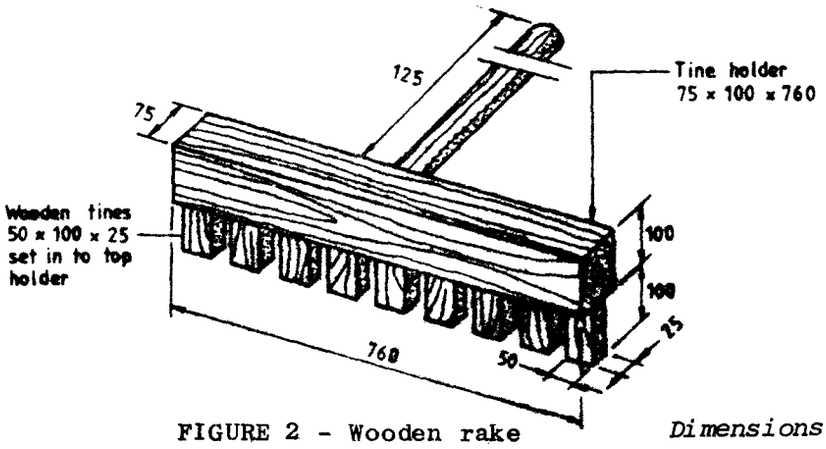


FIGURE 2 - Wooden rake
(for raking the nuts spread on the drying ground)

Dimensions in millimetres

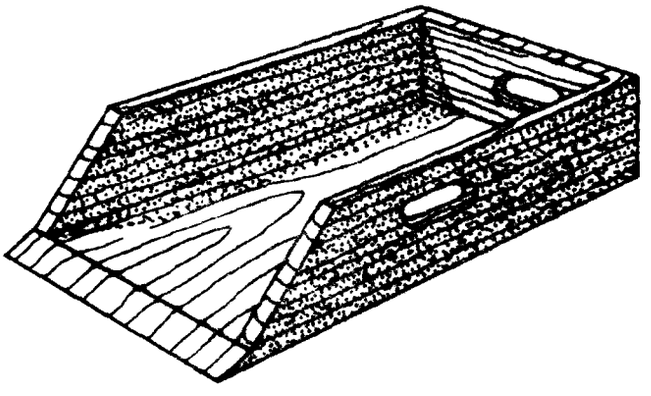


FIGURE 3 - Wooden scoope
(for filling baskets/bags with dried nuts)

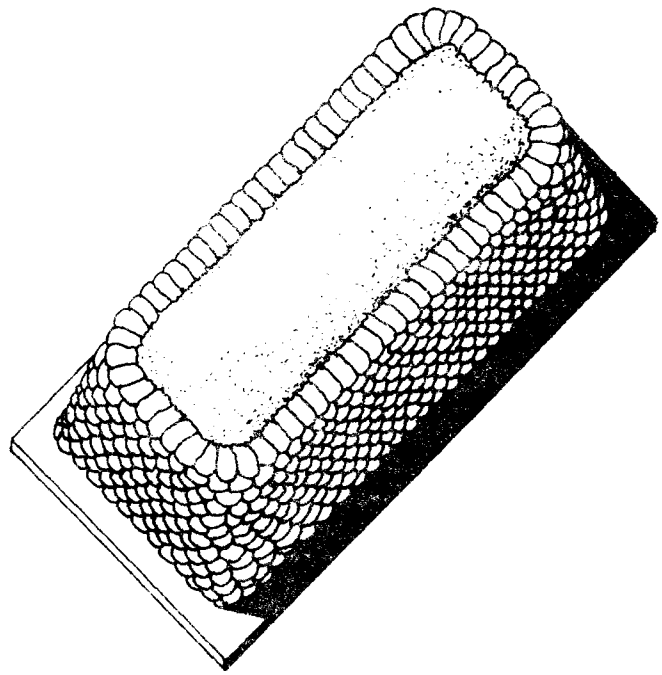


FIGURE 4 - Dump of cashew nuts

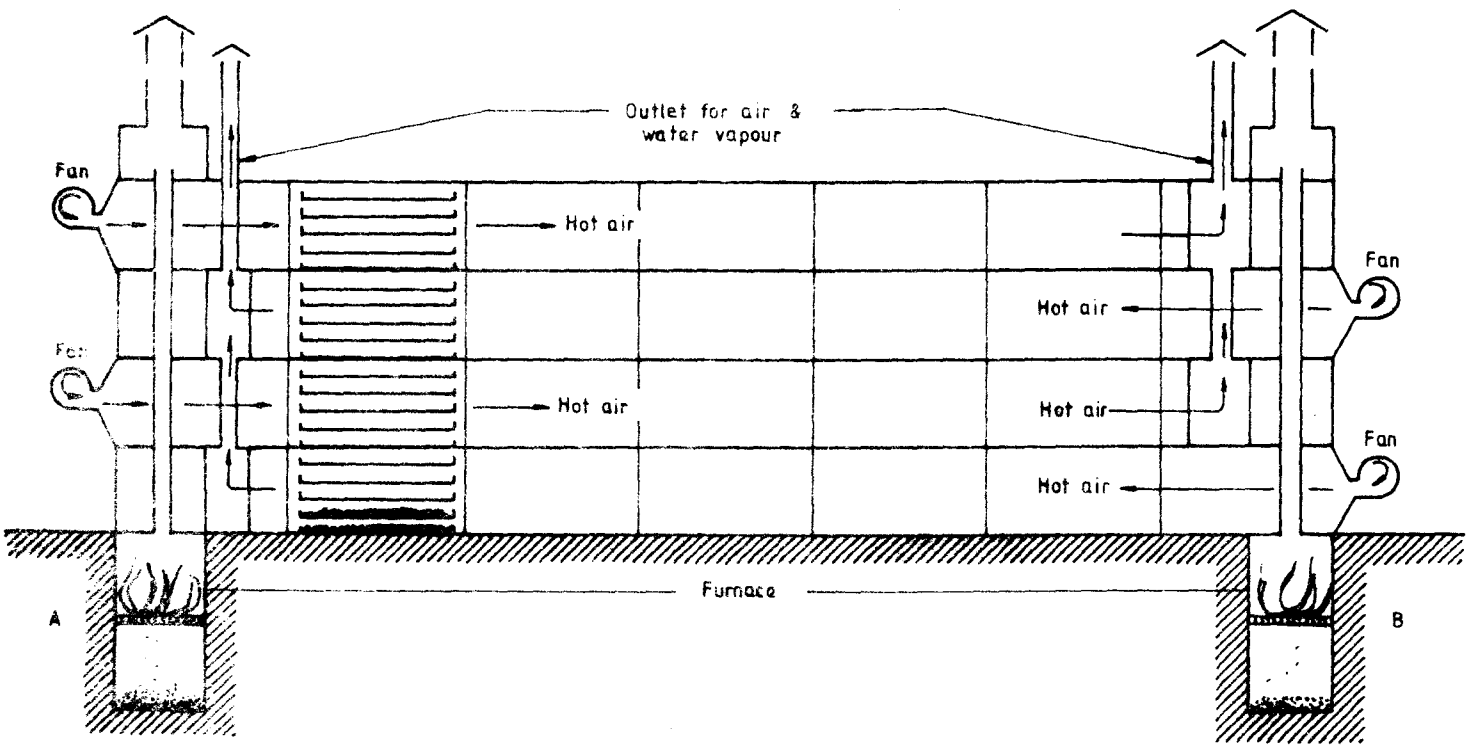


FIGURE 5 - Diagramatic section of a dryer

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