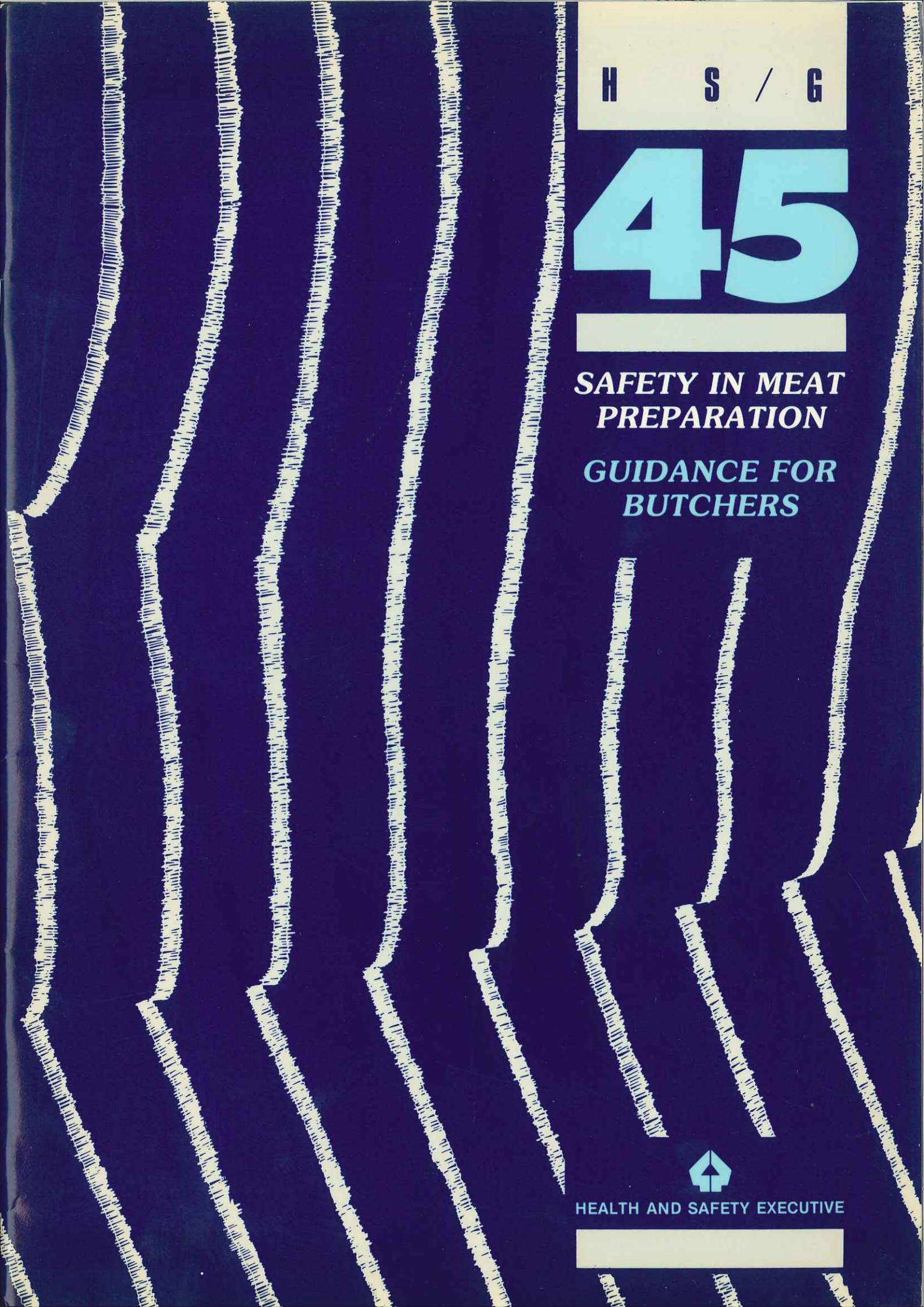
H S / G

45

SAFETY IN MEAT PREPARATION

GUIDANCE FOR BUTCHERS



HEALTH AND SAFETY EXECUTIVE

SAFETY IN MEAT PREPARATION

GUIDANCE FOR BUTCHERS

HS(G) 45

Health and Safety Executive

CONTENTS

London: Her Majesty's Stationery Office

INTRODUCTION

1 Many of the machines and hand tools used in the meat industry are so familiar that it is easy to forget that they can be dangerous.

2 This booklet is intended for owners and managers of retail and wholesale butchery establishments and small meat factories, and also for employees and safety representatives. It describes the main risks associated with the use of knives and machines and other equipment found in the meat industry, and what should be done to safeguard workers in the industry. It has been prepared by the Health and Safety Executive's Food National Interest Group and Local Authority Unit, after wide consultation with employers, trade unions, machinery manufacturers and other interested organisations.

3 The Health and Safety Executive (HSE) is responsible for developing standards nationally, and for inspection and enforcement in food factories. Local authorities are responsible for inspection and enforcement in shops, supermarkets and catering establishments.

4 Further information and advice (including detailed advice on legal requirements) may be obtained from Area Offices of HSE or the Local Authority Environmental Health Department as appropriate.

LEGAL DUTIES

5 Under the Health and Safety at Work etc Act 1974 employers have a general duty to ensure, so far as is reasonably practicable, the health and safety at work of their employees. The duty includes providing a safe workplace, safe machinery and safe systems of work, and adequate information, instruction, training and supervision. Employees have a duty to take reasonable care of their own safety.

6 Specific requirements on health, safety and welfare in the workplace are also laid down in :

- Factories Act 1961
- Dangerous Machines (Training of Young Persons) Order 1954
- Offices, Shops and Railway Premises Act 1963
- Prescribed Dangerous Machines Order 1964
- Electricity Regulations 1908 and 1944
- The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985
- Health and Safety (First Aid) Regulations 1981
- Fire Precautions Act 1971
- Fire Precautions (Factories, Offices, Shops and Railway Premises) Order 1976

STAFF TRAINING

7 Many accidents occur when employees use machines or equipment without proper training. No-one should be expected to use equipment and machinery unless they have been properly trained. Managers and supervisors may also need suitable training.

8 The following checklist shows how to prepare a typical training programme.

TRAINING CHECKLIST

Information and advice may be obtained from:

the supplier of the equipment

training centres or Colleges of Further Education

trade associations

trade unions.

Organisation

- Will training be 'on' or 'off' the job?
- Who will do the training?
- Who will supervise the training?
- What records of training will be kept?

Selecting and assessing the trainee

- How is the trainee to be selected? Selection should take account of the physical and mental demands of the job.
- How much does the trainee know already about safe working practices?

Basic instruction

For each task prepare a checklist of all the points training should cover, eg:

what equipment to use

how the equipment works and what it does

dangers associated with its use

safety precautions and how they protect the user

how to clean the equipment safely

what to do if the equipment seems faulty

what protective clothing to wear.

Supervised working

Set the trainee to work under close supervision.

Make sure the supervisor has time and knowledge to supervise effectively.

Make sure the supervisor watches to see that dangerous practices do not develop.

Final check

Check that the trainee knows how to carry out the work properly and safely. Make sure that the trainee can be left to work safely without close supervision.

TRAINING AND PRESCRIBED DANGEROUS MACHINES

9 A number of machines have been identified* as particularly hazardous. These are called 'prescribed dangerous machines'. There are special legal requirements to train people who operate them.

10 Prescribed dangerous machines include:

meat mincing machines

rotary knife bowl-type chopping machines (bowl cutters)

bandsaws

circular knife slicing machines (used for cutting bacon and other foods)

machines with a circular saw blade.

*In the Factories Act 1961 (Section 21) and/or the Offices, Shops and Railway Premises Act 1963 (Section 19) and the respective Orders and Regulations made under them.

WORKING ENVIRONMENT

LAYOUT

11 Workplace layout should not allow public access to knives, machinery or storage areas. Particular attention should be paid to keeping children, including those of staff, out of the work area.

12 Workers using knives and other hand tools should have enough room to work safely. There have been incidents in which one worker has accidentally stabbed another because they were working in cramped conditions.

13 There should also be adequate space round machines, particularly those with exposed blades, eg slicers or bandsaws. Machines should be sited so that the operator cannot be accidentally bumped or distracted.

FLOORS

14 Slips, trips and falls form the single largest source of accidents in the meat industry. Table 1 shows common causes of such accidents and appropriate precautions.

Table 1 Slips, trips and falls

Causes	Precautions
Wet floor after cleaning	Warning notice to keep people away from the area until the floor is dry
Spillages, fat residue	Clean up promptly
Oil leaks from machines/plant	Have leak repaired
Unsuitable footwear (eg high heels)	Suitable footwear
Broken or uneven floor surface	Repair/replace
Moving from one type of floor to another	Warning notice

LIGHTING

15 Operators, whether they are using a machine or a knife or are simply moving round, must be able to see what they are doing. Poor lighting can result in eye strain and may contribute towards accidents. Lighting should be provided and maintained to a good standard throughout the premises. Illumination levels of 500 lux are recommended in the workplace (see Further Information - HS(G) 38). Light fittings should be positioned so that light is shed evenly throughout the working area, without glare or strong shadows.

HOUSEKEEPING

16 Good housekeeping and general tidiness are important factors in preventing accidents. Materials and equipment should be stored in an orderly manner. Passageways and production areas should be kept clear of obstruction.

CLEANING

17 To protect the health and safety of staff and customers alike the workplace, equipment and machinery must be kept clean. This booklet does not give guidance on the requirements of the Food Hygiene Regulations. It is concerned with the safety of the person who is doing the cleaning.

18 Cleaning should be supervised by a responsible person with adequate training and knowledge.

CHEMICALS

19 Some chemicals used for cleaning can be harmful if they are used or stored incorrectly. Employers should make sure that staff know of the hazards, and are fully trained in how to use such substances, what precautions they should take and what to do if there is an accident. This information may be found on the manufacturer's label.

Storage

20 Chemical containers must be clearly marked with their contents. *Never* use food or drink containers for storing chemicals.

21 Containers should be properly closed after use and returned to the appropriate storage area.

Mixing chemicals

22 Mixtures of certain chemicals can produce toxic gases which are harmful to personnel and may contaminate products. Violent chemical reactions may also occur. This can be a particular problem if chemicals mix in drains. In general terms:

(a) acids and alkalis should be kept separate;

(b) concentrated substances should be kept well away from water supplies;

(c) when a concentrate is diluted, the concentrate should be added to water and not the water to the concentrate. The recommended dilution rate must be observed.

Protective clothing

23 Suitable protective clothing (eg aprons, gloves, overalls, goggles and wellington boots) should be provided to protect workers from splashes of cleaning chemicals.

First aid

24 Eye wash bottles should be provided at suitable locations, and staff should be taught how to use them. Bottles should be maintained and replenished according to the manufacturer's instructions.

MACHINES

25 It is often necessary to remove guards for cleaning. Running unguarded machinery, whether deliberately or unexpectedly, can be dangerous.

26 Before cleaning starts, the machine should be electrically isolated. Switching off at the STOP button is not enough. Either pull out the plug or use the isolating switch.

27 During cleaning a blade carrier should be used to handle sharp cutters or blades.

28 After cleaning check that the machine has been properly reassembled, with all components, including guards, correctly replaced and in full working order.

ELECTRICAL SAFETY

29 Electricity can cause shock, burns and fire.

30 Wet conditions increase the risk of electric shock.

31 All electrical equipment should be installed and maintained by a competent electrician.

32 Correct fuses should be used, in accordance with the current rating of the equipment.

33 Each machine supplied via a permanent cable must have its own isolator to disconnect it from the electrical supply. The isolator should always be used to disconnect the machine during cleaning and maintenance work.

34 Working areas should have sufficient socket outlets, to avoid cables trailing across the floor.

35 Efficient cable or cord grips should be used both at the plug and where the cable enters the equipment.

36 Flexible cables should be positioned and protected so that they cannot be damaged by heavy equipment or materials. Flexible cables should be checked regularly for damage. Loose or damaged plugs should be eliminated. Damaged cables should generally be replaced: if they are repaired a suitable cable coupler should be used. Do not try to carry out makeshift repairs to damaged cables.

37 Standard electrical equipment should not be used in wet conditions.

38 A sensitive (30 mA max) residual current circuit breaker (also known as an earth leakage circuit breaker) should be fitted in the electrical supply to pressure washing units and steam cleaners. Such devices should be tested regularly using the test button.

39 START buttons should be recessed or shrouded to prevent unintended operation.

40 STOP buttons should be red, protruding for easy operation and within easy reach of the operator.

41 Control functions should be clearly marked.

42 New machines with exposed blades, such as slicers and bandsaws, are fitted with a no-volt release (NVR). This device ensures that the machine starts only when the control button is operated and not when it is plugged in or when the electrical power is switched on.

43 With some existing machines it may be possible to fit a no-volt release during a major overhaul. Consult the manufacturers for advice.

FIRST AID

REGULATIONS

44 The Health and Safety (First Aid) Regulations 1981 apply to all workplaces. Guidance on the Regulations is given in HSE booklet HS(R)11.

FIRST AID AT WORK

45 How much first aid equipment should be provided in a workplace depends on the number of people employed. For a small establishment a single first aid box may be sufficient. This should be in the charge of a responsible person, and should be properly stocked. Advice can be obtained from the Local Authority Environmental Health Department, the Employment Nursing Adviser at your local HSE Area Office, or from a supplier of first aid equipment.

STABBING INJURIES

46 Knife accidents are common in the meat industry. Most of the fatalities and serious injuries occur during deboning when the knife is used in such a way that it can stab the user. A serious stabbing injury can result in heavy external bleeding, particularly if a main artery is punctured. In a number of cases the victim has bled to death in a few minutes. Prompt first aid action could save a life.

47 During deboning operations someone should be available who knows how to deal with stabbing injuries and heavy bleeding. In areas where deboning is carried out the notice at Figure 1 should be prominently displayed.

KNIFE INJURIES - FIRST AID

If someone is bleeding heavily

IMMEDIATELY APPLY FIRM PRESSURE to the wound with a pad;
lay the victim down;
continue to press the wound;
CALL FOR HELP

The nominated first aider for this address is:

.....

.....

..... Date: .....

Fig 1 First aid notice

REPORTING ACCIDENTS AND OTHER INCIDENTS

48 Under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985 (RIDDOR) employers have a legal duty to report certain accidents, dangerous occurrences and occupational diseases to the relevant enforcing authority.

IMMEDIATE NOTIFICATION

49 You must notify the appropriate authority as soon as possible, normally by telephone, if:

(a) someone dies, or suffers a major injury, in an accident in connection with your business;

(b) there is a dangerous occurrence (such as a burst steam boiler).

REPORT IN WRITING

50 You must send a report to the appropriate authority within 7 days if:

(a) an employee is off work for more than 3 days as a result of an accident at work;

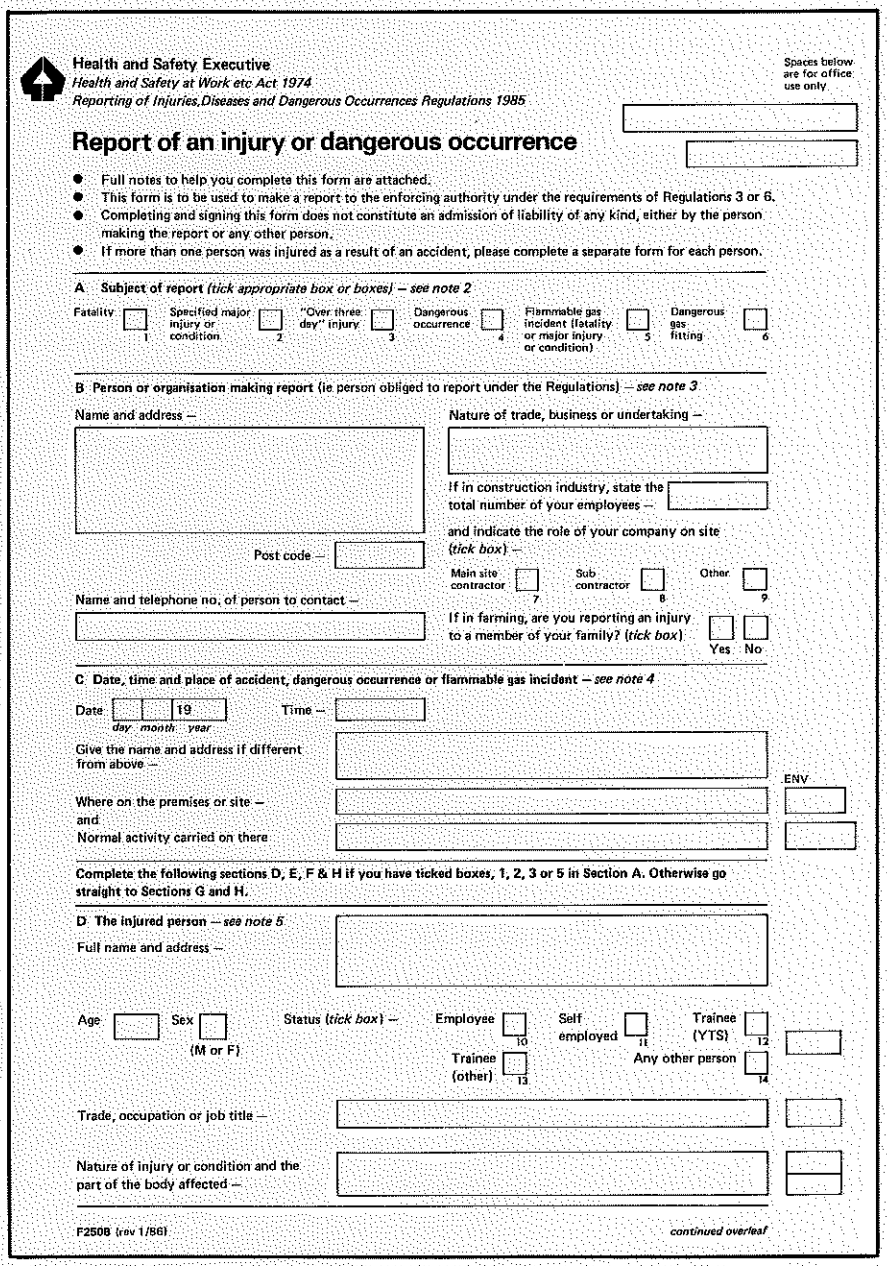
(b) you have previously notified by telephone any death, major injury or dangerous occurrence;

(c) a specified occupational disease is certified by a doctor.

51 Reports should be made on Form 2508, for accidents and dangerous occurrences (a reduced copy of Form 2508 is shown at Figure 2). Form 2508A should be used for reporting cases of disease. These forms are available from HMSO bookshops. Photocopies of the forms may be used.

RECORD KEEPING

52 You must keep a record of any reportable accident, dangerous occurrence or case of disease.



Health and Safety Executive
Health and Safety at Work etc Act 1974
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985

Spaces below are for office use only

Report of an injury or dangerous occurrence

- Full notes to help you complete this form are attached.
- This form is to be used to make a report to the enforcing authority under the requirements of Regulations 3 or 6.
- Completing and signing this form does not constitute an admission of liability of any kind, either by the person making the report or any other person.
- If more than one person was injured as a result of an accident, please complete a separate form for each person.

A Subject of report *(tick appropriate box or boxes) – see note 2*

Fatality 1 | Specified major injury or condition 2 | "Over three day" injury 3 | Dangerous occurrence 4 | Flammable gas incident (fatality or major injury or condition) 5 | Dangerous gas fitting 6

B Person or organisation making report (ie person obliged to report under the Regulations) – *see note 3*

Name and address –

Post code –

Name and telephone no. of person to contact –

Nature of trade, business or undertaking –

If in construction industry, state the total number of your employees –

and indicate the role of your company on site *(tick box)* –

Main site contractor 7 | Sub contractor 8 | Other 9

If in farming, are you reporting an injury to a member of your family? *(tick box)* Yes No

C Date, time and place of accident, dangerous occurrence or flammable gas incident – *see note 4*

Date ☐☐ ☐☐ 19☐☐ (day month year) Time –

Give the name and address if different from above –

Where on the premises or site – and Normal activity carried on there

ENV

Complete the following sections D, E, F & H if you have ticked boxes, 1, 2, 3 or 5 in Section A. Otherwise go straight to Sections G and H.

D The injured person – *see note 5*

Full name and address –

Age Sex (M or F)

Status *(tick box)* – Employee 10 | Self employed 11 | Trainee (YTS) 12 | Trainee (other) 13 | Any other person 14

Trade, occupation or job title –

Nature of injury or condition and the part of the body affected –

F2508 (rev 1/86) *continued overleaf*

Fig 2 Form 2508

SAFE USE OF KNIVES, CLEAVERS AND HANDSAWS

Butchers use a variety of hand tools, including knives, cleavers and saws, for a variety of tasks.

RISKS

Knives

53 Knife accidents are very common in the meat industry. They usually involve cuts or stabs to the non-knife hand and forearm. Serious accidents can result from stabbing injuries to the body. Fatalities have occurred in the retail sector as well as in factory units.

54 Most of the fatalities and serious injuries recorded happened during *de-boning* operations. For this work the meat is held down on the block or table and manoeuvred with one hand, while the knife is gripped firmly, with the blade downwards, in the other hand (Figure 3). The knife is extremely sharp and is pulled through the meat towards the body. Accidents happen when the knife slips or skids off the bone and stabs the butcher.

55 Other work involving knives includes cutting, slicing, dicing, skinning etc. The risk to the body is not so great during these operations as it is in de-boning because the knife is pushed down towards the work surface rather than drawn towards the body. However, there is still a risk of cuts and stabs, particularly to the non-knife hand and forearm.

Cleavers and saws

56 As with knives the main risk in using cleavers and saws is injury to the non-knife hand, which may include cuts, lacerations and even amputation of fingers.

PRECAUTIONS

57 Select the correct tool for the task. Generally knives are specifically designed for a particular job.

58 Knives, cleavers and saw blades should be kept sharp.

Fig 3 Typical grip for de-boning

59 De-boning knives normally have a plastic handle which is designed to prevent fingers slipping onto the blade.

60 Knives that have been re-sharpened until they have very narrow blades should not be used. They can snap during use, and can pass through protective aprons.

TRAINING

61 Operators should be allowed to work with knives and hand tools only after they have been properly trained. Training should include:

the correct use of knives and hand tools;

sharpening and honing;

the dangers associated with misuse;

the correct use of protective clothing and equipment.

ADVICE TO USERS

62 Never use a blunt knife.

63 Know your own knife and how sharp it is.

64 Know how to use a steel and always use it properly.

65 Never use a steel that does not have a hand guard.

66 Do not grind your knife blade until it is dangerously narrow.

67 Always replace knives in their scabbards when they are not in use.

68 Never lay them down on the work surface, where they may be covered by other objects.

69 Never walk around with a knife in your hand, unless the blade is covered.

70 Always pick up a knife by the handle.

71 Never try to catch a falling knife.

ABOVE ALL, BE CAREFUL AND RESPECT YOUR KNIFE

Fig 4 Apron used in de-boning work

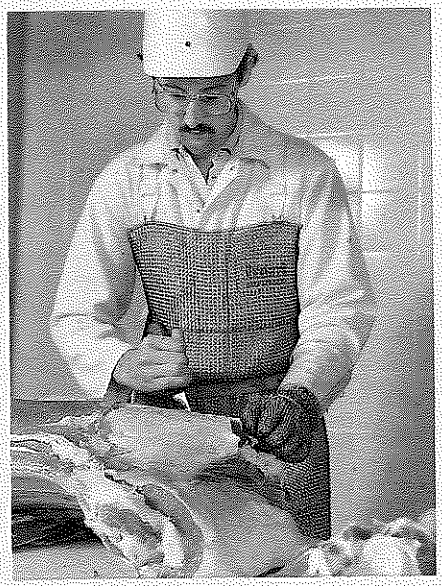


Fig 5 Apron used in de-boning work

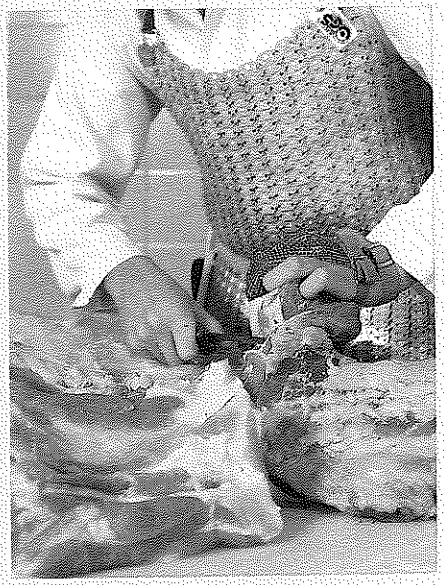


Fig 6 Apron used in de-boning work

PROTECTIVE CLOTHING

72 Injuries and fatalities can be prevented if operators wear the right protective clothing, in particular protective aprons and gloves.

Aprons

73 Suitable protective aprons must be worn during all de-boning work or during other work where the knife is pulled with the point towards the body. The only exception is where a fully trained butcher is principally engaged in serving cutomers.

74 Aprons should always be worn by butchers undergoing training in de-boning work or other knife work where the knife is pulled with the point towards the body (Figures 4 to 6).

75 At present suitable aprons are made from overlapping metal discs or interlocking metal rings*

76 The apron should cover the body area from mid breast bone to mid thigh (Figure 7). Its weight should be borne by the wearer's shoulders and not the neck. The apron should be fully adjustable with shoulder straps and waist/hip belts so that it sits neatly against the body (Figures 8, 9). The bib should not sag when the wearer bends forward.

*This information was correct at the time of publication. Further developments may allow other materials to be used.

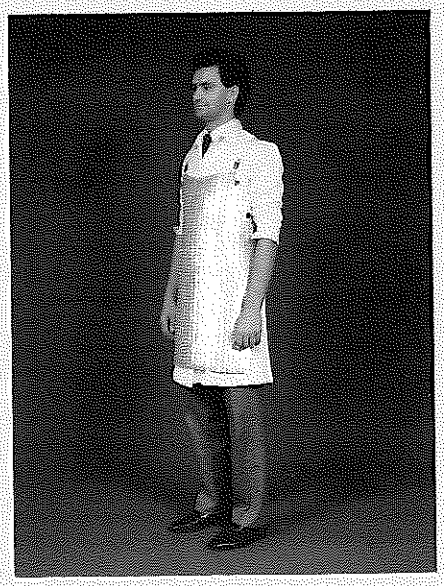


Fig 7 The protective surface of the apron should cover the body from mid breast bone to mid thigh

Fig 8

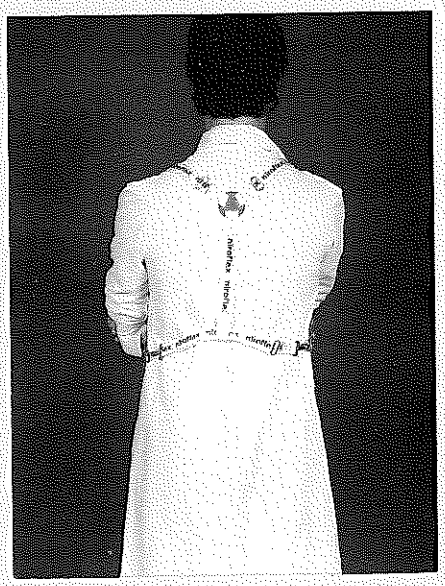


Fig 9 The weight of the apron should not be borne by neck. Figures 8 and 9 show suitable shoulder strap arrangements

77 Aprons should be properly maintained: loose or missing links should be replaced immediately and straps and fastenings should be kept in good condition.

78 'Stab pads' made of Balata belting or similar material are not suitable as protection against stabbing injuries.

79 A British Standard is being prepared for butchers' protective aprons.

Gloves

80 It is recommended that a suitable protective glove be worn on the non-knife hand during de-boning work.

81 Protective gloves are also recommended for other hand knife operations, particularly when the operator is inexperienced or under training.

82 At present suitable protective gloves are made from metal mesh or interlocking rings.*

83 A wide range of protective gloves is available, providing 3 or 5 digit protection for the left or right hand (Figures 10 to 13).

84 Gloves come in a variety of sizes and care should be taken in selecting the right size for each individual.

Forearm protectors

85 Some gloves are designed to give wrist and forearm protection: forearm protectors made of clear plastic and either attached to or independent of the gloves can also be obtained.

PROTECTIVE CLOTHING - ADVICE TO USERS

86 Always use your protective apron during de-boning operations or other work where the tip of the knife points towards the body.

87 Make sure that your apron is the correct size for you. The protective surface should extend from your mid breast bone to your mid thigh.

88 Make sure that your apron is properly adjusted so that it fits neatly against your body.

89 Wear your protective gloves when you are de-boning and where possible for other knife work as well.

90 Make quite sure the glove is the correct size.

91 Report any defects in your protective clothing to your supervisor immediately.

92 Keep your protective clothing (including gloves) clean.

*This information was correct at the time of publication. Further developments may allow other materials to be used.

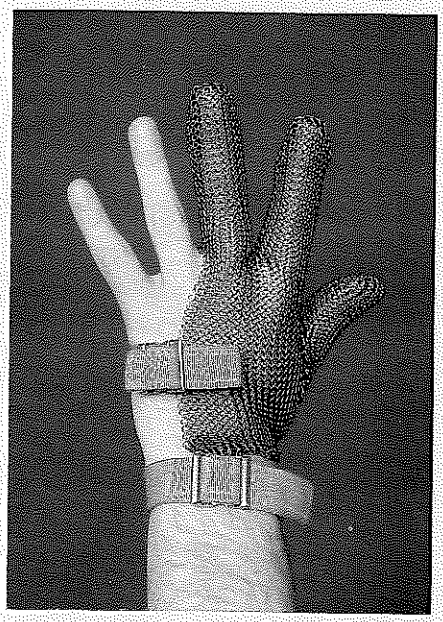


Fig 10

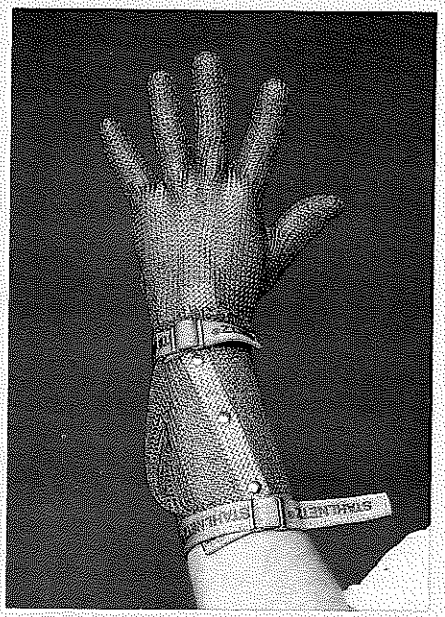


Fig 11

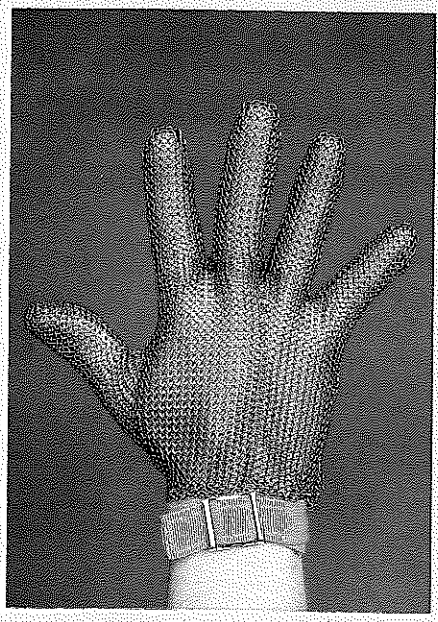


Fig 12

Fig 13

SAFETY WITH MACHINERY

GUARDING

93 Dangerous parts of the machine must be guarded. Meat preparation machinery has to be stripped down for cleaning more frequently than most other machinery. It should be possible to clean guards easily and thoroughly and they must be replaced after cleaning. Machines must not be run if any guard has been removed.

94 Guards should be designed and made only by someone who understands the principles and standards involved.

Drives

95 Drives and transmission machinery must be enclosed by a guard or safely situated within the machine body.

Feed and delivery openings

96 Many machines have openings to allow raw materials to be fed in or the finished product to be taken out. The openings must not allow anyone to reach into the dangerous parts of the machine.

Fixed guards

97 Fixed guards must be secure and tamperproof and their fixings should be removable only with a tool, eg bolts or hexagon socket machine screws. Toggle clamps, wing nuts and quick release catches should not be used.

Electrical interlocking

98 Guards that have to be opened regularly are best fitted with interlocking switches connected to the motor supply, so that the machine cannot start or run unless the guard is in place. It is essential that any switch used is of proven reliability and installed in such a way that it will not be prone to failure or misuse. (Ordinary reed switches and micro switches are not normally suitable.)

Maintenance of guards

99 Whatever the type of guarding and interlocking, it should be checked before the machine is used, and maintained in proper working order. A visual examination should be made and any broken or missing guards should be repaired or replaced. Interlocks should also be checked and tested to ensure they are secure and working. Broken interlocks should be replaced or repaired.

100 In particular, the guards should be checked after maintenance or cleaning when the guards may have been removed.

MACHINE SETTING

101 Some machines have to be adjusted while running. Final settings sometimes have to be made once the actual product can be seen. The controls for running adjustments should be safely positioned. Machines should be set and adjustments made with the guards in position.

MACHINE STABILITY

102 Machines should be on a secure base so that they cannot move or vibrate when in use. They may need to be bolted to the floor or worktop.

OPERATOR SAFETY

103 Operators should not wear chain-mail or other gloves when working machinery with serrated or toothed blades.

104 Loose or frayed clothing and jewellery should not be worn when operating machines.

105 Machines should not be used if the operator is feeling unwell or drowsy (certain medicines etc carry a warning that they may cause drowsiness).

WARNING NOTICES

106 Warning notices may be displayed alongside machines to remind operators and others of the dangers they pose. Many machine suppliers provide suitable notices, eg:

DANGEROUS MACHINE: to be operated by authorised persons only.

WARNING: Do not talk to or distract the attention of the operator while the machine is in motion.

BANDSAWS (FREE STANDING AND TABLE TOP)

107 Free standing bandsaws (Figure 14) are widely used in the meat industry for primal cuts, portion cutting and breaking down frozen blocks before mincing.

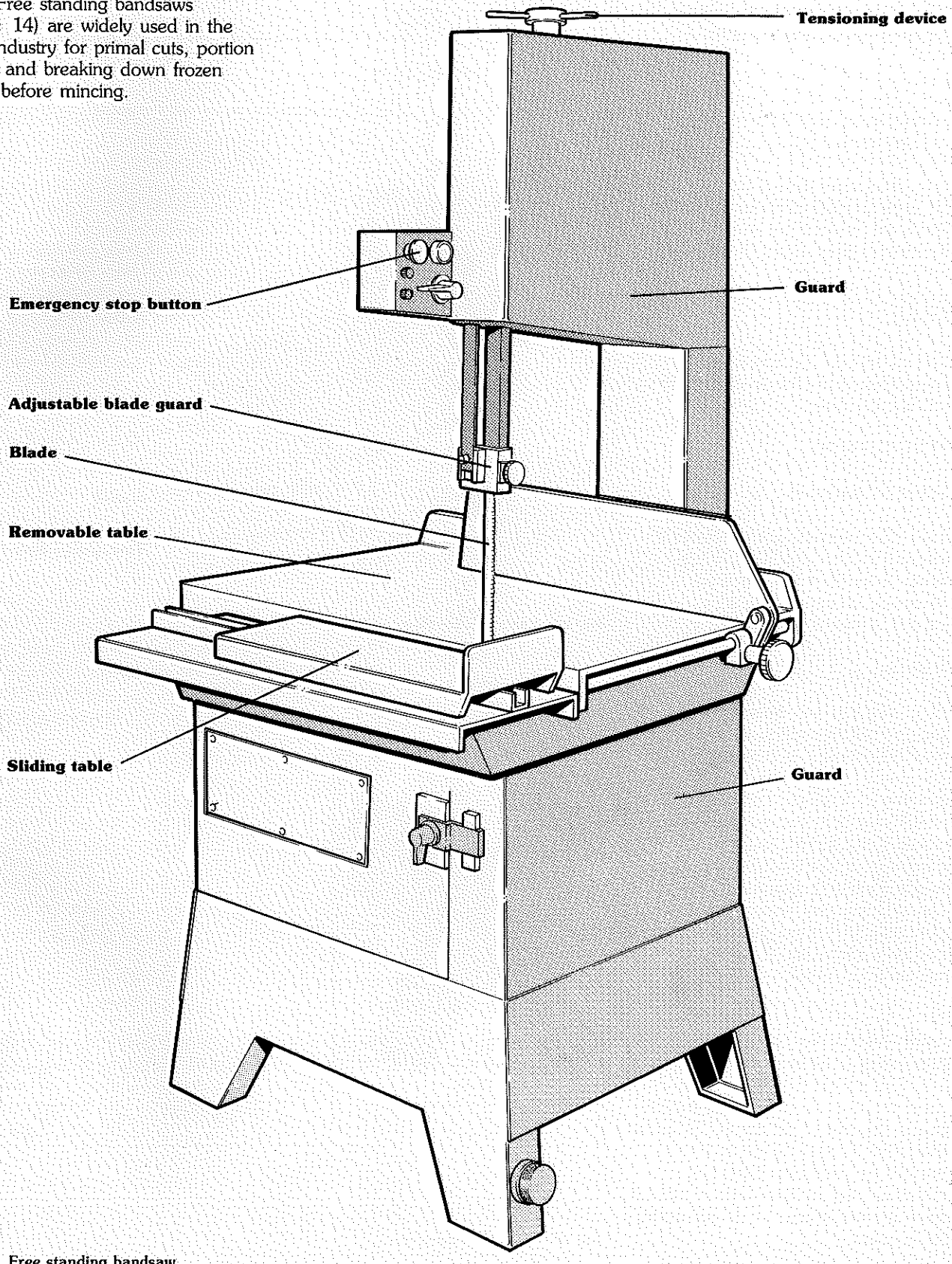


Fig 14 Free standing bandsaw

108 Table top machines (Figure 15) are used for cutting portions of meat.

109 The size of the machine will determine the type of work that can be done on it.

110 Bandsaws should not be used for cutting small portions so that the hands are taken close to the blade eg for cutting pork chops from fresh pork loin.

RISKS

111 There is a danger of amputation at the blade of even the smallest bandsaw.

PRECAUTIONS

Siting of machines

112 The machine should be sited where it can be used and cleaned safely, away from passageways, doorways, other working areas and other equipment (Figure 16).

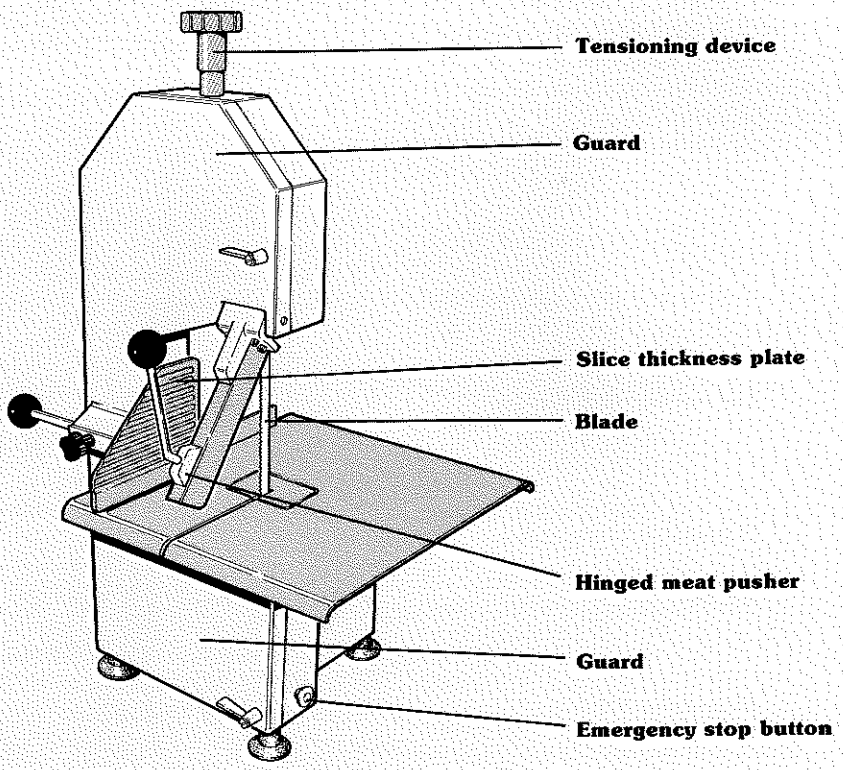


Fig 15 Table top bandsaw

Guarding

113 The **top** and **bottom pulleys** and the **return section of the blade** must be enclosed in a strong **guard.** The guard needs to be opened for cleaning so it should interlock the power supply to the motor. The blade should come to rest as soon as possible after the machine has been switched off or a guard door opened. The stopping time should be a maximum of 4 seconds on table top machines and 7 seconds on freestanding models.

114 As much as possible of the cutting area of the blade must be guarded by a **blade guard** (Figure 17). This should be L shaped to cover the front (toothed) and outer side of the blade and should be easily adjustable. It must be set as low as possible for each cut. Table top machines may be fitted with a **hinged meat pusher** instead of an adjustable blade guard.

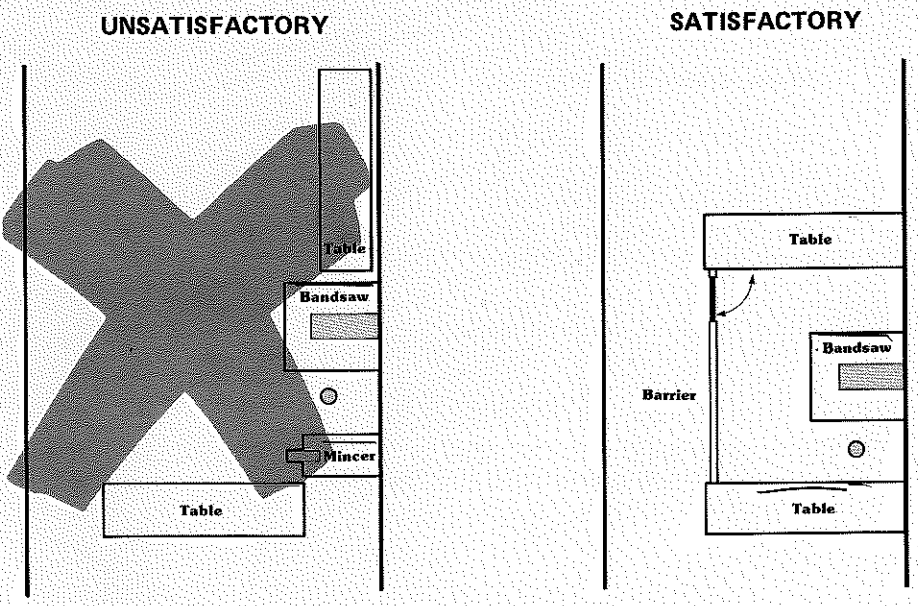


Fig 16 Location illustration

115 Any **removable table** should interlock the power supply to the motor.

Safe working methods

116 Even with correct guarding, the cutting portion of the blade is necessarily exposed on this type of machine. It is therefore essential to combine correct guarding with a safe method of work that keeps fingers and hands away from the blade. Where necessary sliding tables, portioning devices, slice thickness plates and last slice devices should be used.

117 The adjustable blade guard should always be set as low as possible, or the pusher guard should be used if one is fitted.

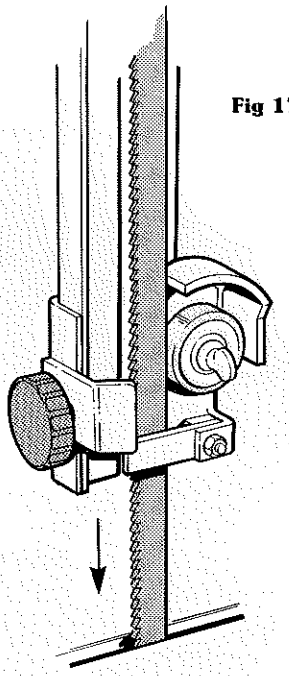


Fig 17 Adjustable blade guard

Other safeguards

118 Blade **guides** (Figure 18) and **scrapers** (Figure 19) should be provided and maintained in good working order. If blade guides are worn or badly adjusted the blade can twist unexpectedly.

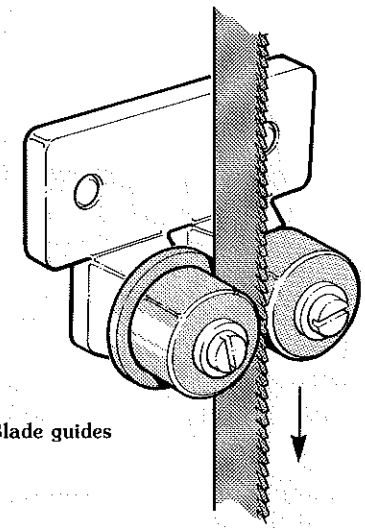


Fig 18 Blade guides

119 Blades should be kept sharp and correctly adjusted and tensioned.

120 Only blades of the type recommended by the machine manufacturer should be used.

121 Operators should not wear chain-mail or other gloves or jewellery when working at bandsaws.

SELECTION AND TRAINING OF OPERATORS

122 Working with bandsaws may be particularly demanding both physically and mentally. Operators should be carefully selected, trained and properly supervised.

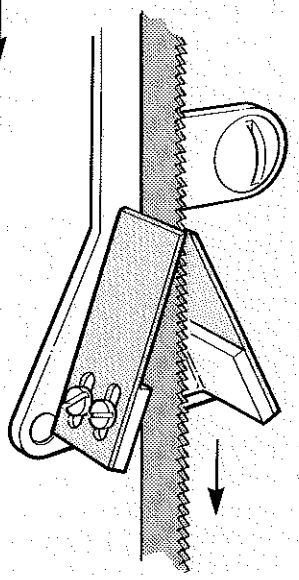


Fig 19 Blade scrapers

MINCERS

123 This section deals with mincers, (Figure 20) either free standing or bench mounted, where material is fed to the worm via a feed throat.

RISKS

124 The risks are due to the shearing action of the **worm** at the **feed throat** and the cutter at the rear of the fixed **mincing plate**. Even the smallest mincer can cause serious injury.

PRECAUTIONS

125 The operator must not be able to touch the worm through the feed throat. Either the feed throat should be long and narrow (Figure 21) or a **restrictor plate*** must be securely fixed over the top of it (Figure 22). Any holes in the restrictor plate should be small enough to prevent any operator reaching the worm.

126 If a restrictor plate is used it must be sufficiently rigid to prevent its being bent out of position. It should be secured so that it cannot work loose.

127 The machine should not be used if the restrictor plate is loose, bent or missing.

128 Some old mincers have a **feed tray** which can be lifted off easily to give clear access to the worm. Such machines must not be used unless they have been modified to prevent this happening.

129 A **delivery guard** must be fitted if the operator can reach through the mincing plate to the cutter. Some operators fingers can reach through a 10 mm hole. A guard should always be fitted when kidney plates or coarse plates with holes of 10 mm diameter or more are used.

130 A **push stick** should always be provided to force meat down the feed throat. Fingers must never be used. The push stick should be designed so that it cannot reach the worm.

131 The machine should never be overloaded.

**Dimensions of restrictor plate* - HSE has commissioned research on suitable dimensions for restrictor plates. The results will be published when available.*

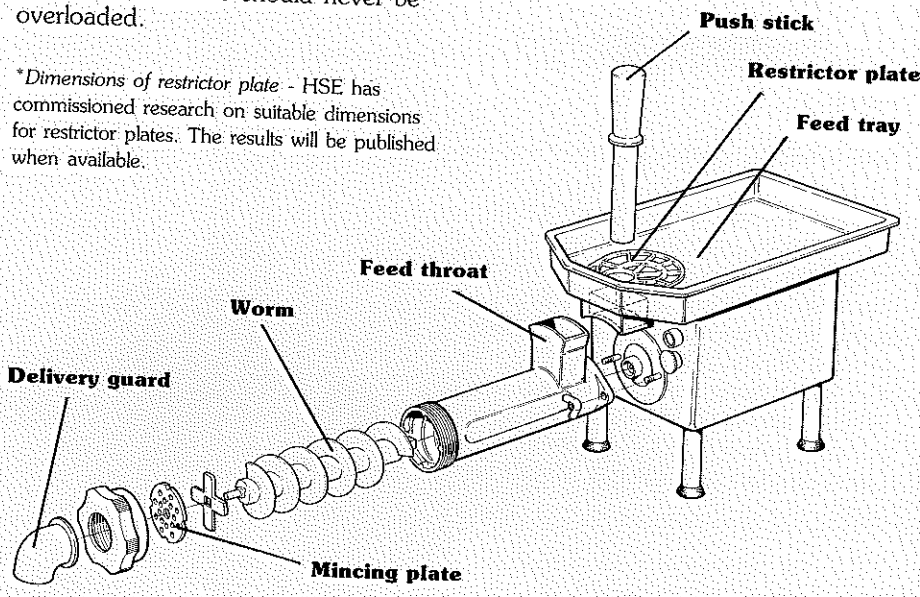


Fig 20 Mincer

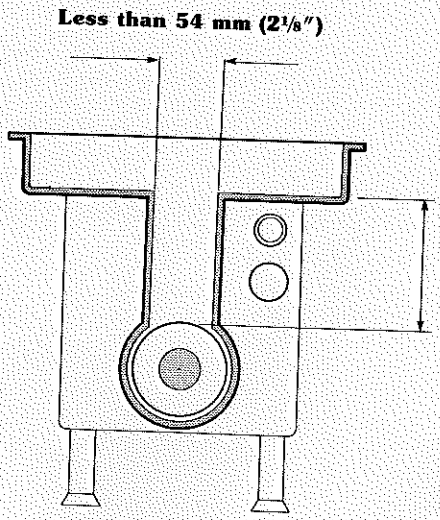


Fig 21 Feed throat dimensions

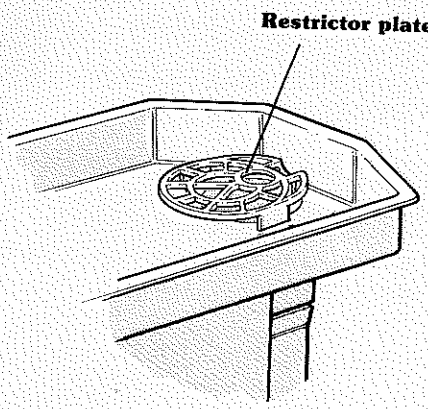


Fig 22 Detail of restrictor plate

MIXER/MINCERS

132 This section deals with manually fed machines that mix and mince. Material is fed to the worm from a hopper (Figure 23). The mixing arms or paddles are normally located on a horizontal shaft in the feed hopper (Figure 24).

RISKS

133 In addition to the risks associated with mincing machines (see paragraph 124) the mixing paddles on mixer/mincers are dangerous, and fatal accidents have occurred.

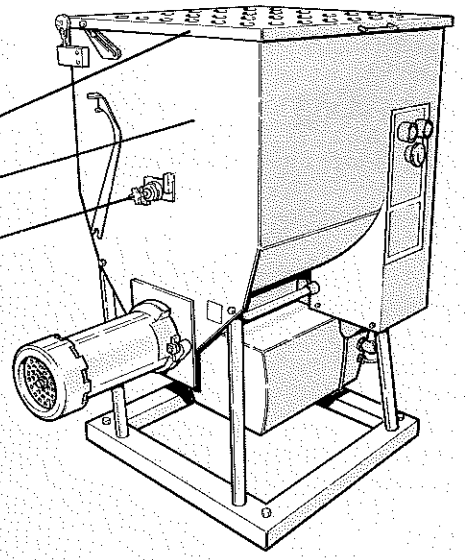
PRECAUTIONS

134 The operator needs access to the hopper for feeding and cleaning, but should not be able to touch the **mixing paddles** or the **worm** while they are moving. A **hopper guard** or **lid** should be provided to prevent access to the mixing paddles and worm. This should interlock the power supply to the motor (Figure 25). The worm and mixing paddle should stop before the lid can be opened.

135 The lid may have openings in it so that the operator can look into the hopper or add seasonings etc. The openings should not be large enough to allow a hand or finger to reach the paddles or worm.

136 The operator must never push a stick or rigid object through the openings in the lid.

137 A **delivery guard** should be fitted where the holes in the mincing plate exceed 10 mm in diameter. This guard may be fixed or, alternatively, a hinged hood or cover could be fitted, interlocked with the power supply to the motor.



Note: **Delivery guard not shown but required where holes in end plate exceed 10 mm**

Fig 23 Mixer/mincer

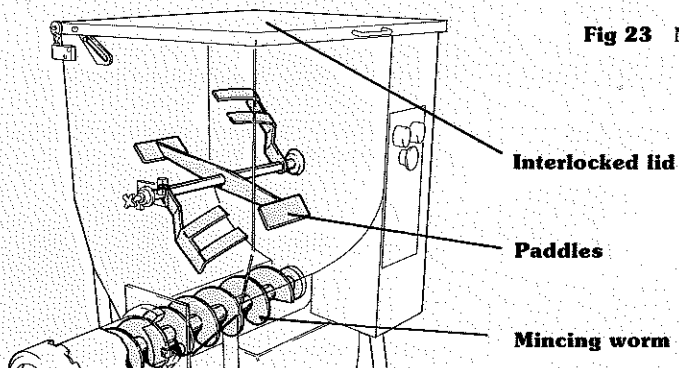


Fig 24 Detail of mixer/mincer

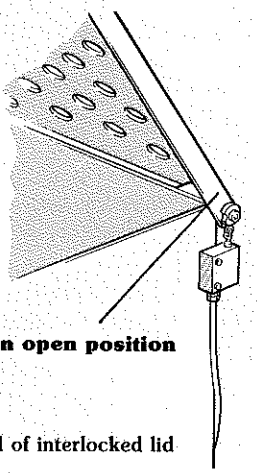


Fig 25 Detail of interlocked lid

BOWL CUTTERS

138 Bowl cutters (Figure 26), otherwise known as bowl choppers or food cutters, have a series of **blades** on a horizontal drive shaft running in a bowl which is a circular trough. The bowl rotates to feed material to the blades. Typical products are sausage meat and coleslaw.

139 This section does not cover machines which have bowl capacities below about 10 kg (15 litres). Standards for these machines are still under consideration. For further information please contact any Local Authority Environmental Health Department or HSE Area Office.

RISKS

140 The main danger is contact with the blades, which run at high speed.

141 These machines may also produce high noise levels.

PRECAUTIONS

Guarding

142 The bowl should be smooth and without projections so that it cannot catch anyone.

143 The **guard** over the blades must enclose the rear half of the bowl. It should interlock the power supply to the motor, and the blades should stop before it can be opened. A time-delay interlocking device or centrifugal switch is usually needed, unless a brake is fitted to the drive.

144 The machine must not be used if the interlock is not working properly. **NEVER** reach under the blade guard.

145 A series of **bars** or some other barrier should be fitted to cover the quarter of the bowl where it runs towards the blades. A **quadrant guard** restricts access to the blades but allows the operator to load the bowl. The remaining quarter of the bowl is left open so that the machine can be unloaded. Alternatively, an interlocking guard may be used to enclose the open top of the bowl entirely.

146 Where the machine is fitted with an automatic unloading device it may not be possible to fit a full quadrant guard. In this case the longest practicable guard should be used.

147 A **non-return flap** should be fitted to the rear hood where the bowl runs out from the blade. It should not be possible to push the flap back under the guard or lift it above the horizontal.

Noise

148 The noise from these machines can be minimised by ensuring that the blades are sharp and that the shaft bearings are properly lubricated and not worn.

149 Blades which are improperly balanced can also produce high noise levels. Blades should be balanced when replaced after cleaning or sharpening etc. Consult the machine manual or supplier on the correct method of balancing.

150 On some machines it may be necessary to fit a cover to reduce noise emission (Figure 27). These covers are normally hinged at the rear hood and cover the front half of the bowl. They may be of a suitable plastic or of stainless steel. They should be interlocked with the machine motor so that high speed cannot be selected until the noise cover is closed.

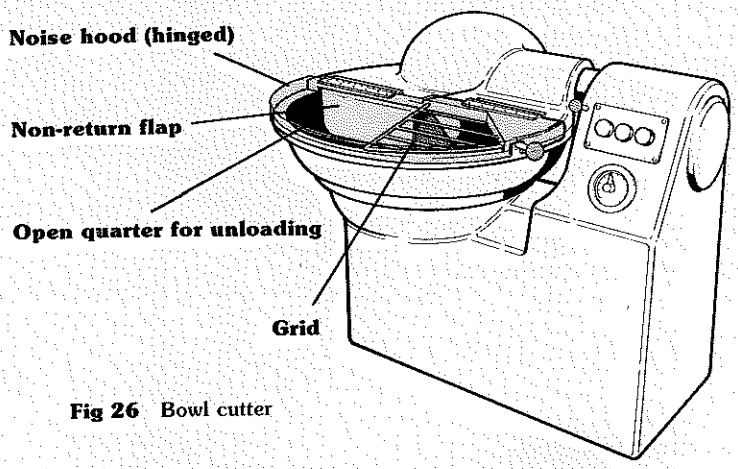


Fig 26 Bowl cutter

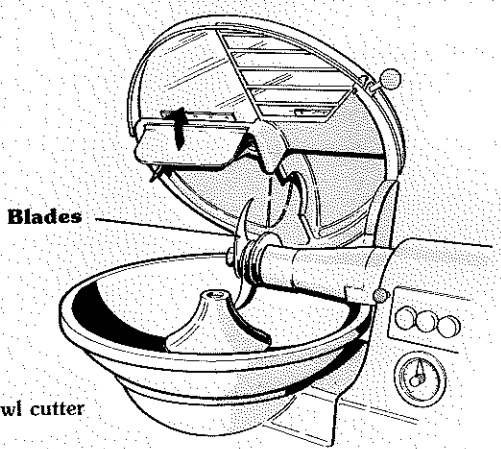


Fig 27 Detail of bowl cutter

SLICERS

151 There are three main types of slicer; the gravity feed slicer, the horizontal feed slicer and the bacon slicer.

152 Gravity feed slicers have an inclined carriage and are used for slicing cooked meat and other foods. The carriage may be hand or power operated.

153 Horizontal feed slicers have a horizontal carriage to carry the meat. The operator pushes this carriage towards a circular blade and slice thickness plate.

154 The traditional bacon slicer has a vertical circular blade and a horizontal carriage. The carriage has clamps to hold the meat. Some machines are power operated and present additional risks. These machines should not be used to slice slippery, small or unevenly shaped food, eg cucumbers or tomato, that cannot be securely held or clamped to the carriage.

RISKS

155 The main danger on these machines is the exposed cutting edge of the blade, which can cause serious cuts and even amputation.

156 On power driven gravity feed slicers there may also be a risk of getting trapped between the carriage and the machine frame.

157 On power driven bacon slicers it is possible for the operator's hand to be pushed onto the blade by the meat supports on the carriage.

PRECAUTIONS

Gravity and horizontal feed slicers (Figures 28, 29)

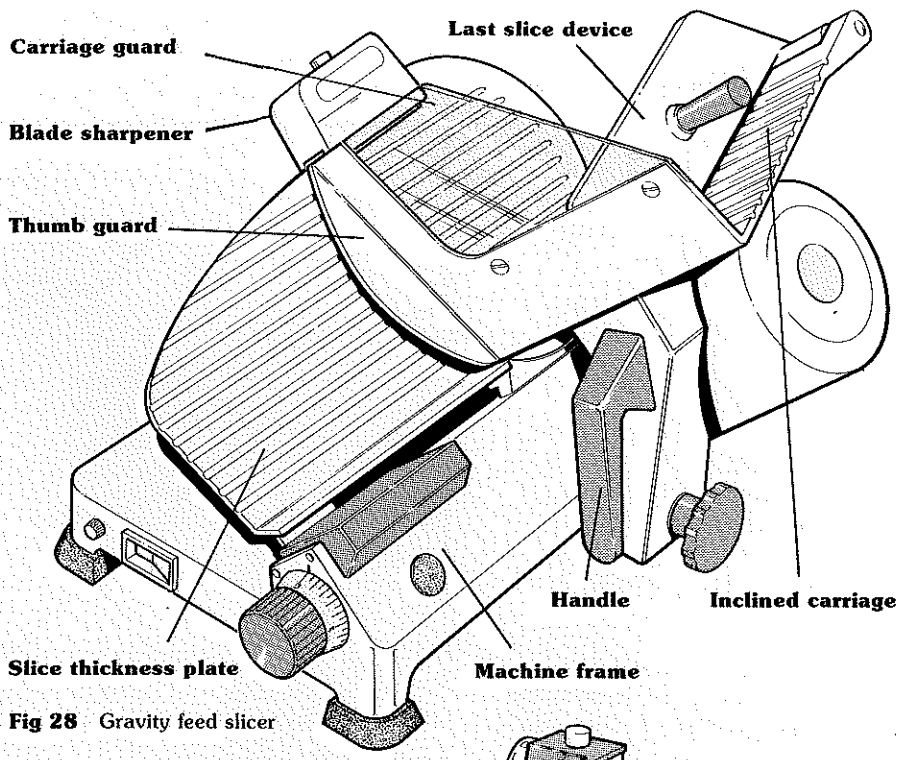


Fig 28 Gravity feed slicer

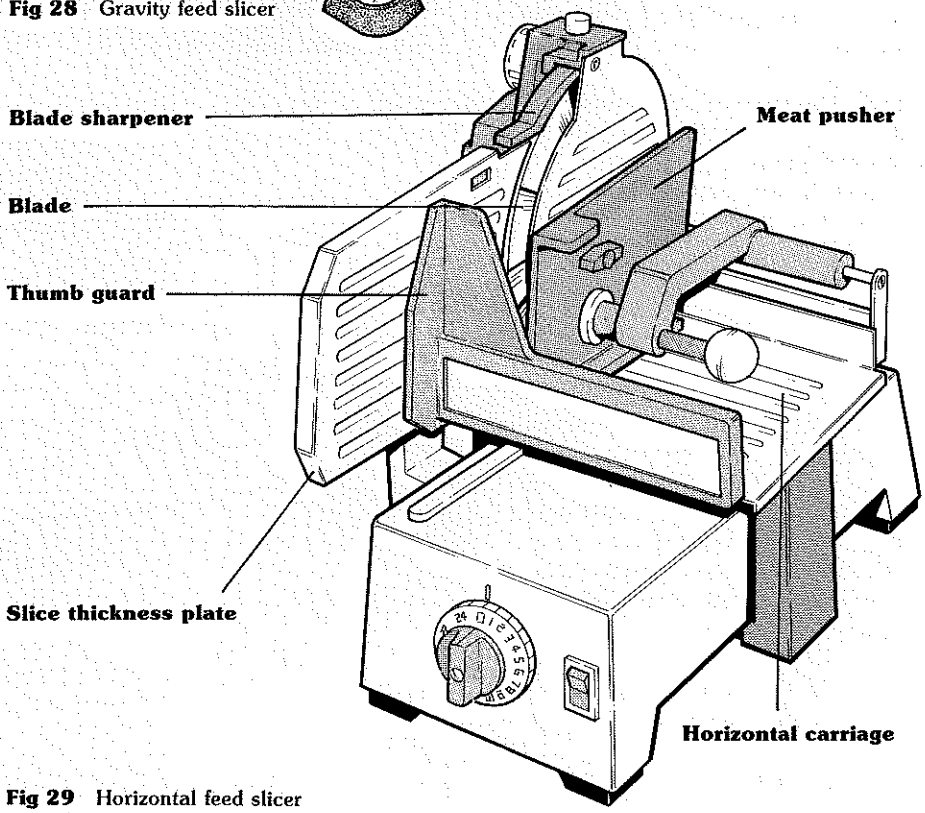


Fig 29 Horizontal feed slicer

158 The edge of the blade must be guarded (**blade guard**) (Figure 30), except at the cutting section. The guard may be permanently fixed to the machine frame flush with the blade edge or it may be removed for cleaning if it interlocks the power supply to the blade motor.

159 A **thumb guard** should be provided at the operator's side of the carriage to cover the blade at the far end of each cut.

160 On certain machines the blades have to be removed for cleaning. A **blade carrier** (Figure 31) that prevents access to the sharp edge should be used to remove the blade safely.

161 The **slice thickness plate** should be shaped to the edge of the blade to prevent injury at the cutting section.

162 The carriage should have a last slice device or meat pusher of suitable size and shape to prevent the operator's hand slipping onto the blade. The meat pusher should have a handle and on the horizontal slicer it should not be possible to swing the pusher clear of the carriage.

163 Keep the blade sharp. The operator has to use more force with a blunt blade which increases the risk of slipping onto it.

164 When the **blade sharpener** is in use all guards must be in place. The slice thickness plate should be at zero except on machines with a detachable sharpener.

165 On gravity feed slicers a suitable plastic or perforated metal carriage guard should be fitted at the operator's side of the carriage to prevent accidental contact with the blade.

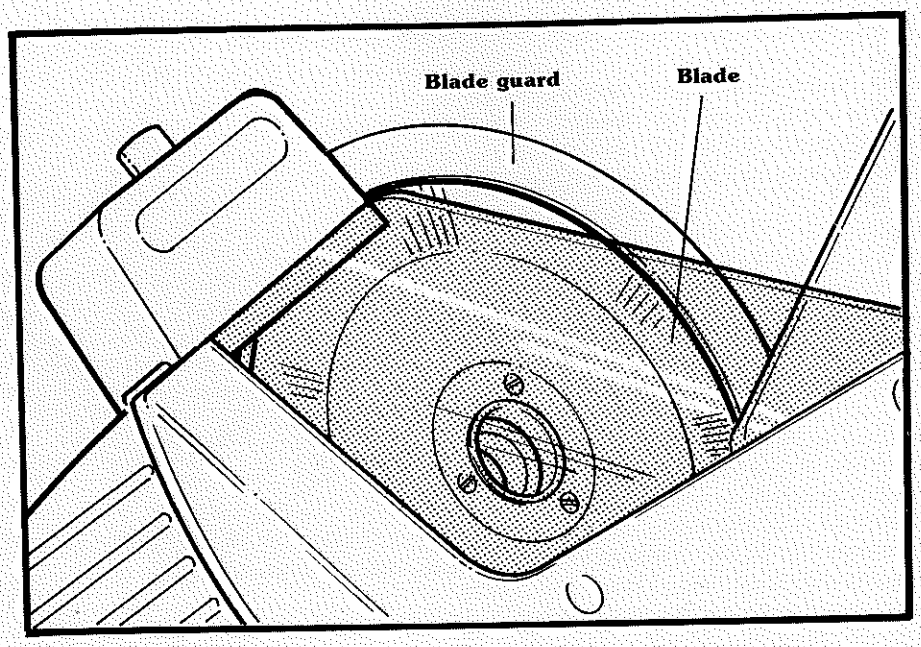


Fig 30 Blade cover removed

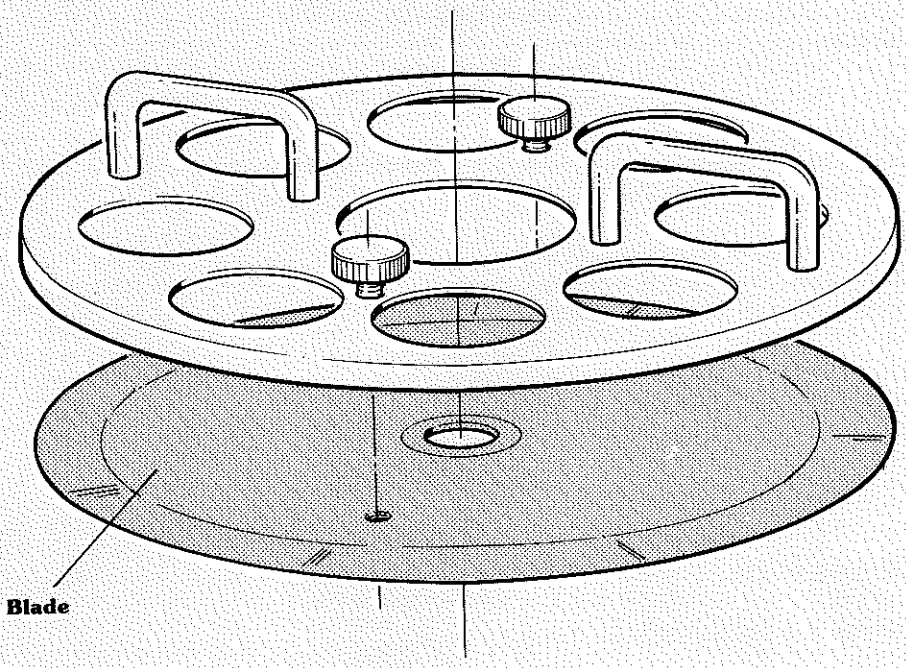


Fig 31 Blade carrier

Bacon slicers

166 These must have a **blade guard** to prevent access to the **blade** at the rear of the machine.

167 The blade edge should always be guarded by the **sharpener cover**.

168 Hand operated machines (Figure 32) should have a **broad front guard** beside the cutting section of the blade.

169 Power operated machines (Figure 33) need a **large plate guard** to prevent the operator's hand being pushed onto the blade if the machine starts unexpectedly. The guard used on the hand operated machine is not enough. The plate, other guards and the sharpener should interlock the power supply to the blade motor. Modern machines can be modified to this standard.

170 A few power operated machines of an old design are still in use. They present the same risks as modern machines and must be guarded to a similar standard. The alternative is to disconnect the drive and convert the machine to hand operation.

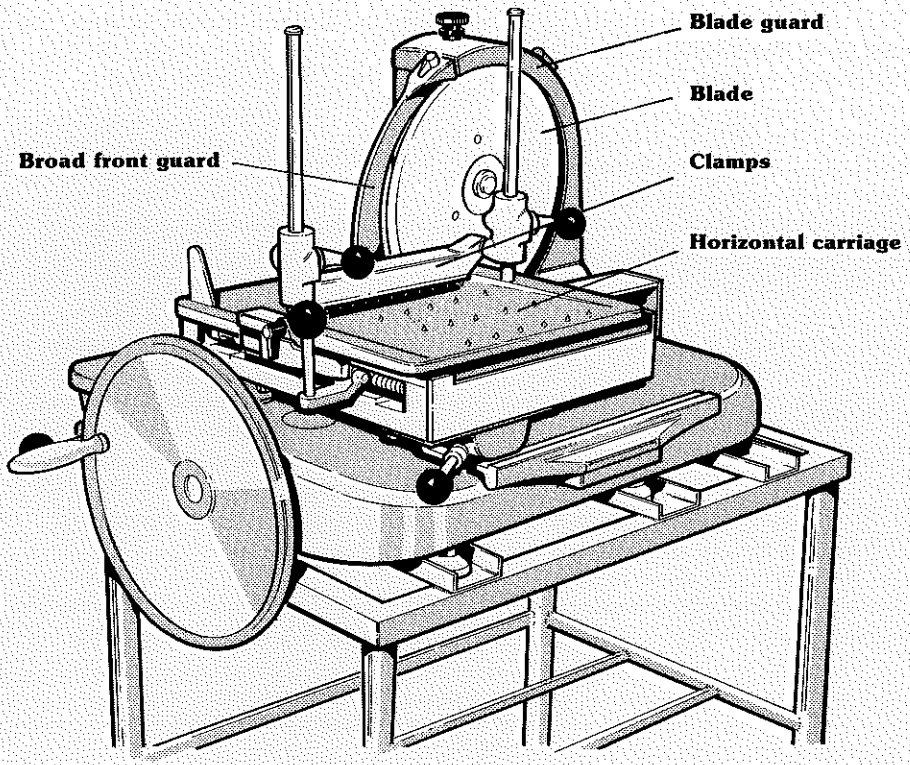


Fig 32 Hand operated bacon slicer

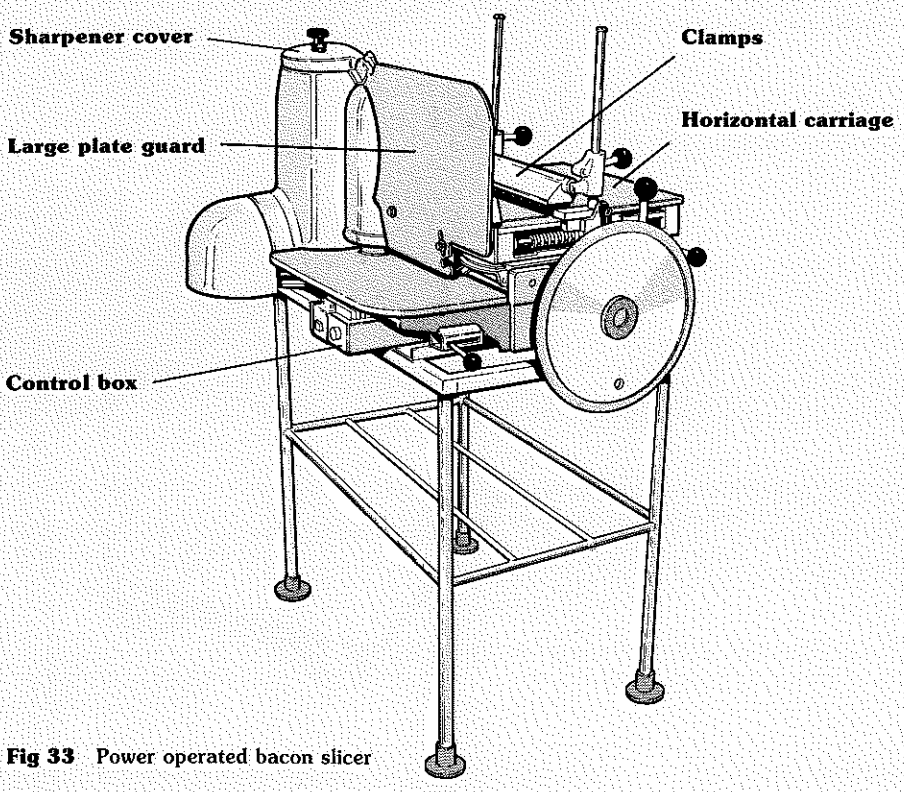


Fig 33 Power operated bacon slicer

PATTY FORMING MACHINES

171 Patty (hamburger) forming machines (Figure 34) mould minced or ground products into portions. The mould is filled in one position and moves to another for the completed product to be ejected. Some moulds have a sliding action, others have a rotary motion. Most machines have a feed hopper but some are fed from sausage fillers or mincers.

172 This section does not cover hand operated presses which form single portions.

RISKS

173 Trapping in the meat **feeder**, **mould** and **ejector** as they move is the main risk with these machines. Serious accidents have happened at these parts.

174 Accidents may also occur at the paper interleaving or scoring devices which are fitted to some models.

PRECAUTIONS

175 The meat feeder must be guarded.

176 If the machine has a **feed hopper** it must have a **feed hopper guard** to prevent the operator touching the meat feeder. The guard may be securely fixed in position or hinged. If it is hinged it should be interlocked with the motor. The guard may be a grid with suitably spaced bars.

177 Suitable guards must be fitted to a mincer if it is used as the meat feeder (see paragraph 124).

178 A long scraper should be available for clearing meat from the sides of the hopper. Do not use your hand.

179 The machine must have a **guard** to prevent access to the traps between the mould and other parts of the machine. The guard should interlock the power supply to the motor.

180 **NEVER** try to clean the mould while the machine is running.

181 Paper interleaving and scoring devices should be guarded using fixed guards and/or guards that interlock the power supply to the motor.

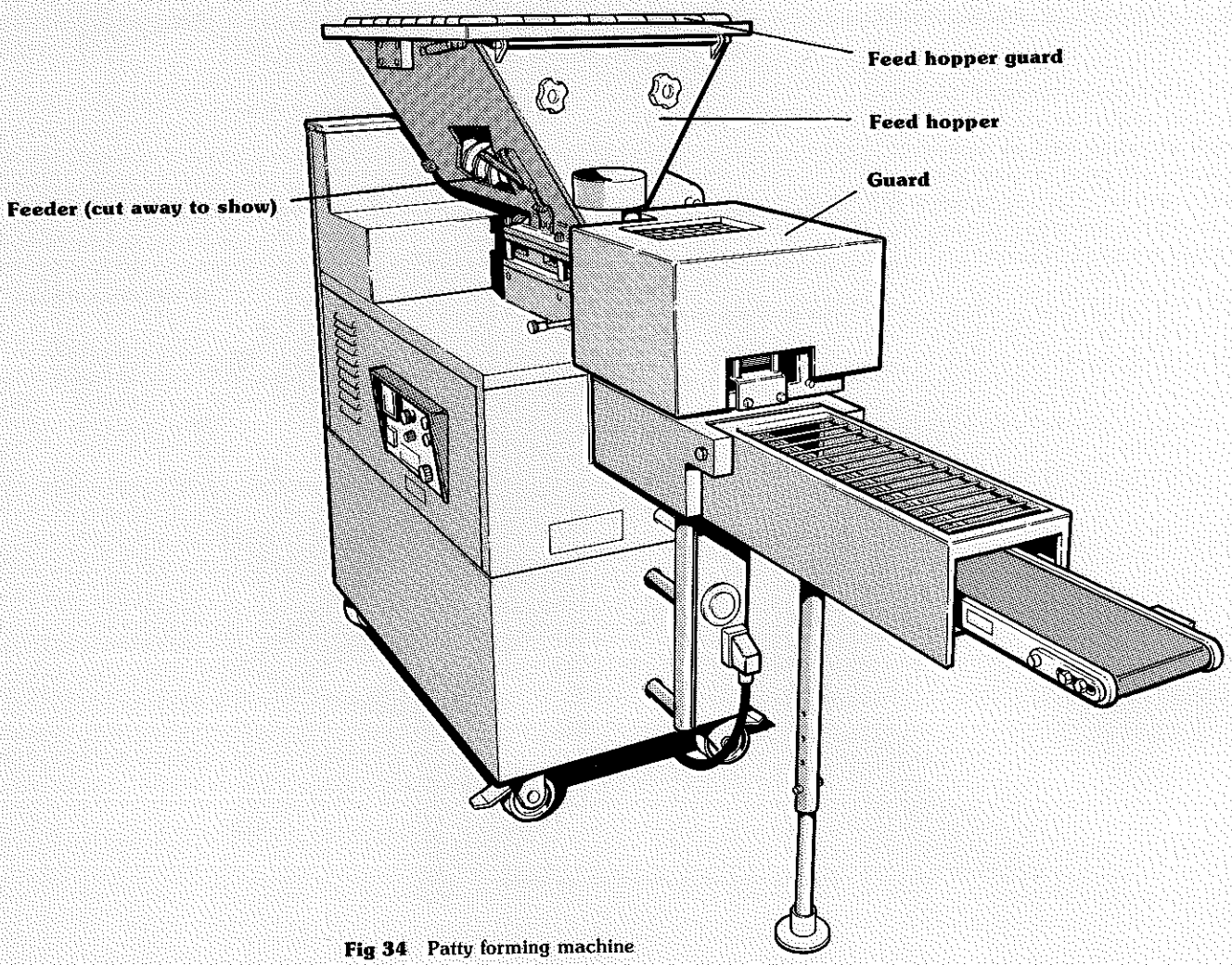


Fig 34 Patty forming machine

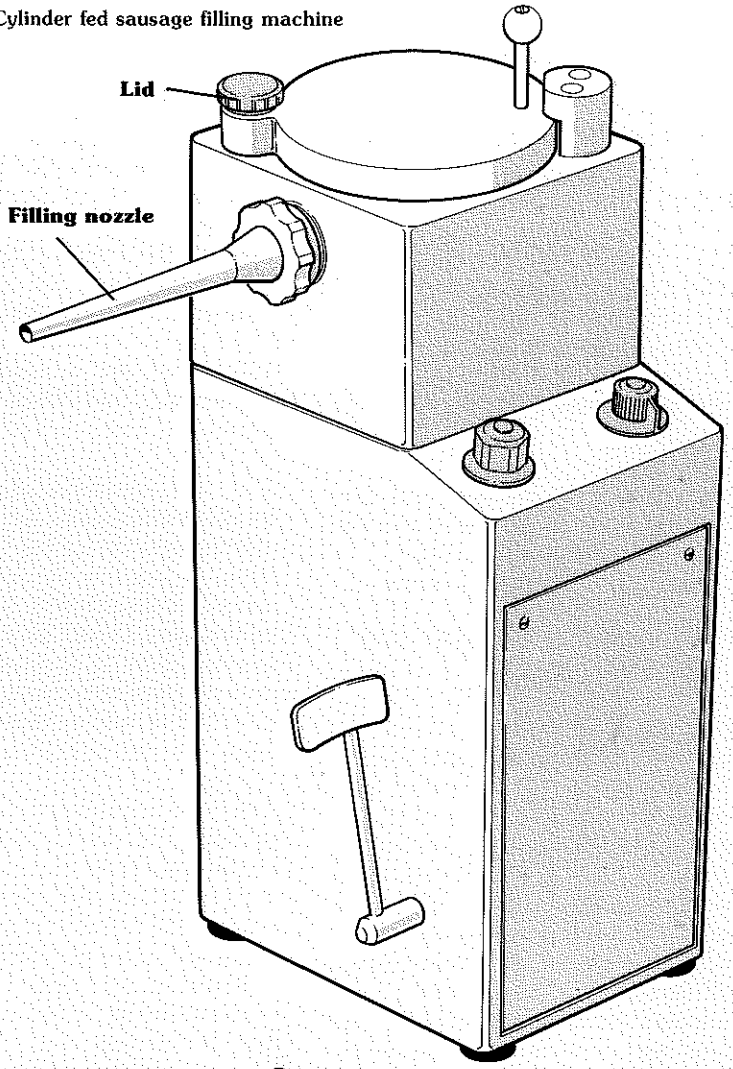
SAUSAGE FILLING MACHINES

182 These machines are used to fill artificial or natural casings with sausage meat.

183 This section deals with the smaller, cylinder type of machine (Figure 35), which consists of a vertical cylinder, containing the sausage meat, and an adjustable portioning piston, driven upwards by hydraulic pressure supplied by a pump within the lower casing of the machine. The cylinder has a close fitting lid.

184 Meat is forced out of the cylinder via a discharge nozzle, normally near the top of the cylinder, into the sausage casing. There may be a control device to release a measured quantity of meat, or the casing is hand twisted as the meat is forced into the skin.

Fig 35 Cylinder fed sausage filling machine



RISKS

185 On some machines a shear trap can be created between the internal piston and **discharge port**. Amputations have occurred on these machines, particularly during cleaning.

PRECAUTIONS

186 The discharge port is located towards the top of the **cylinder**. To prevent a trapping risk as the rising piston passes the discharge port, there should be a cut out groove on the piston head, aligned with the discharge nozzle (Figure 36).

187 Check the operation of the machine, to ensure no trapping point exists.

188 The machine should not be operated unless it is properly assembled.

189 The machine should never be overloaded.

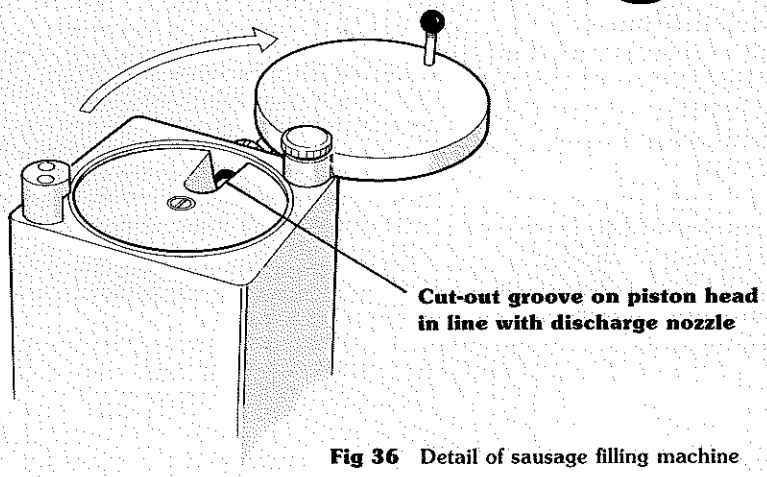


Fig 36 Detail of sausage filling machine

CHILL SAFETY

190 This section deals with small and medium sized cold stores and chills. A chill room normally operates at or just above freezing point and the cold store operates below freezing.

RISKS

191 The main risk associated with chills and cold stores is exposure to low temperatures, either while working or if accidentally locked in. Additional dangers may arise if the refrigerant escapes into the atmosphere.

192 Working in the cold store can slow down mental reactions and can reduce manual dexterity, which increases the potential for accidents.

PRECAUTIONS AGAINST THE EFFECT OF COLD

193 Employees should not be exposed to low temperatures during the working day for any longer than absolutely necessary. Visits of less than a few minutes may not require protective clothing, but if more than one visit is made within a short time protective clothing may need to be worn. The type of protective clothing will depend on many factors, including the temperature of the cold store, type of work being carried on, the work rate and individual preference. It is particularly important to keep the hands, head and feet warm. Manufacturers/suppliers should be able to recommend suitable protective clothing.

194 Employees should be given advice on the effects of working in low temperatures and be trained to recognise early signs of frostbite (eg white patches on the skin).

First aid

195 Anyone suffering from the effects of cold should be placed in a warm room and given warm drinks. Rapid heating must be avoided. Areas of the skin showing signs of frostbite should not be massaged. Medical advice should be sought.

PRECAUTIONS AGAINST BEING LOCKED IN

196 At least one exit from the chill or cold store should be capable of being opened from the inside, or there should be an alternative means of escape, such as a hatch. A hatch may be fitted into the door or walls and retained by a bolt or bar accessible only from the inside.

197 Doors and escape routes should not be obstructed either from inside or outside the store.

198 The opening mechanism on the escape route should be marked, eg with emergency lighting or luminous signs, so that it is clearly visible to anyone trapped inside. Opening mechanisms should be kept in good working order at all times. Instructions on the action to be taken by someone locked in should be clearly displayed inside the chill or cold room.

199 If it is necessary to lock the chill or cold store, say for security reasons, all staff should follow a system of work to ensure that the cold store is unoccupied before it is locked, and an alarm should be provided in the store to sound in a normally occupied area, or there should be an axe inside the store for breaking out.

PRECAUTIONS AGAINST THE ACCIDENTAL RELEASE OF REFRIGERANTS

200 To minimise the possibility of refrigerant release plant should be designed, installed and regularly maintained by competent engineers.

201 The most common refrigerants, R12, R22 and R502, are chlorofluorocarbons. High concentrations of these refrigerants in enclosed or non-ventilated areas can lead to oxygen deficiency and asphyxiation.

202 Some older units may use ammonia as the refrigerant. Ammonia gas is both toxic and explosive.

203 If there is a major release of refrigerant the premises should be evacuated immediately and, in the case of ammonia, any naked flame in the vicinity of the plant should be extinguished.

OTHER SAFETY PRECAUTIONS

204 Chills and cold stores should be well lit. A minimum illumination level of 300 lux is recommended. Walls, floors and doors should be kept free from ice build-up.

205 Racking should be appropriately designed for the goods being stored and the safe working load should be displayed. Racking systems should be inspected regularly for damage.

FURTHER INFORMATION

HSE PRICED PUBLICATIONS

(Available from HMSO Bookshops)

Legal guidance booklets

HS(R)4 (1979) *Guide to the 1963 OSRP Act* ISBN 0 11 883232 8

HS(R)6 (1983) *Guide to the HSW Act* ISBN 0 11 883710 9

The Factories Act 1961 A short guide ISBN 0 11 881111 8

HS(R)11 *First aid at work* (under revision)

SHW 928 *Factories Act 1961 Memorandum on the Electricity Regulations* ISBN 0 11 883648 X

HS(R)23 (1986) *Guide to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985* ISBN 0 11 883858 X

Electrical safety

HSE Guidance Note GS 27 *Protection against electric shock* ISBN 0 11 883583 1

HSE Guidance Note GS 37 *Flexible leads, plugs, sockets and other accessories* ISBN 0 11 883519 X

HSE Guidance Note PM 29 *Electrical hazards from steam/water pressure cleaners etc* ISBN 0 11 883538 6

HSW Guidance Note PM 32 *The safe use of portable electrical apparatus (electrical safety)* ISBN 0 11 883463 7

Food preparation machinery

HSE Guidance Note PM 33 *Safety of bandsaws in the food industry* ISBN 0 11 883564 5

HS(G)35 (1987) *Catering safety - Food preparation machinery* ISBN 0 11 883910 1

General

HSE (1985) *Watch your step. Prevention of slipping, tripping and falling accidents at work* ISBN 0 11 883782 6

HS(G)38 (1987) *Lighting at work* ISBN 0 11 883964 0

BRITISH STANDARDS

(available from British Standards Institution, Linford Wood, Milton Keynes, MK14 6LE)

BS 2771 Part 1 (1986) *Electrical equipment of industrial machines: specification for general requirements*

BS 4293 (1983) *Residual current operated circuit breakers*

BS 5490 (1977) *Specification for classification of degrees of protection provided by enclosures*

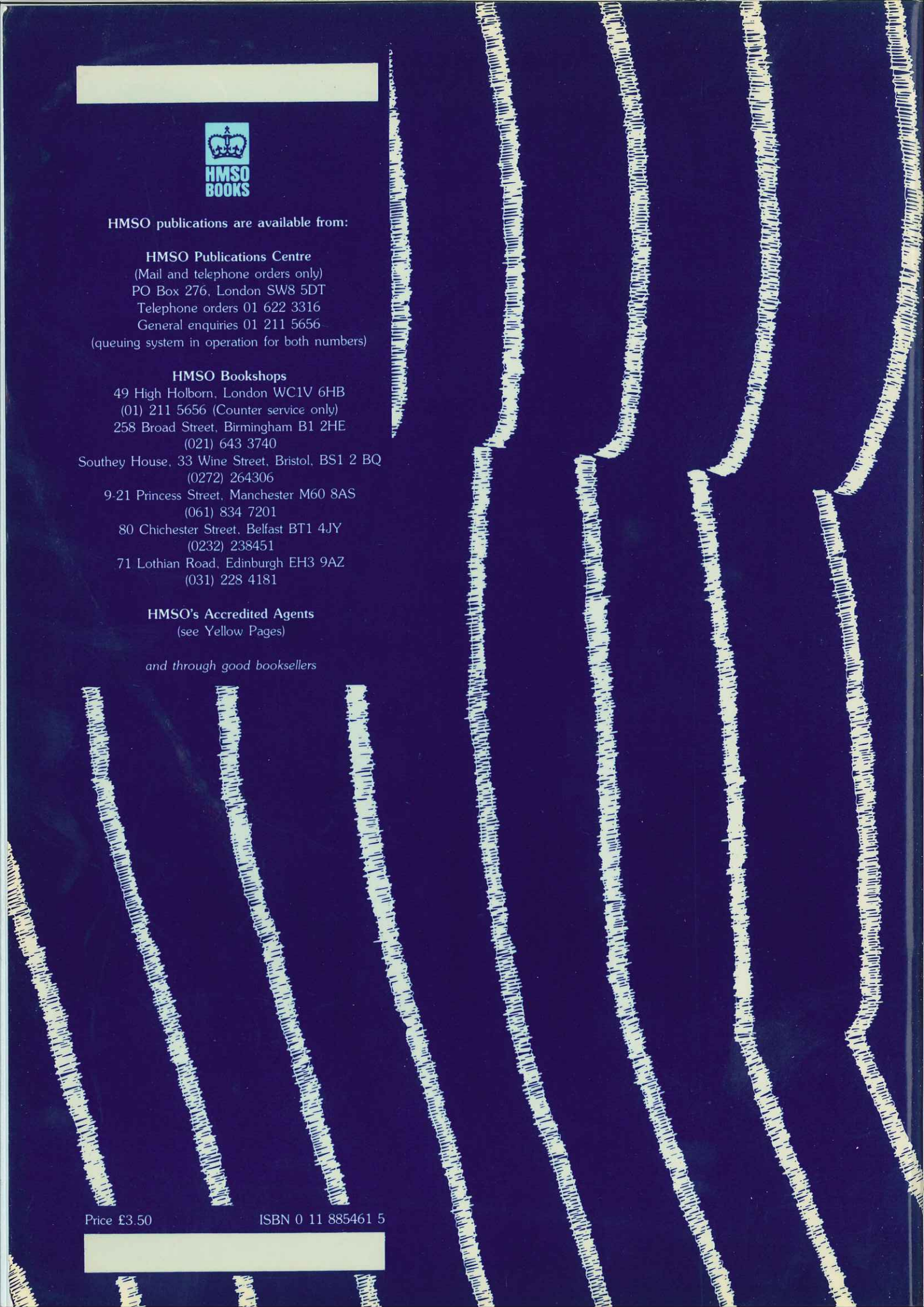
BS 4794 Part 2: Section 2.20 (1982) *Position switches with positive opening operation*

BS 5304 (1988) Code of practice for safety of machinery

ADDITIONAL GUIDANCE

Bacon and Meat Manufacturers Association *Safety guidance notes - meat industry* (produced by HSE/Meat Traders Joint Working Party and available from Bacon and Meat Manufacturers Association, 19 Cornwall Terrace, London NW1 4QP)

Chartered Institution of Building Services Engineers (CIBSE) *Code for interior light* 1984 ISBN 0 90 095327 6 (available from CIBSE, Delta House, 222 Balham High Road, London SW12 9BS)



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