One Hour Safety Presentation

The main goal of the Division of Safety & Hygiene is the reduction of accidents and illnesses in the workplace. Toward this goal, the One Hour Safety presentation is designed to support the delivery of a presentation to co-workers in your workplace to help them understand and promote safer and healthier work environments. It is recommended that you take the DSH Training Center course as a background for using One Hour Safety Presentation to train others at your workplace. Call 1-800-OHIOBWC, option 2, 2, 2 for class dates and locations.

The One Hour Safety Presentation contains:

- Transparency Masters from which films can be made to use on an overhead projector,
- Instructor Notes which gives the instructor suggestions and script notations to use during the presentation, and
- Student Handouts which can be copied for those attending the presentation.

Materials are included for a one-hour presentation on each of these topics:

- ✓ Accident Analysis
- ✓ Bloodborne Pathogens
- ✓ Effective Safety Teams
- ✓ Enhancing Safety through a Drug-Free Workplace
- ✓ Ergonomics Basic Principles
- ✓ Ergonomics Developing an Effective Process
- ✓ Hazard Communication
- ✓ Lockout/Tagout and Safety-related Work Practices
- ✓ Machine Guarding Basics
- ✓ Measuring Safety Performance
- ✓ Powered Industrial Trucks Training Program
- ✓ Respiratory Protection
- ✓ Violence in the Workplace

Applications used:

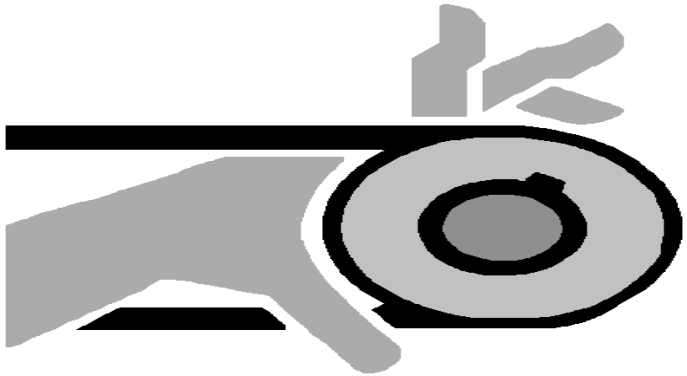
1) Text documents (ending in .txt) can be opened with any word processing program.
2) Microsoft PowerPoint slides (ending in .ppt) can be opened with the Microsoft PowerPoint program. If you do not have PowerPoint and you do have Windows 95, 98, 2000 or Windows NT operating system, you can view the PowerPoint slides by downloading a free PowerPoint Viewer from the following website: http://office.microsoft.com/downloads/default.aspx?Product=PowerPoint&Version=95|97|98|2000|2002&Type=Converter|Viewer
3) Adobe Reader document (ending in .pdf) contains the One Hour Safety Presentation in read-only format. It can be opened when you download Adobe Reader, which is available free of charge at the following website: http://www.adobe.com/products/acrobat/readstep2.html

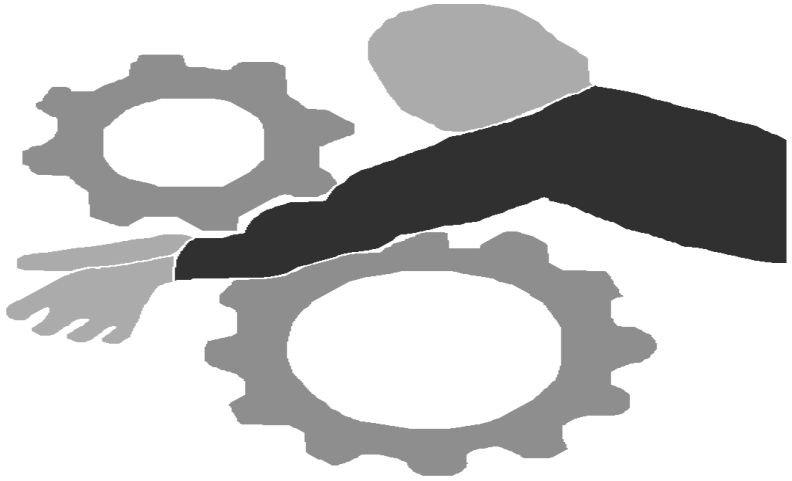
If you have comments or questions about these materials for One Hour Safety Presentation, please e-mail us: OCOSHTrng@bwc.state.oh.us

Transparency Masters

Subpart O – MACHINE GUARDING

- **1910.211 Definitions**
- **1910.212 General Requirements for all Machines.**
- **1910.213 Woodworking Machinery**





Subpart O

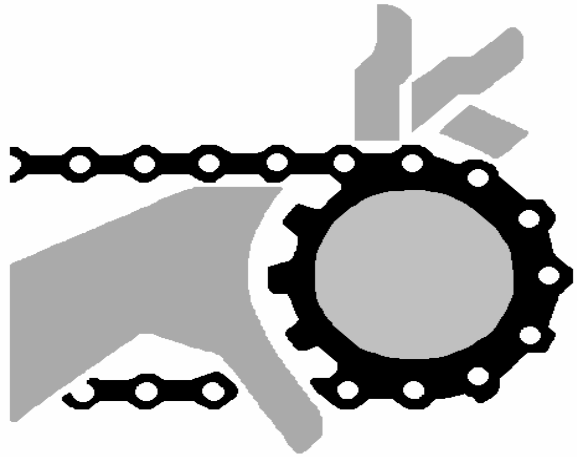
- **1910.215 Abrasive Wheel Machinery**
- **1910.216 Mills and Calendars**
- **1910.217 Mechanical Power Presses**
- **1910.218 Forging Machinery**
- **1910.219 Mechanical Power-Transmission**

Basics of Machine Safeguarding

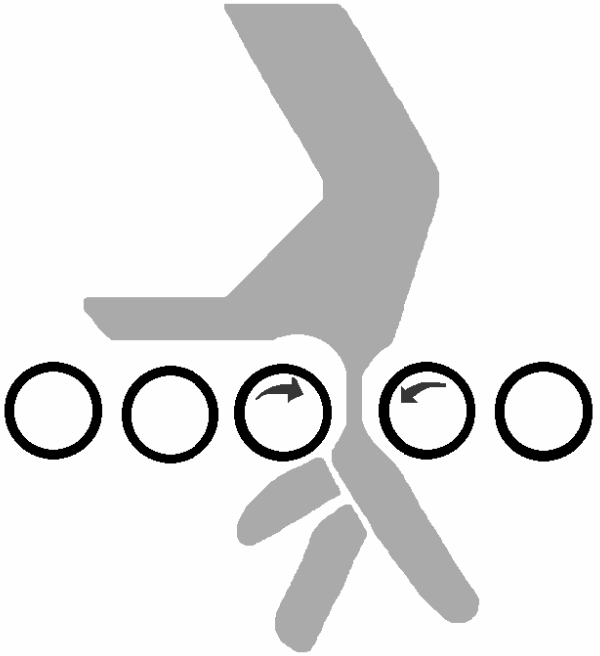
- **A good rule to remember is: Any machine part , function, or process which may cause injury must be safeguarded.**
- **And a guard should not allow someone to reach over, under, around or through.**

Basics Areas of Safeguarding

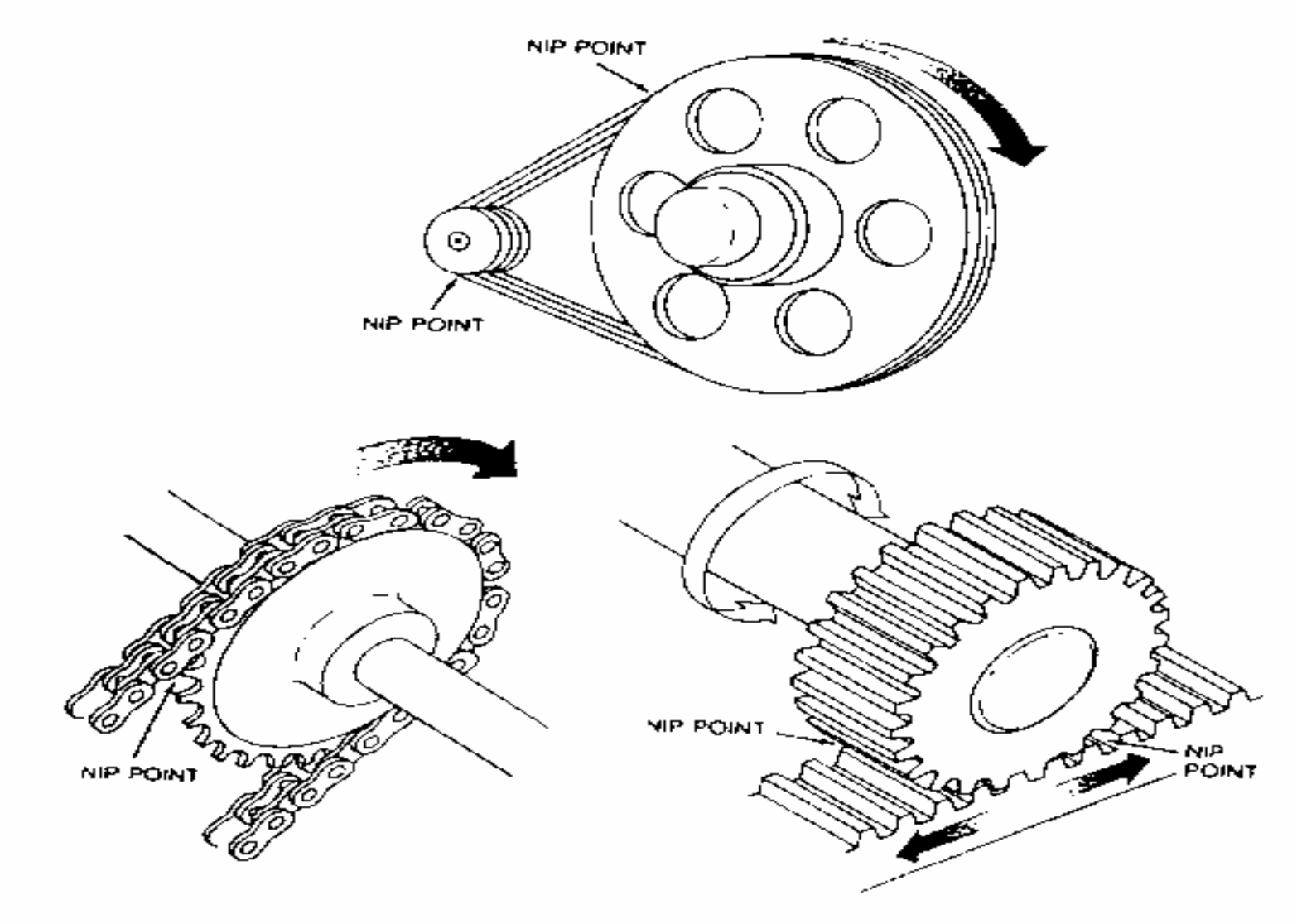
- **The point of operation**
- **Power transmission apparatus**
- **Other moving parts (reciprocating, transverse, or rotating)**



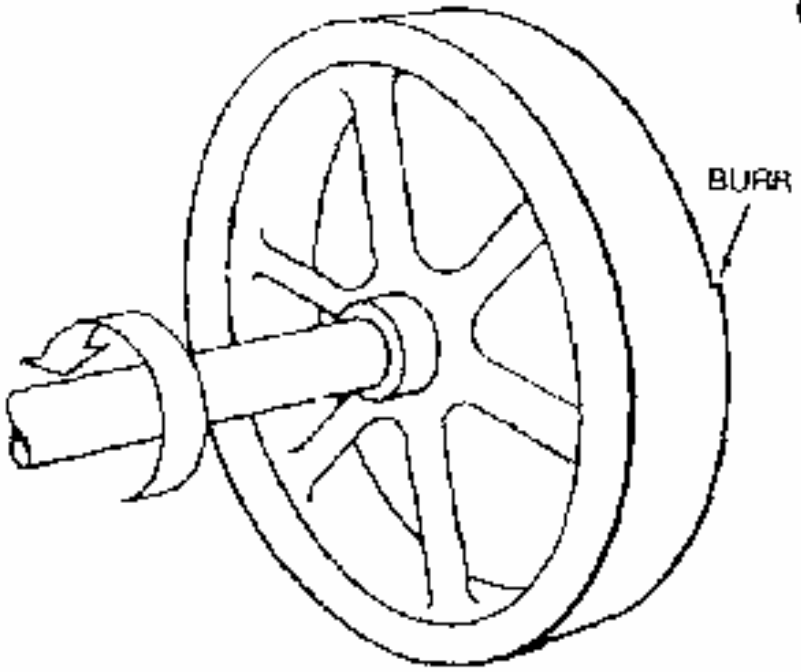
Motions



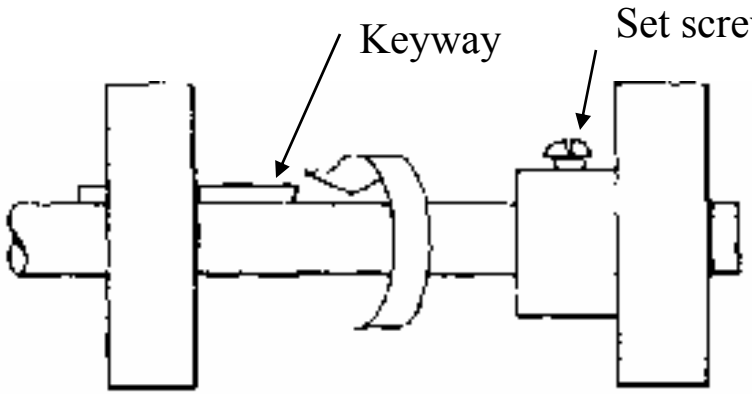
- **Motions**
  1) **Rotating (including in-running nip points)**
  2) **Reciprocating**
  3) **Transverse**



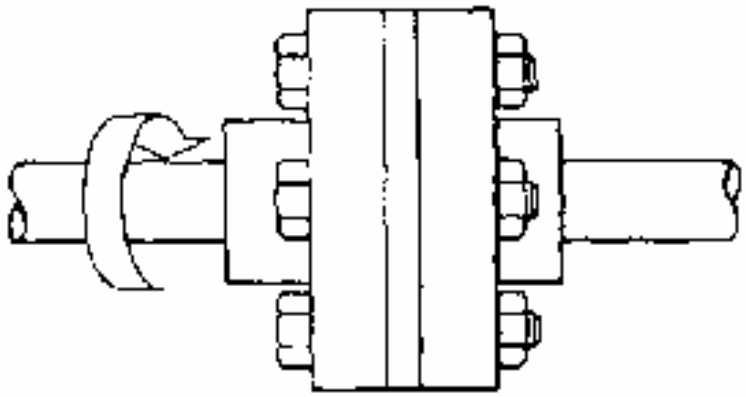
Nip Points



ROTATING PULLEY WITH SPOKES AND PROJECTING BURR ON FACE OF PULLEY



ROTATING SHAFT AND PULLEYS WITH PROJECTING KEY AND SET SCREW



ROTATING COUPLING WITH PROJECTING BOLT HEADS

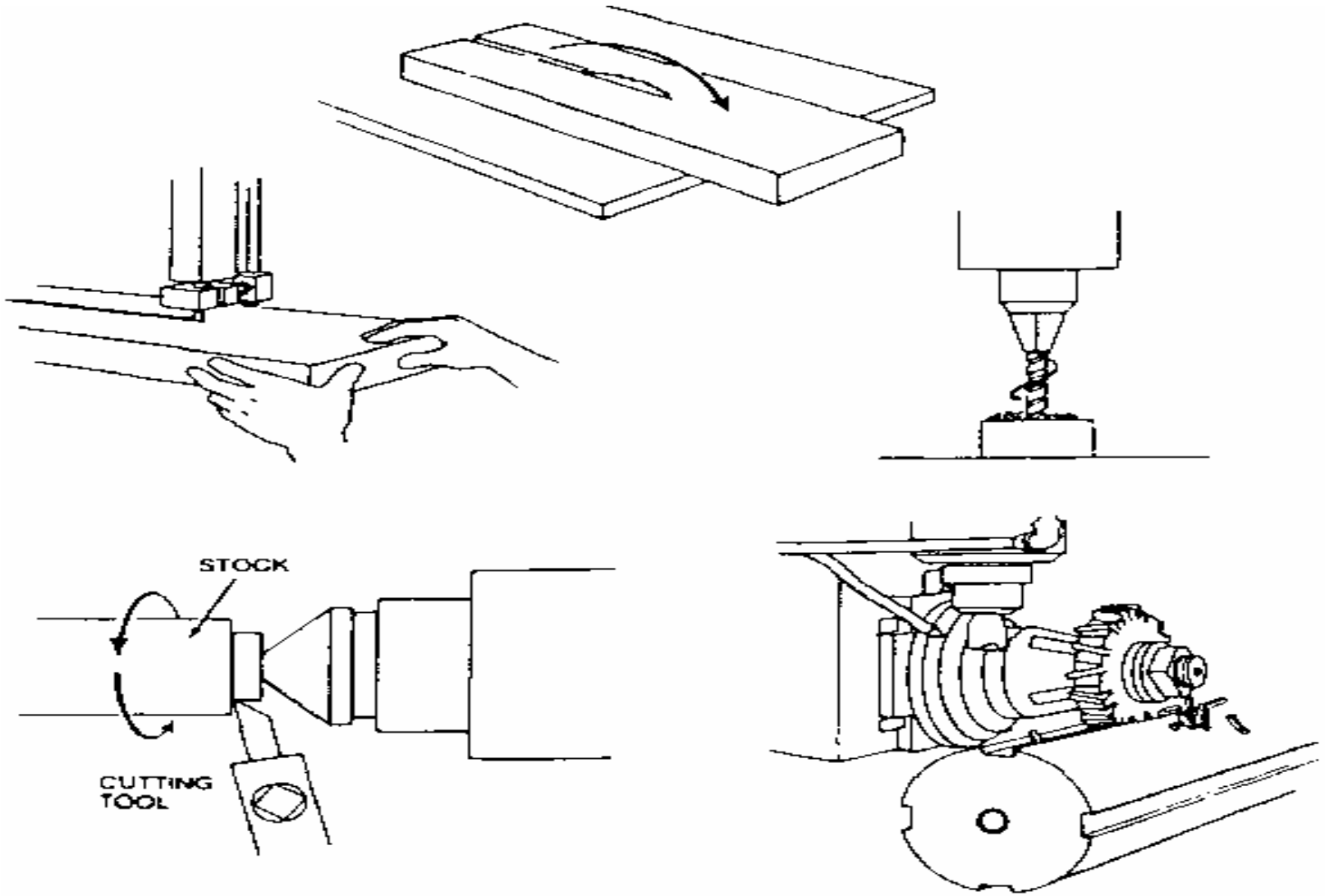
Rotating Hazards

Safeguarding

- **Guards--- Prevents access to the danger areas.**
- **Devices---Controls access to the Point of Operation.**

Actions

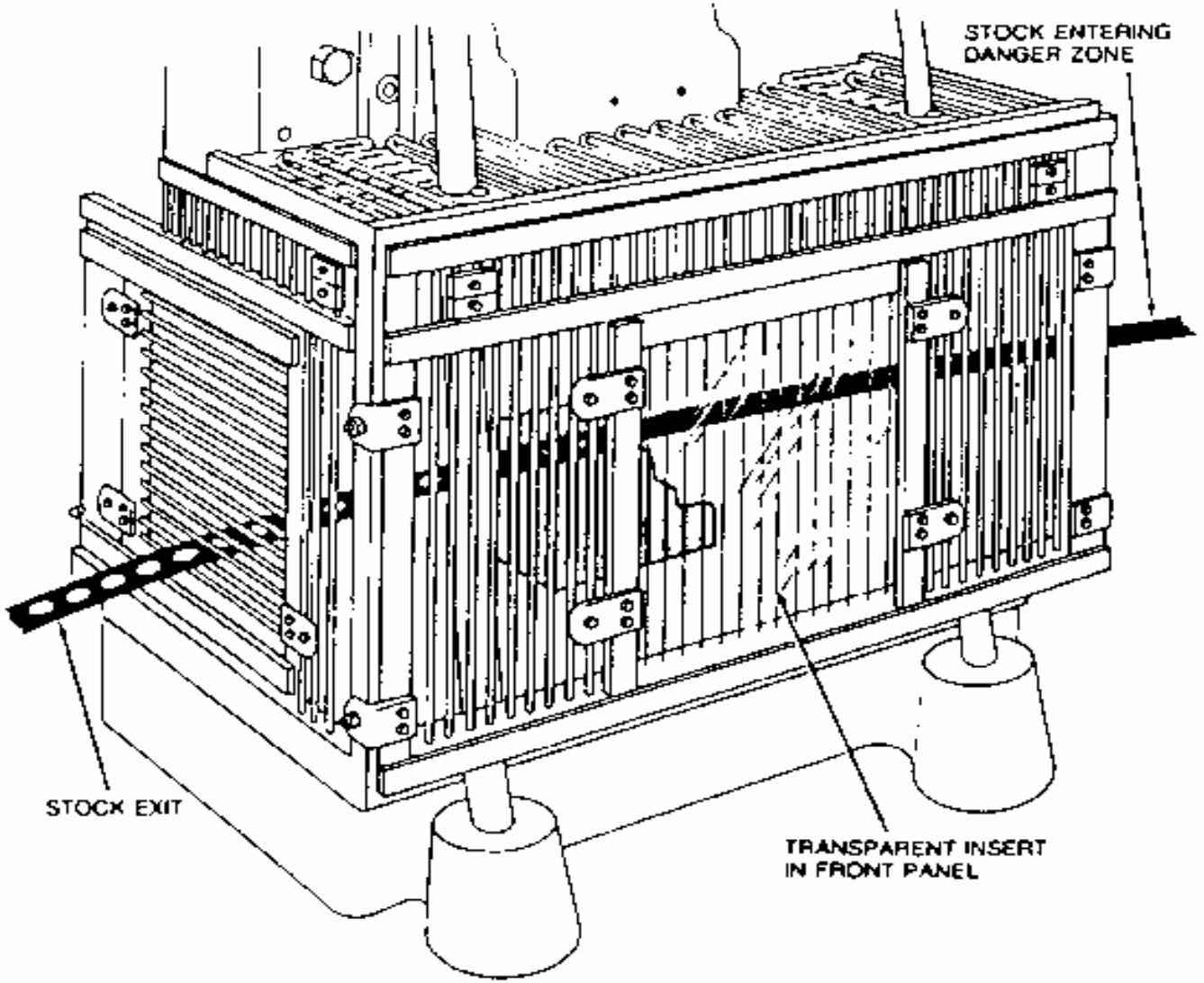
- **Cutting**
- **Punching**
- **Shearing**
- **Bending**



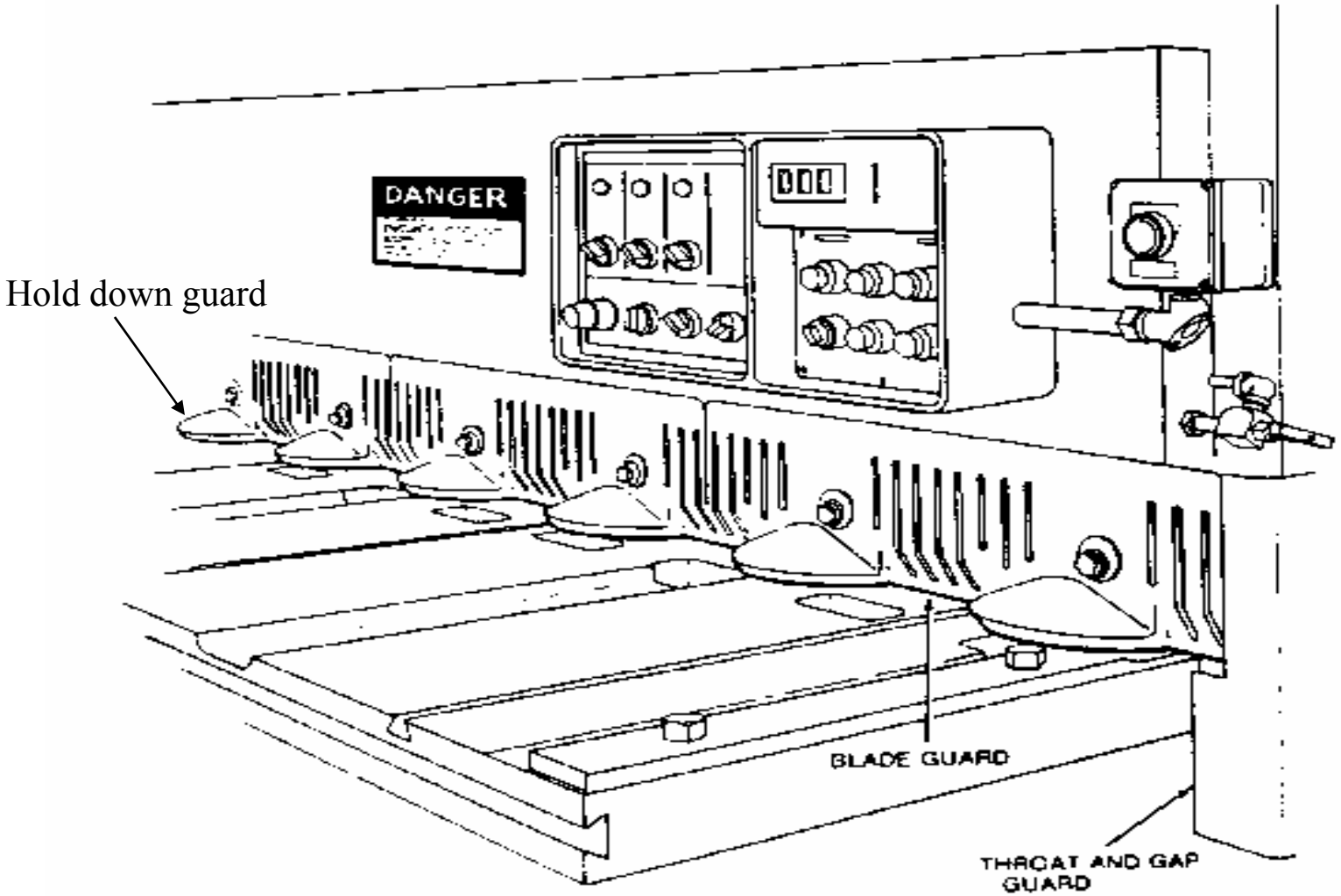
Different Actions

Guards

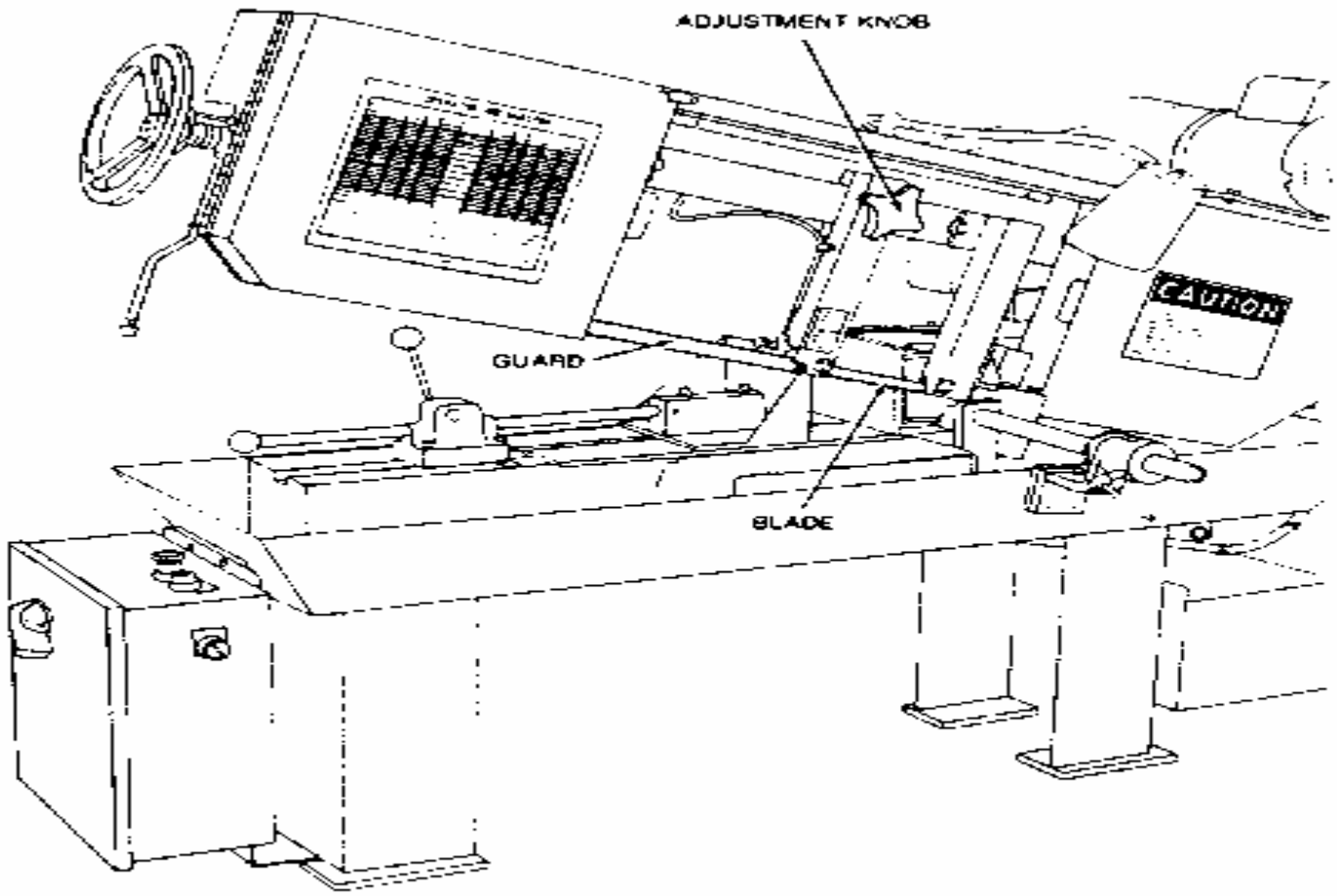
- **Fixed**
- **Interlocked**
- **Adjustable**
- **Self-adjusting**



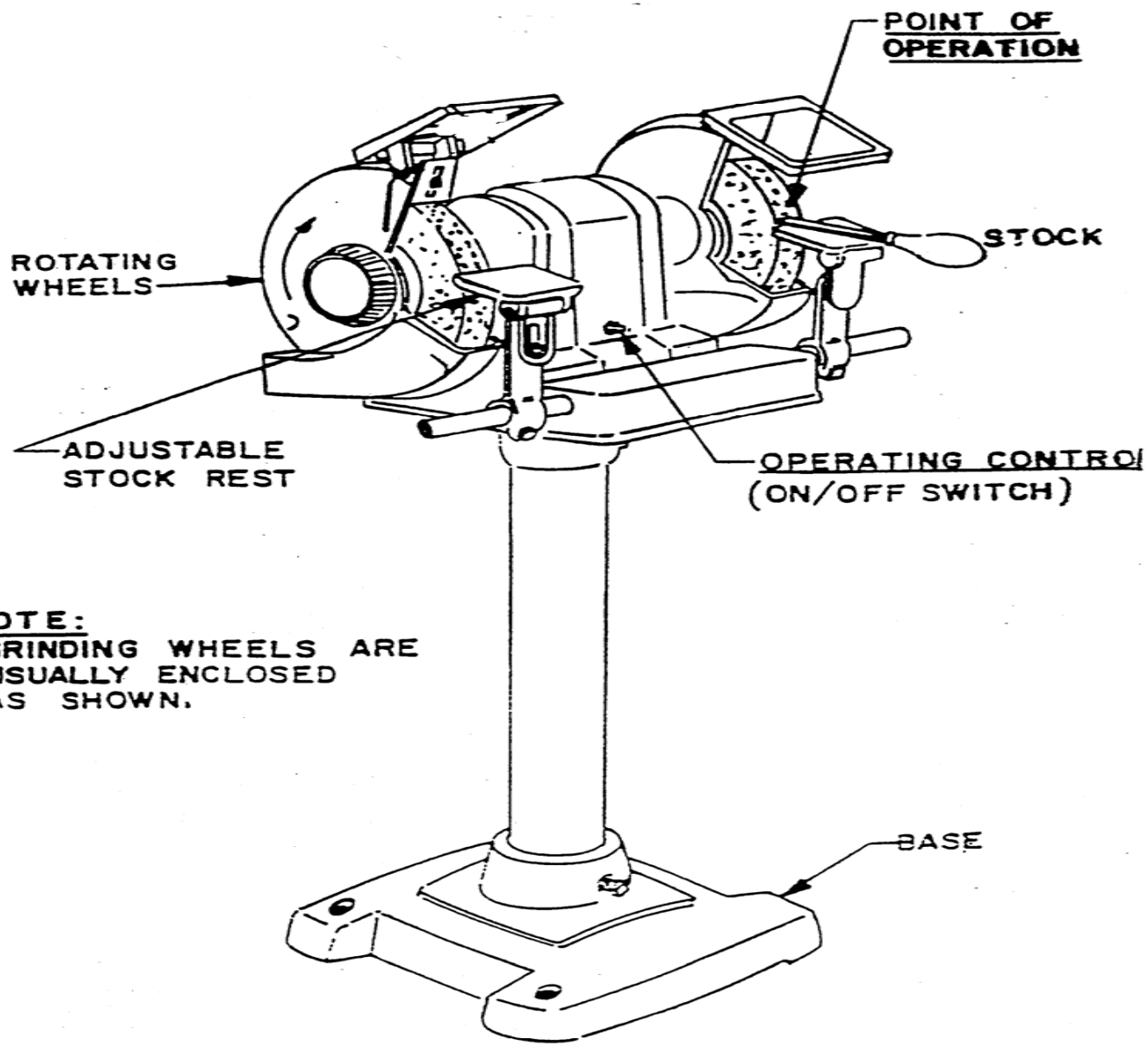
Fixed Guard On A Power Press



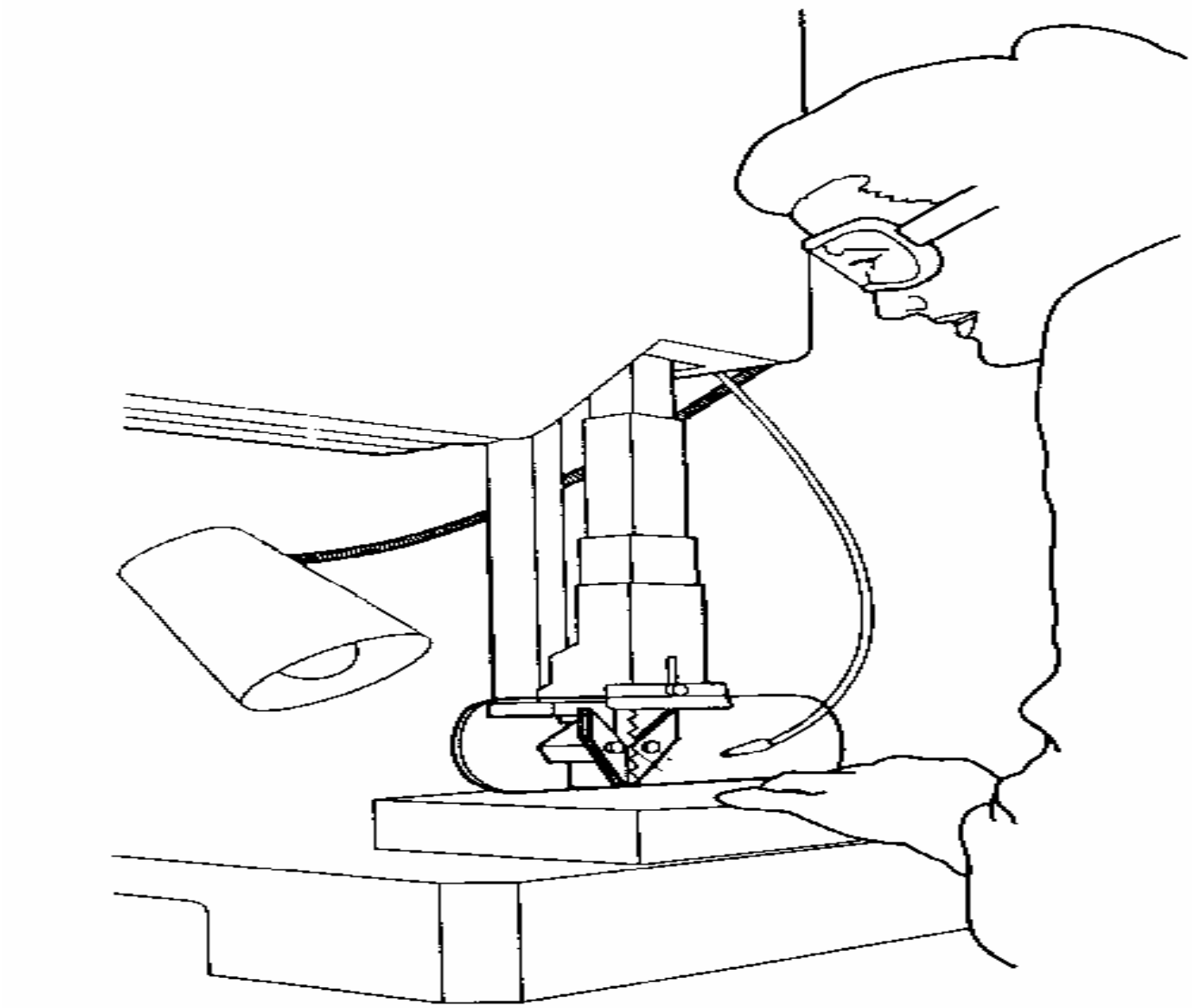
Fixed Guard on a Power Squaring Shear



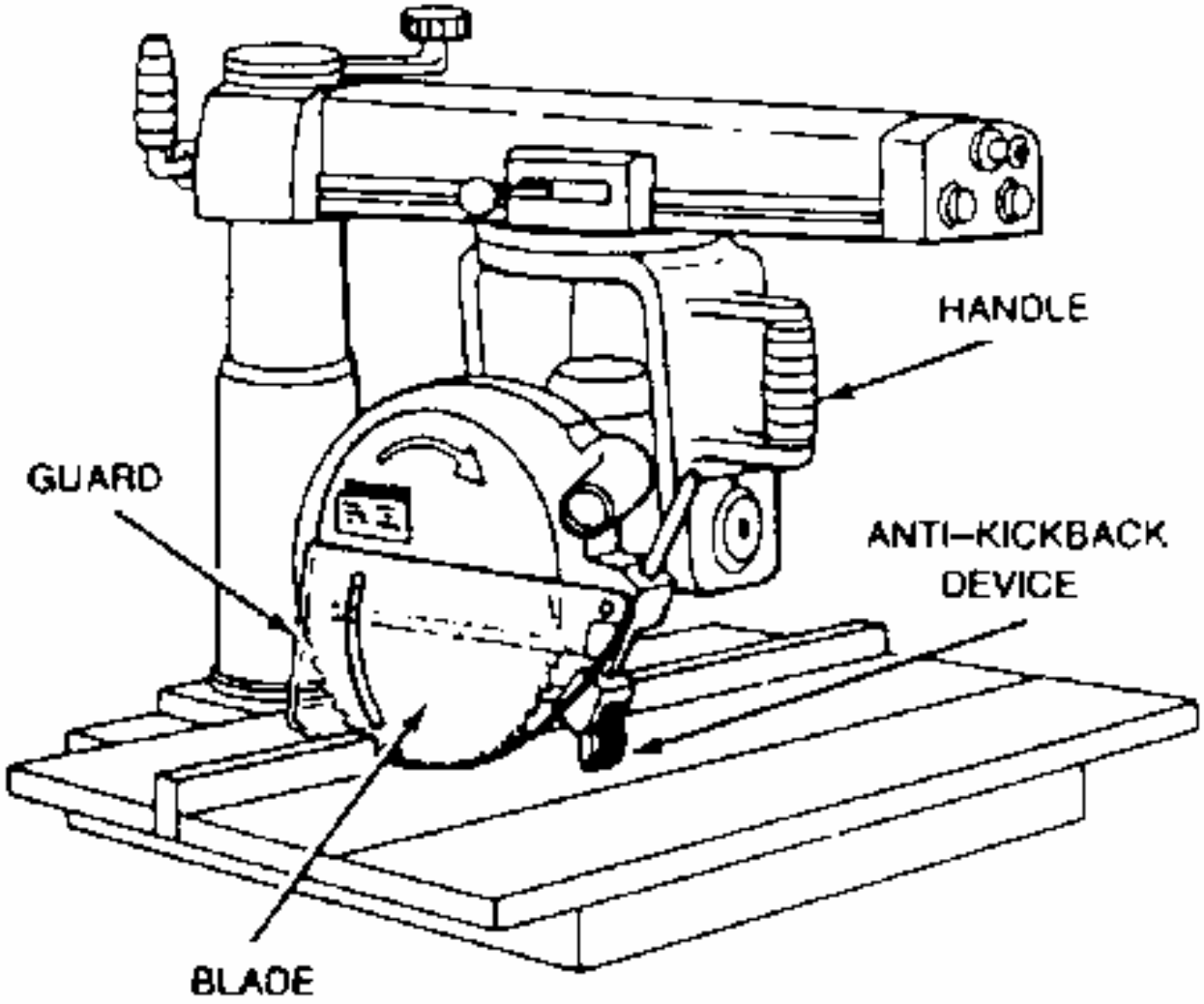
Adjustable Guard On Horizontal Bandsaw



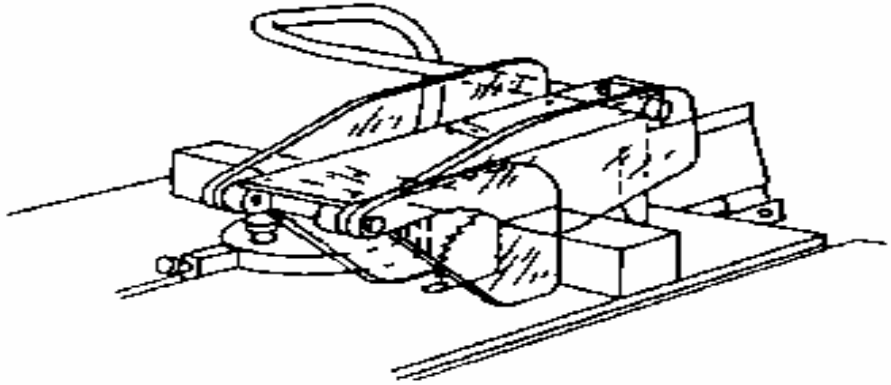
Adjustable Guard On Pedestal Grinder

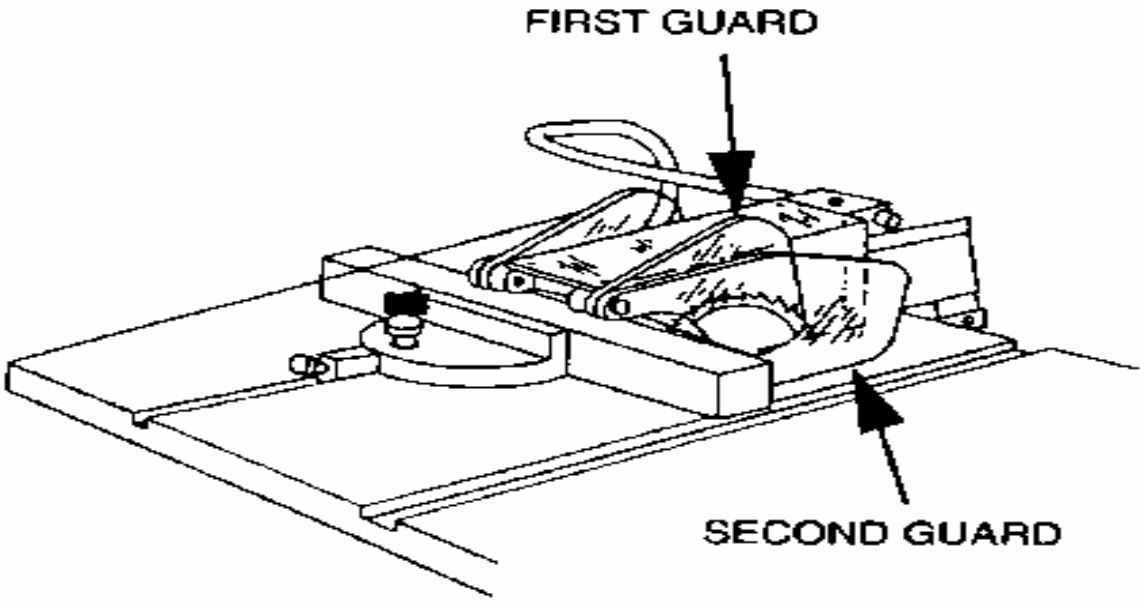


Adjustable Guard On Bandsaw



Self-Adjusting Guard On Radial Arm Saw

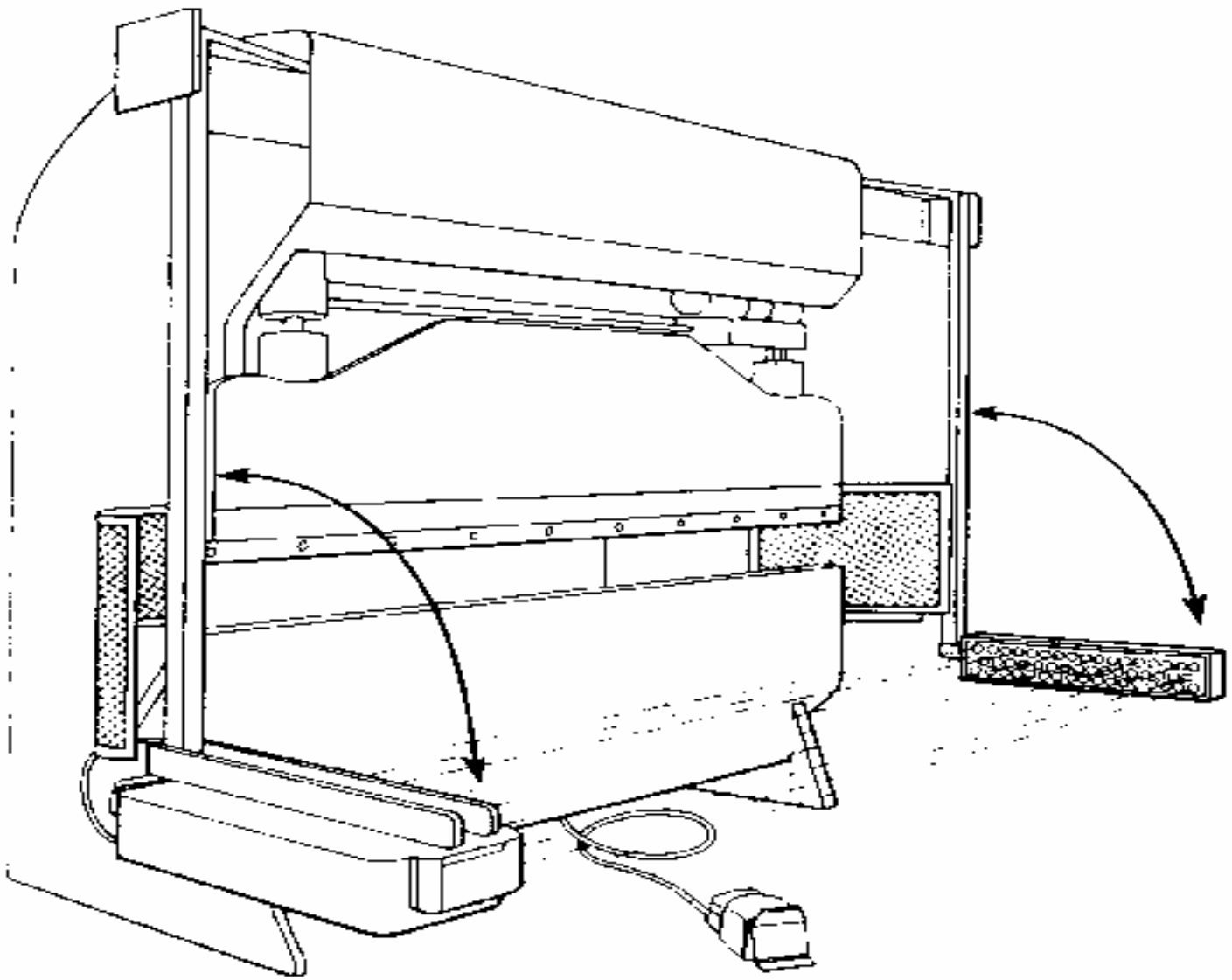




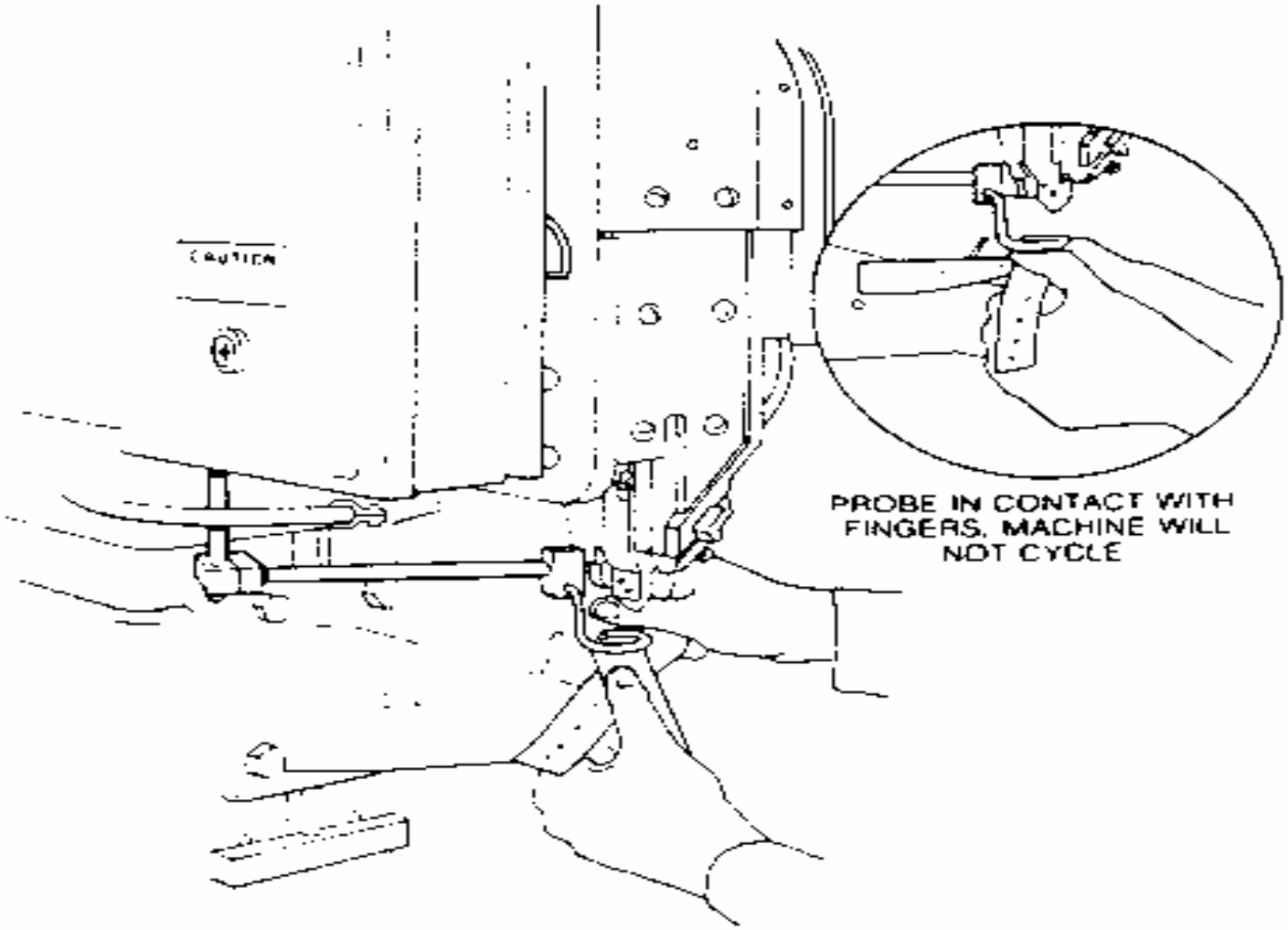
Self-Adjusting Guard Table Saw

Devices

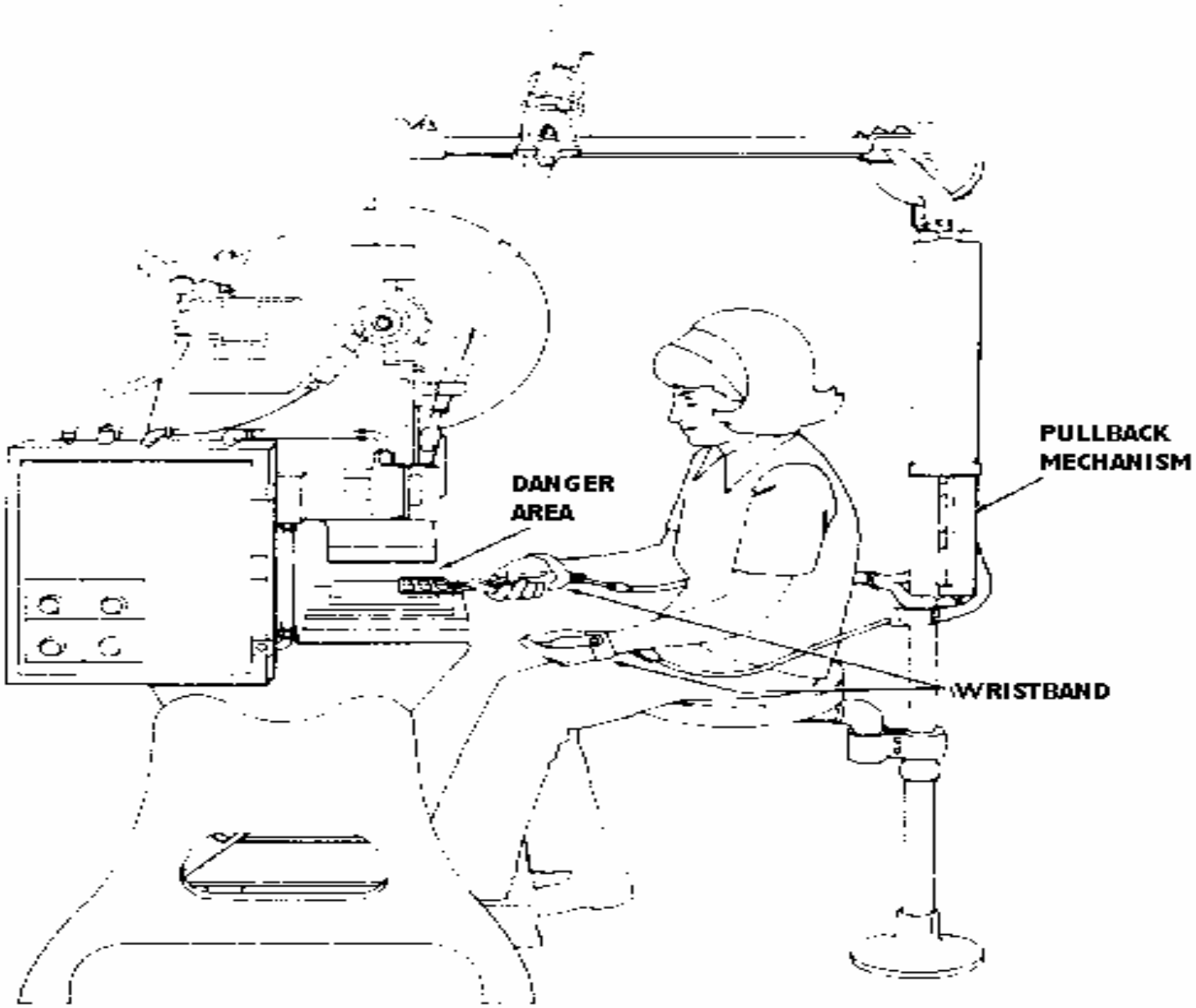
- **Presence Sensing**
    1) **Photo-electrical**
    2) **Electromechanical**
- **Pullback**
- **Restraint**



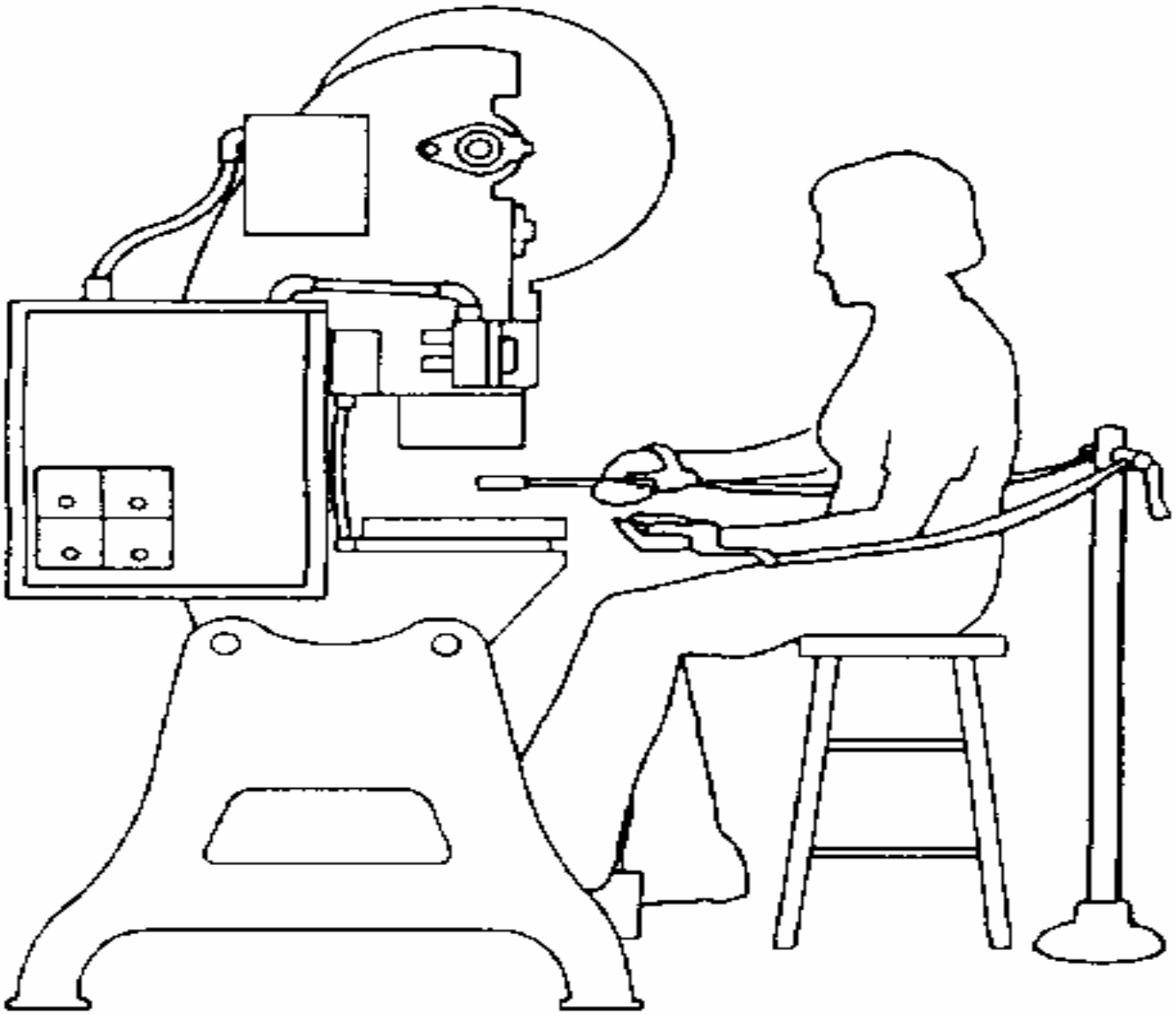
Photoelectric Presence Sensing Device On Press Brake



Electromechanical Sensing Device On An Eye-letter



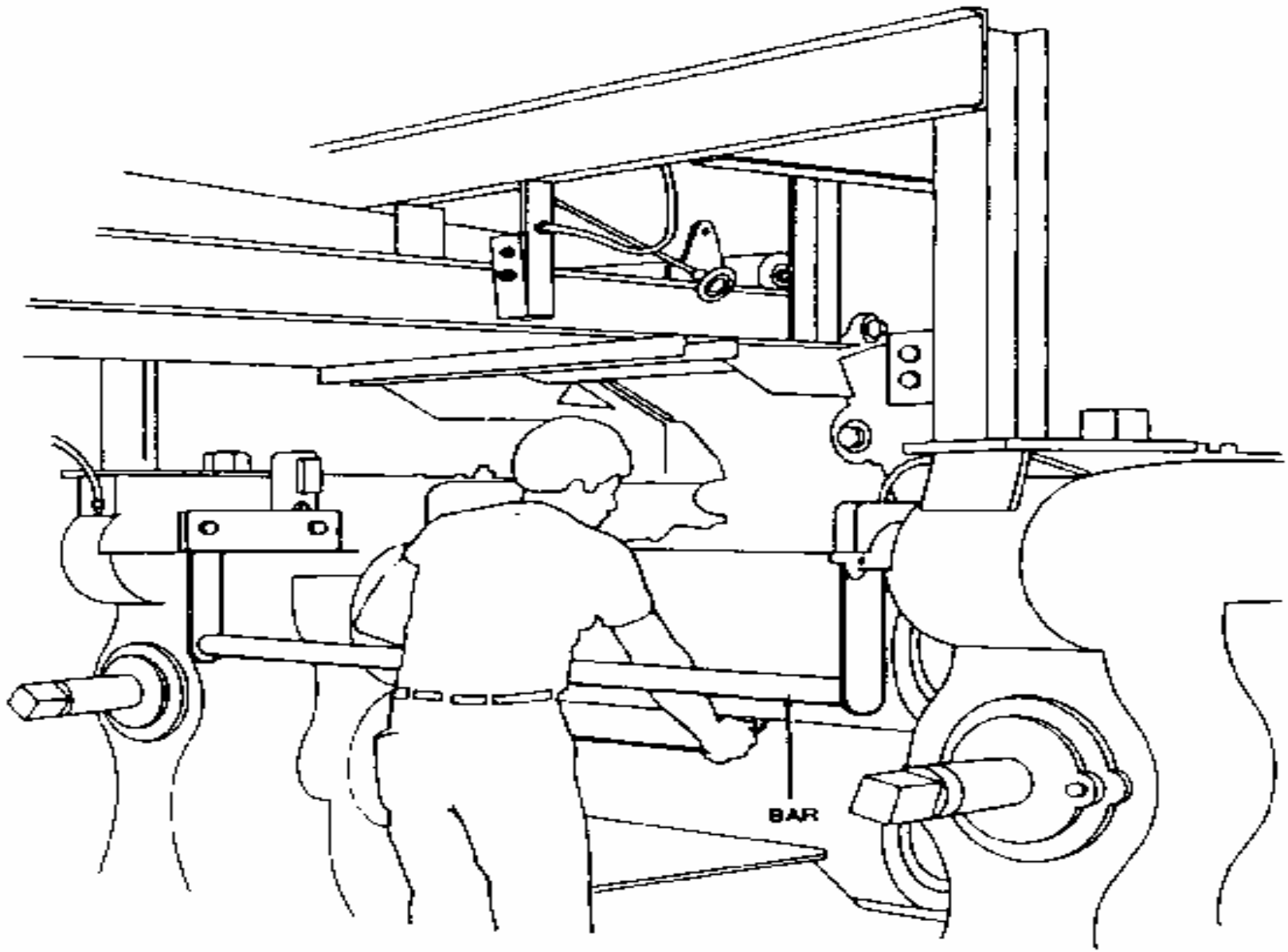
Pullback Device On A Power Press



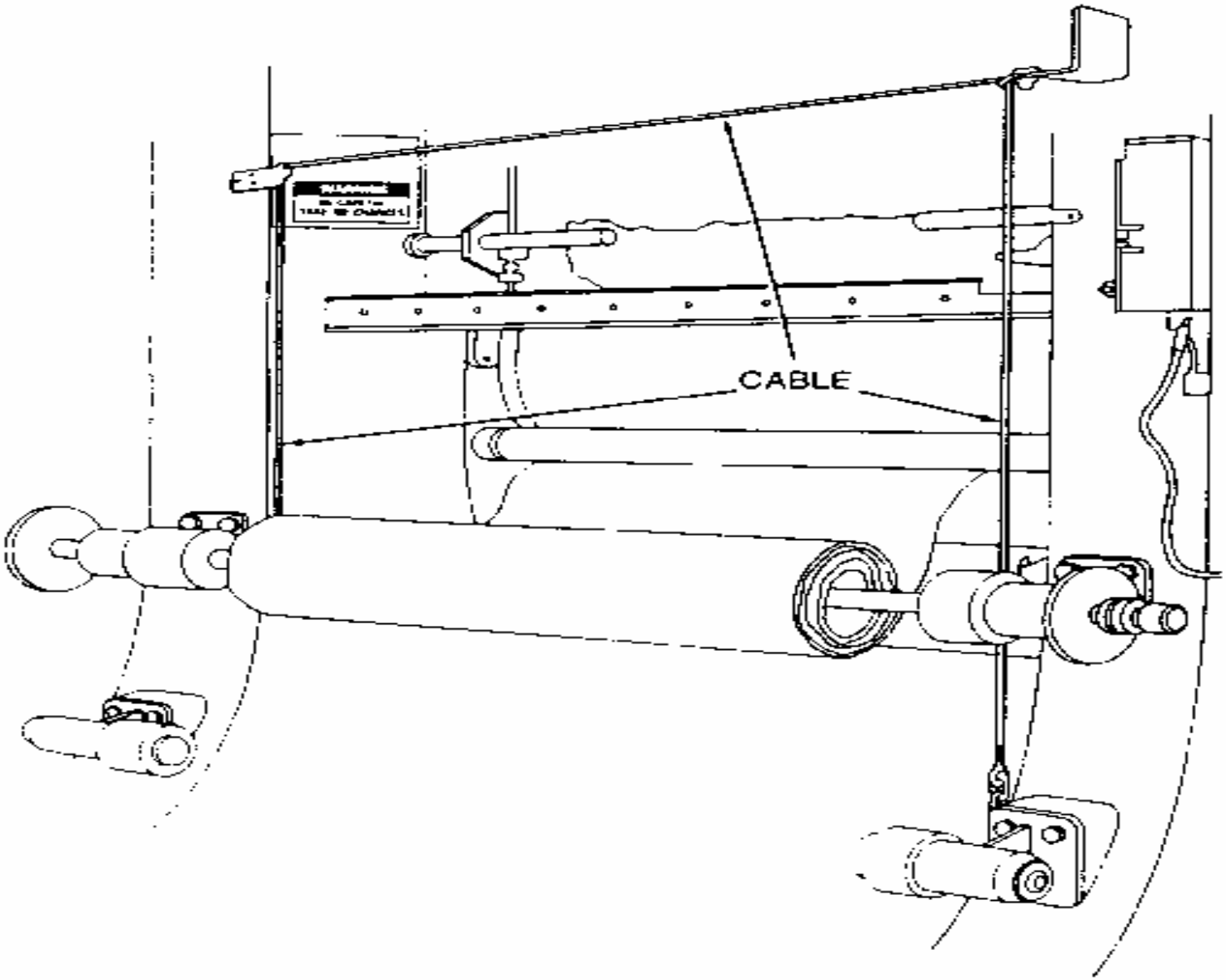
Restraint Device On A Power Press

Devices

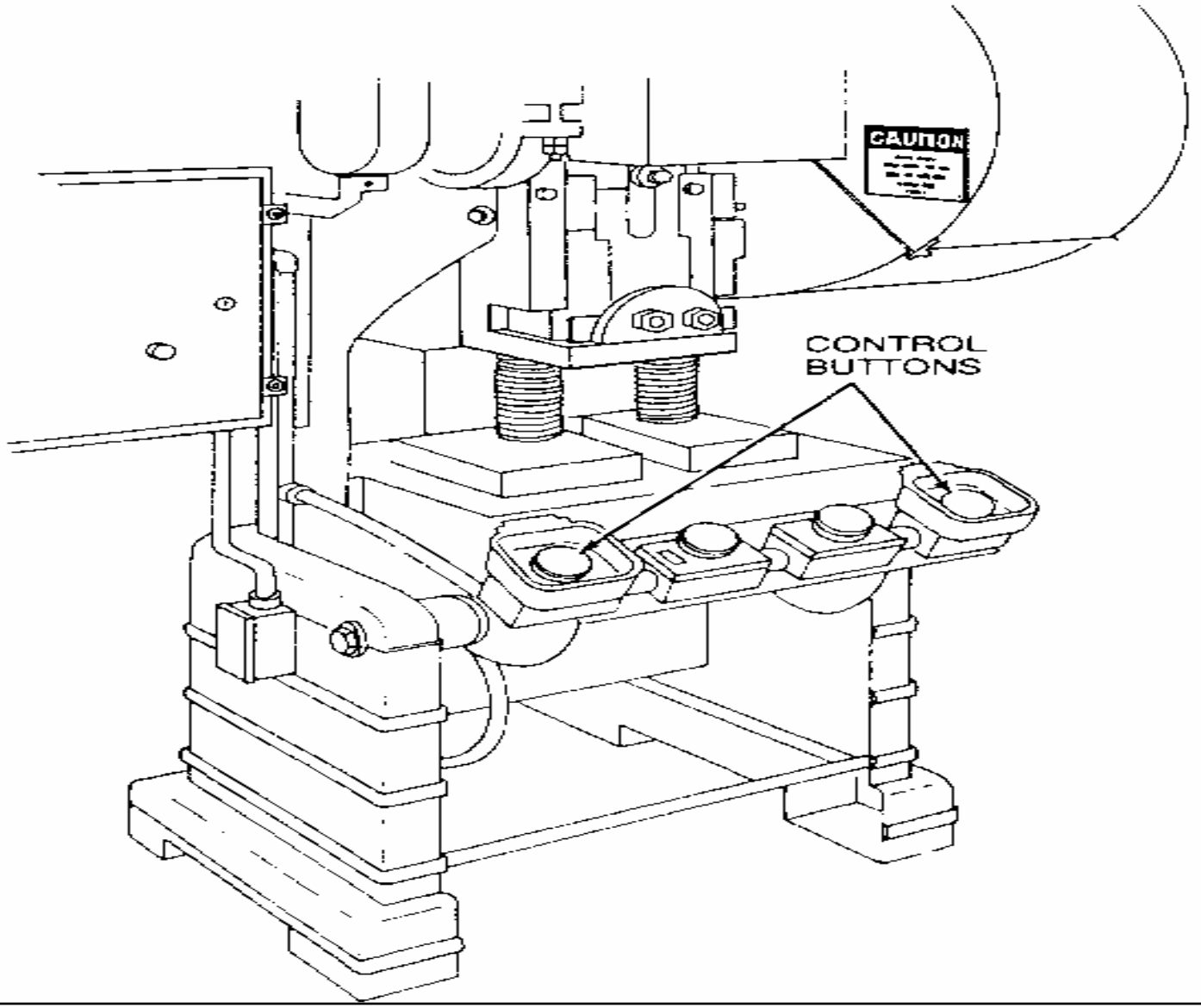
- **Safety Controls**
  - **(a) Pressure-sensitive body bar**
  - **(b) Safety tripwire cable**
- **Two-hand control**
- **Two-hand trip**



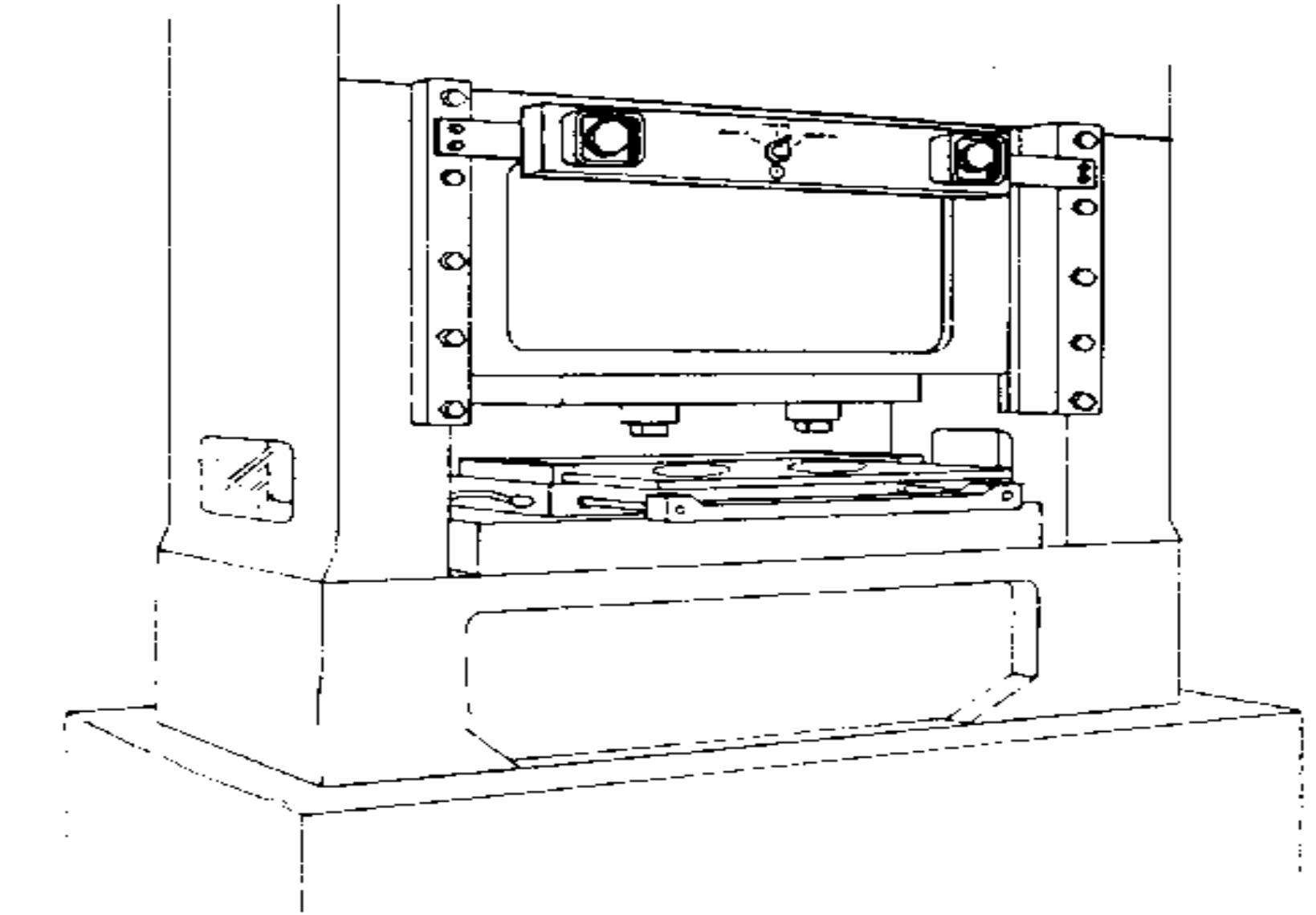
Pressure-Sensitive Body Bar On Rubber Mill



Safety Tripwire Cable On A Calendar



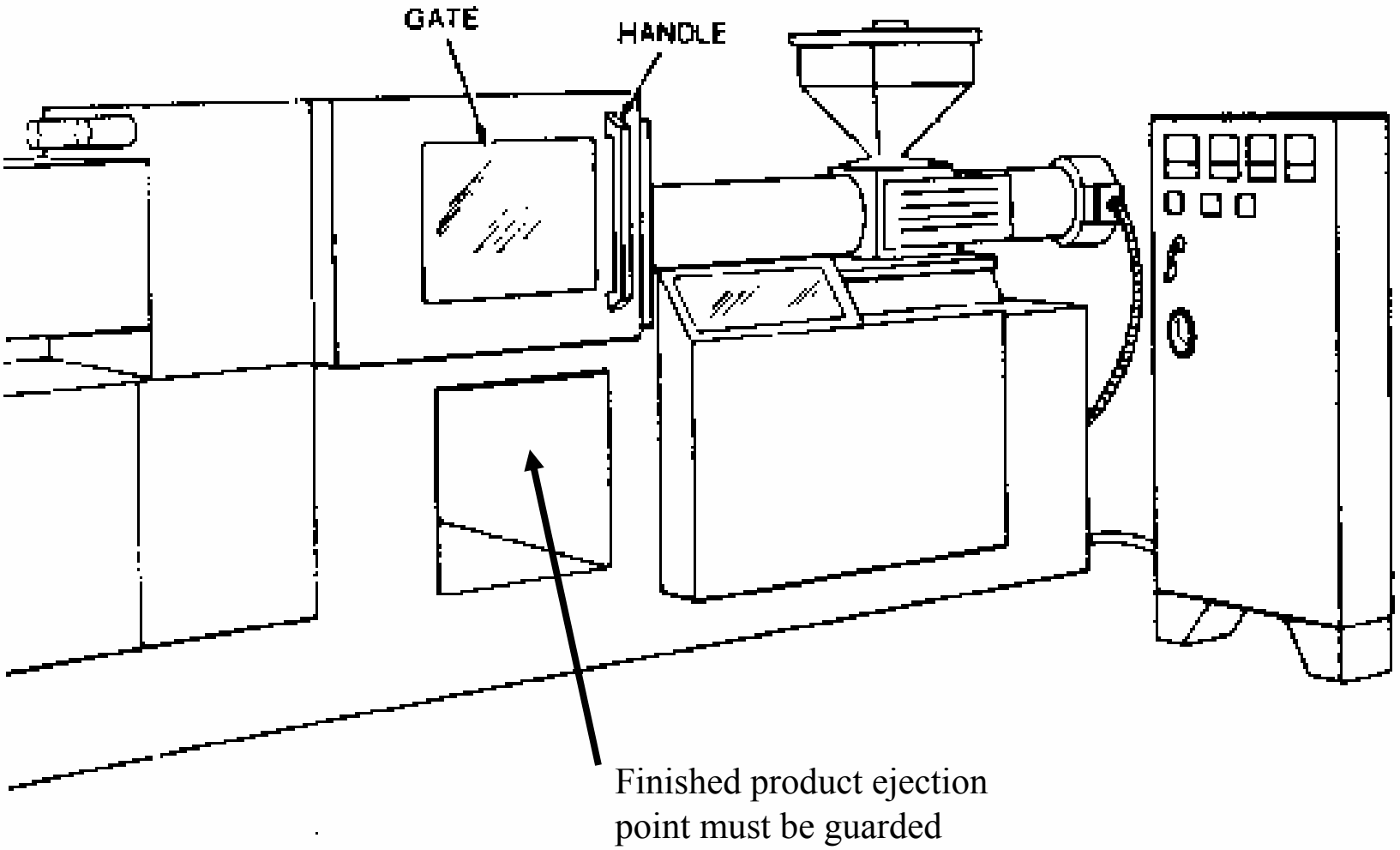
Two-Hand Control Buttons On A Part-Revolution Clutch Power Press



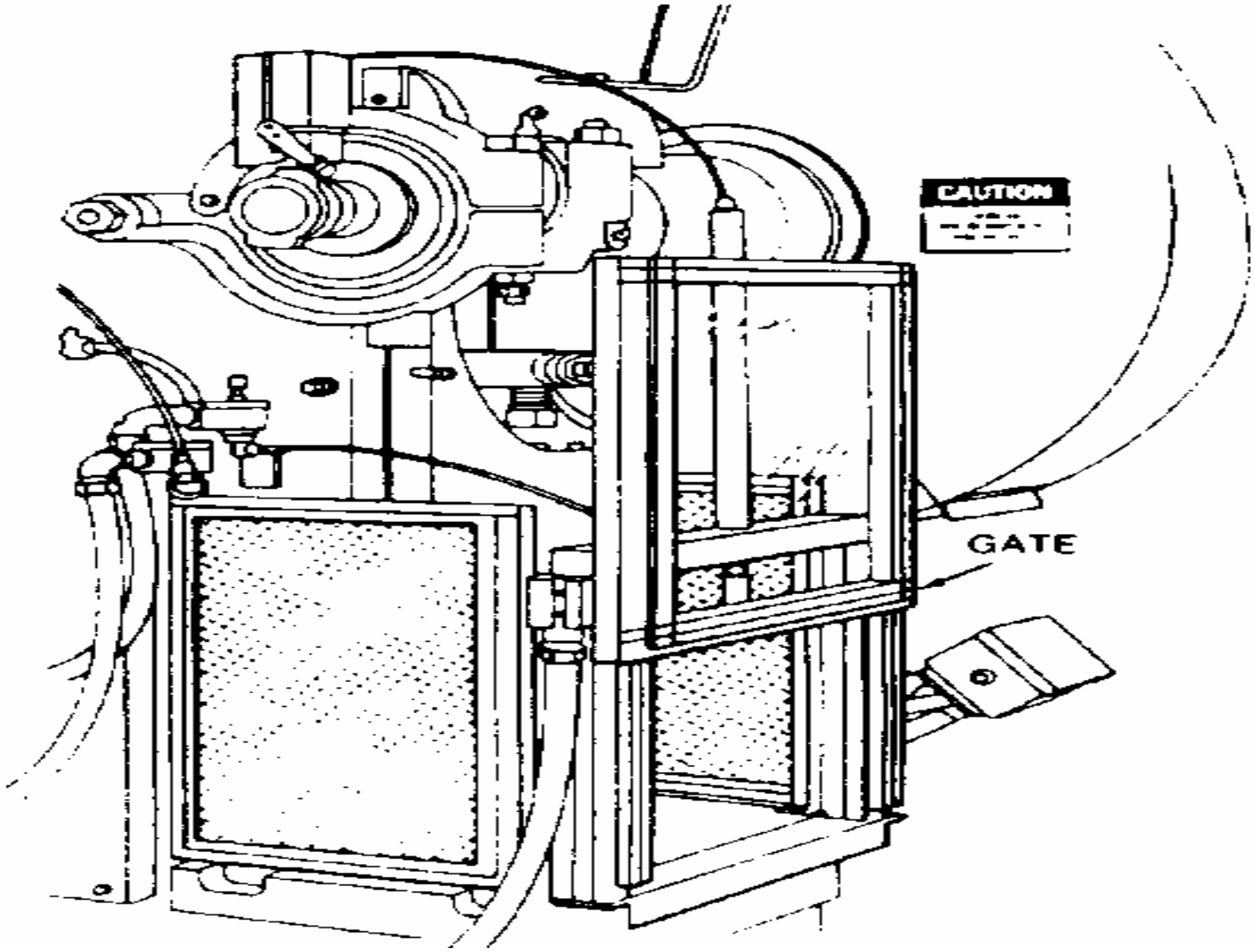
Two-Hand Trip Buttons On A Full-Revolution Clutch Power Press

Devices

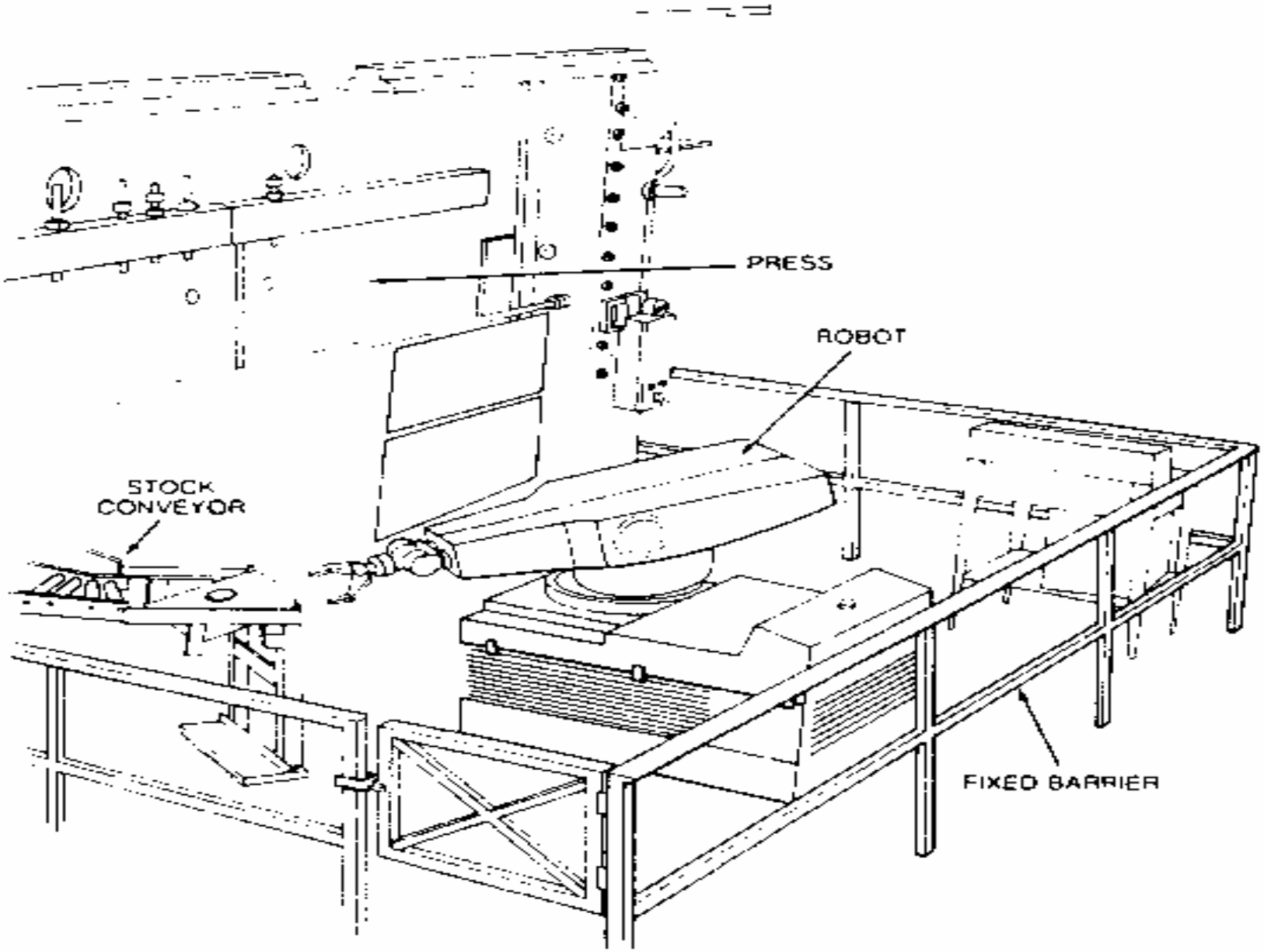
- **Gates**
- **Location/Distance**



Horizontal Injection Molding Machine With Gate Guards

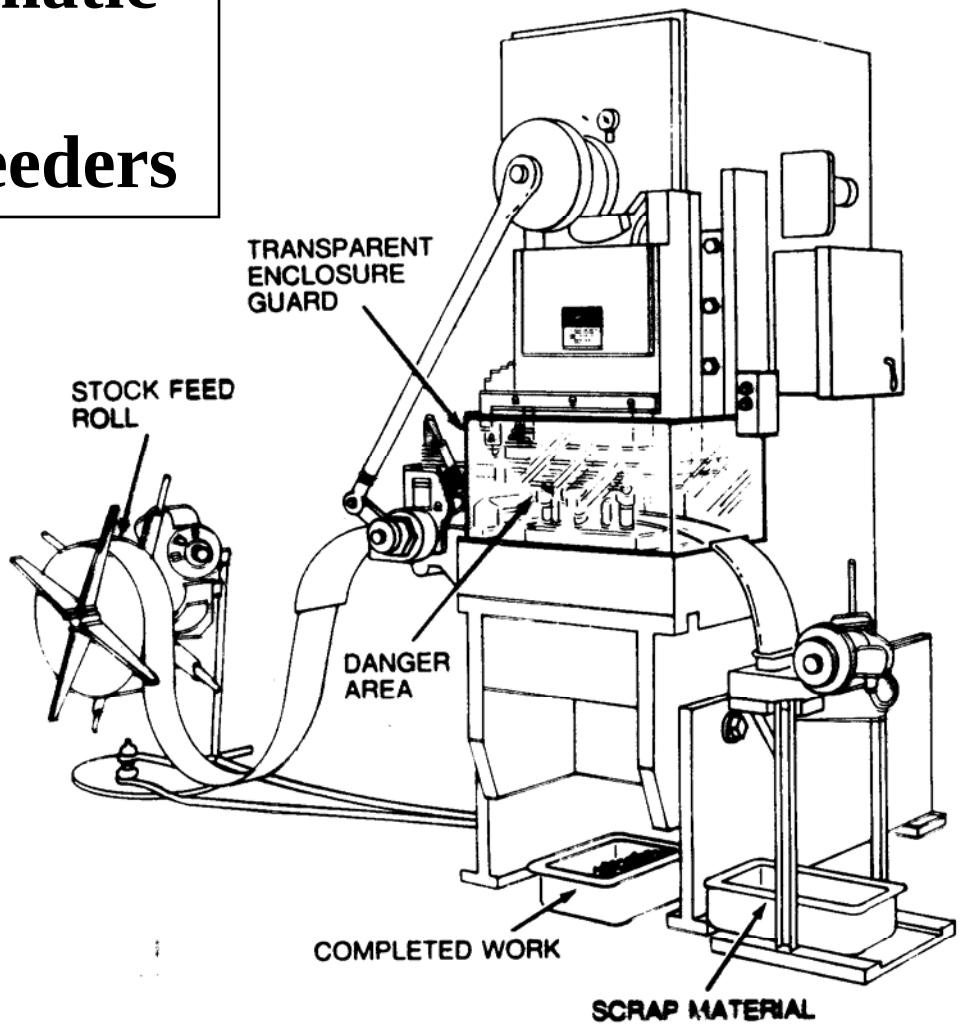


Power Press With Gate Guards



Robot With Fixed Barrier Guards

Power Press With Automatic Feed Guarding feeders



Instructor Notes

Thank you for your interest in teaching the basics of machine guarding to your employees and for promoting self-sufficiency on behalf of the Division of Safety & Hygiene.

A few points to keep in mind while teaching this class to your employees.

Try to do everything you can to get your students "involved" with the information that you will be presenting. This means using actual work place examples wherever possible. Try to use your own machines, your own checklists, your own machine specific hazards, and certainly refer to your company specific procedures when at all possible.

If possible, incorporate some exercises into your training. These exercises might be as simple as small groups reviewing a specific inspection checklist or as involved as having people actually evaluating the guards on a particular piece of equipment. You might even have each person present a review of an operational procedure. The key is to get your class involved so that they are not just listening to you lecture.

Encourage questions and repeat questions for clarity to be sure that everyone has heard and understood. Even if you know the answer, a good technique is to ask the class if anyone can answer the question. On questions where you're not sure of the answer or there is disagreement within the class, tell the class that you'll check on it during a break or as soon after the class as possible. Follow-up and make sure everyone gets the information.

Remember, your goal is to teach your employees to be safe and to provide accurate information about machine guarding and about your specific guards on your specific equipment.

Subpart O – MACHINE GUARDING

- **1910.211 Definitions**
- **1910.212 General Requirements for all Machines.**
- **1910.213 Woodworking Machinery**

These are the standards covered in Subpart O of the OSHA Machine Guarding standards. There are specific standards like 1910.213 that deal with woodworking machinery but many machines are not specifically mentioned in their own standard. For these machines the requirements of 1910.212 are applicable. American National Standards Institute (ANSI) standards may also give specifics to guarding requirements that are not mentioned in the OSHA standards.

Subpart O

- **1910.215 Abrasive Wheel Machinery**
- **1910.216 Mills and Calendars**
- **1910.217 Mechanical Power Presses**
- **1910.218 Forging Machinery**
- **1910.219 Mechanical Power-Transmission**

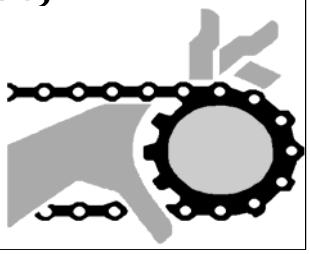
Basics of Machine Safeguarding

- **A good rule to remember is: Any machine part , function, or process which may cause injury must be safeguarded.**
- **And a guard should not allow someone to reach over, under, around or through.**

A guard should not allow a person to reach over, under, around, or through.

Basics Areas of Safeguarding

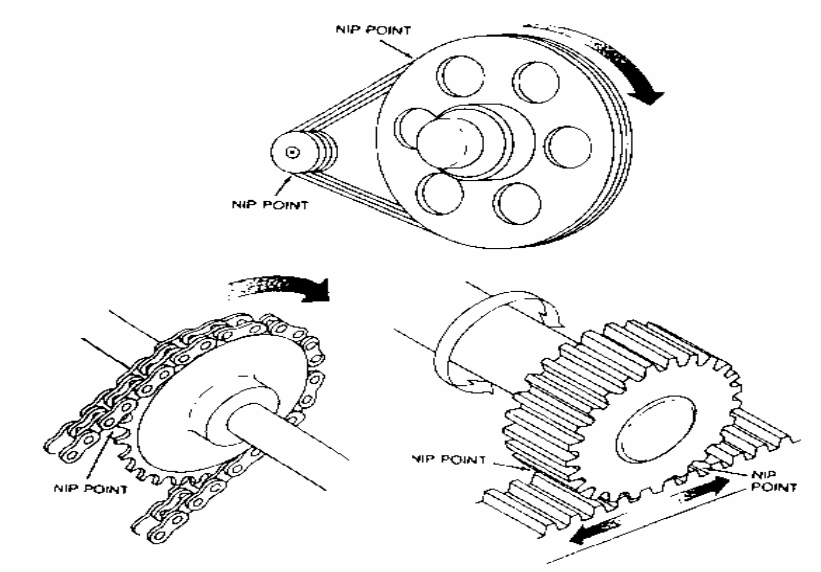
- **The point of operation**
- **Power transmission apparatus**
- **Other moving parts (reciprocating, transverse, or rotating)**



Each of these areas will be emphasized from a guarding standpoint and we'll look at some examples.

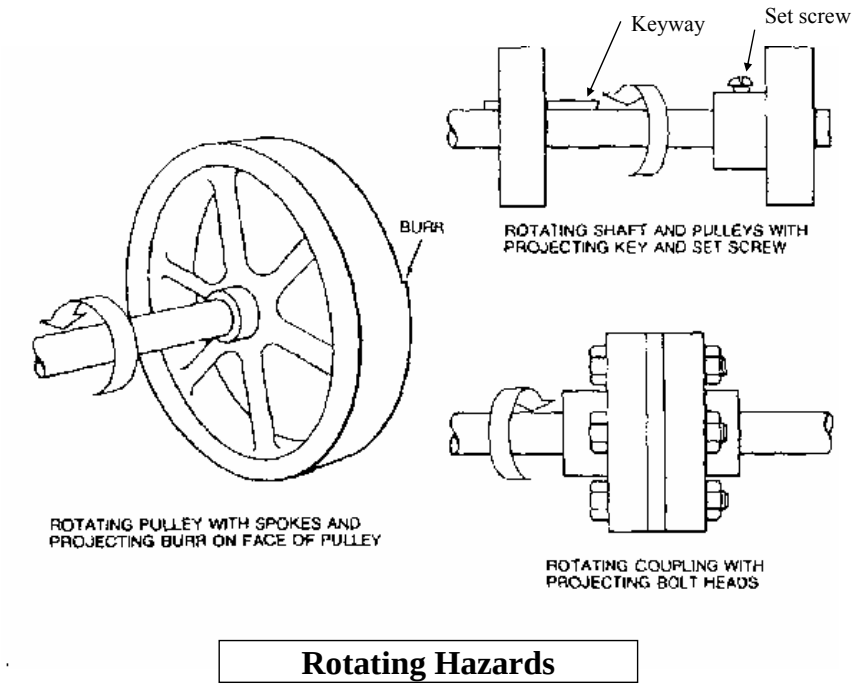
Motions

- **Motions**
  1) **Rotating (including in-running nip points)**
  2) **Reciprocating**
  3) **Transverse**



Nip Points

Emphasize the location of the nip points.

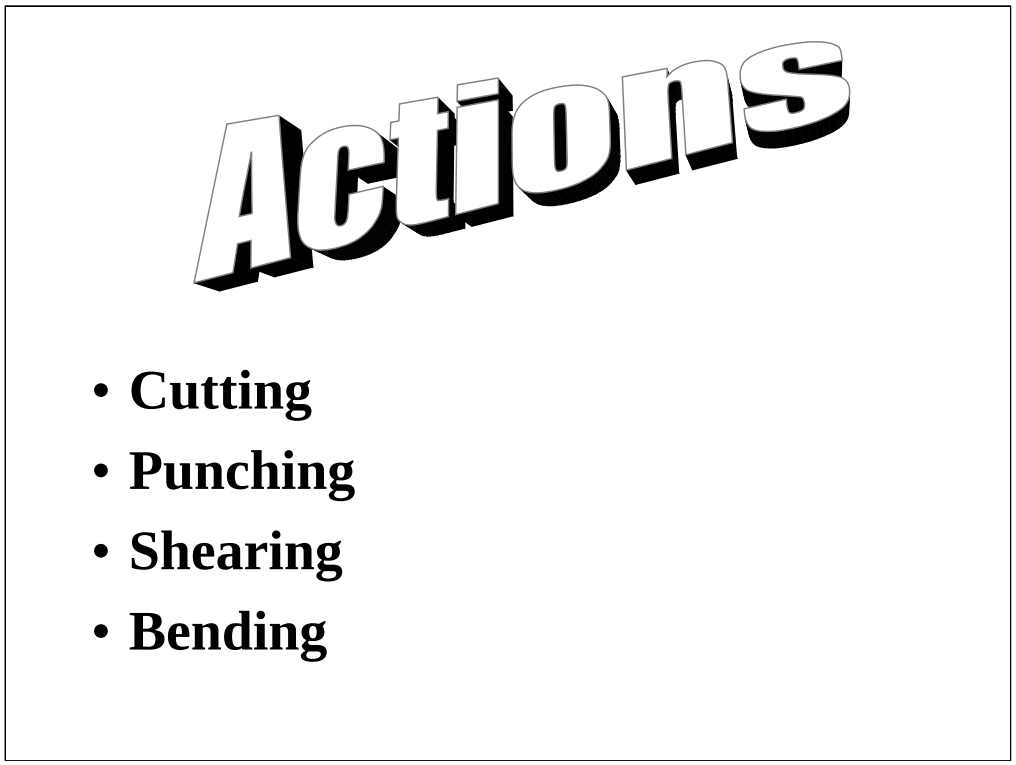


Rotating Hazards

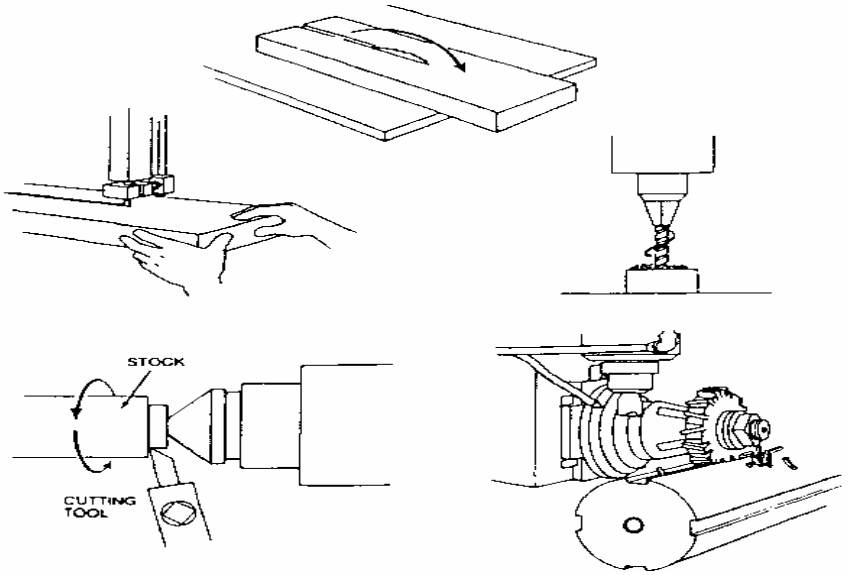
Any rotating spokes where someone can get caught in them or that have burrs on them need to be guarded. When you have key ways or set screws or couplings, they must be guarded as well to prevent someone being caught up in them. Rotating shafts that could allow clothing or hair to be caught in them must be guarded as well.

Safeguarding

- **Guards--- Prevents access to the danger areas.**
- **Devices---Controls access to the Point of Operation.**

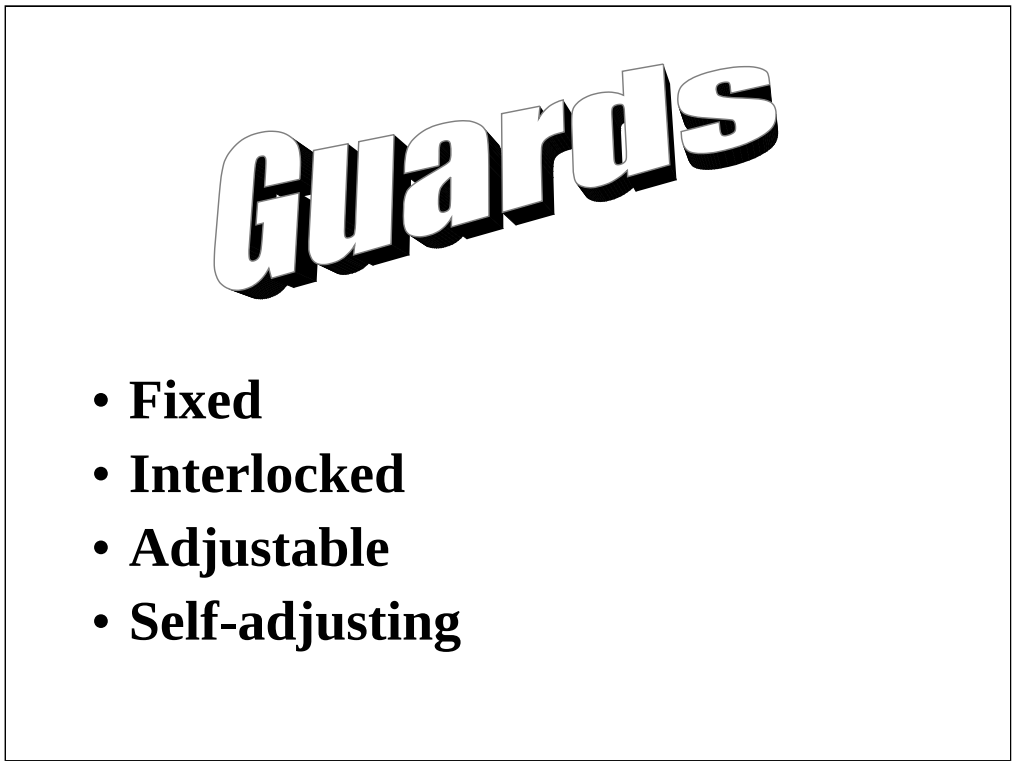


The next slide will show pictures of some of these actions that need to be guarded.

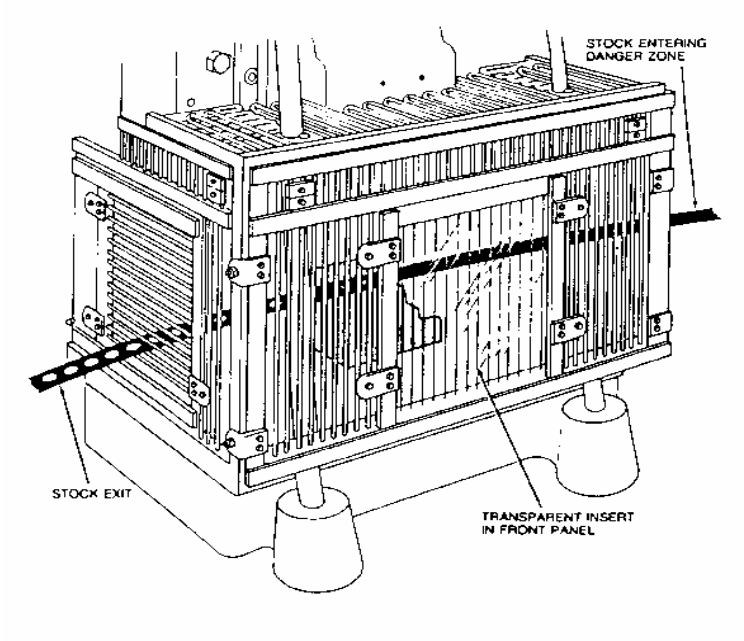


Different Actions

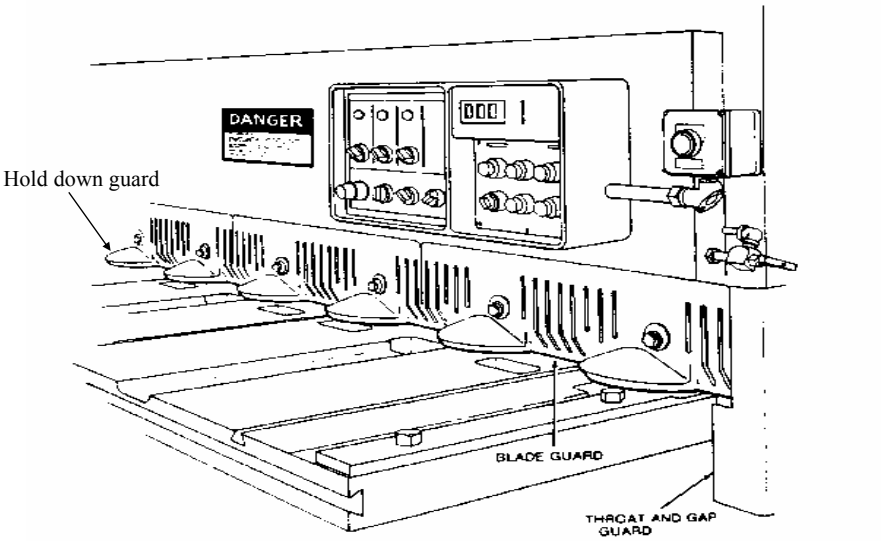
From lower left clockwise: cutter on a lathe, cutting on a bandsaw, cutting on a table saw, drilling with a drill press, and, machining on a mill.



The following slides will show examples of each of these types of guards.

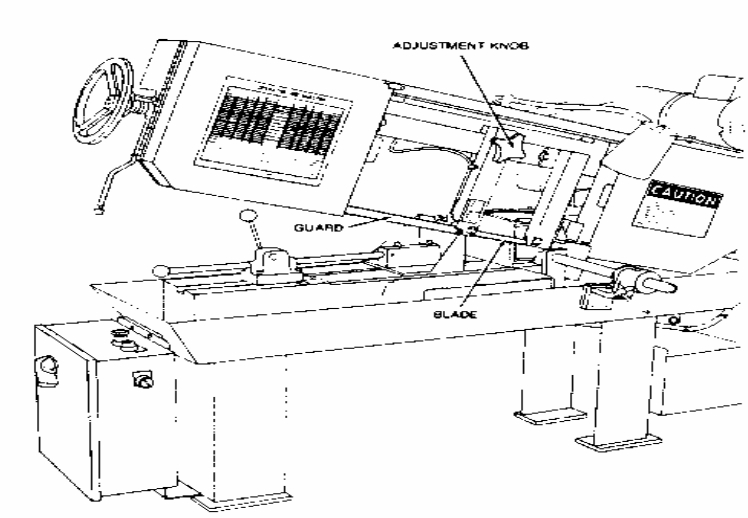


Fixed Guard On A Power Press



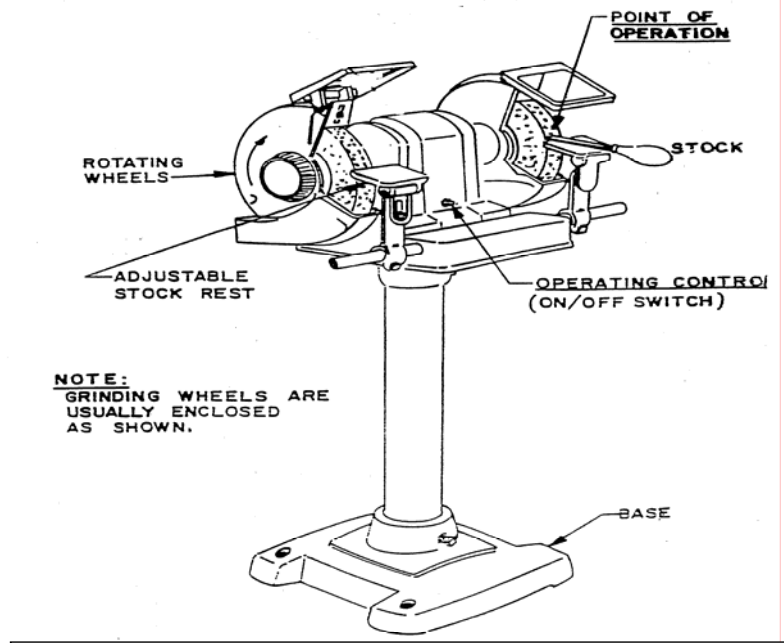
Fixed Guard on a Power Squaring Shear

Not only does the cutting edge have to be guarded but the hold down devices should be guarded as well.



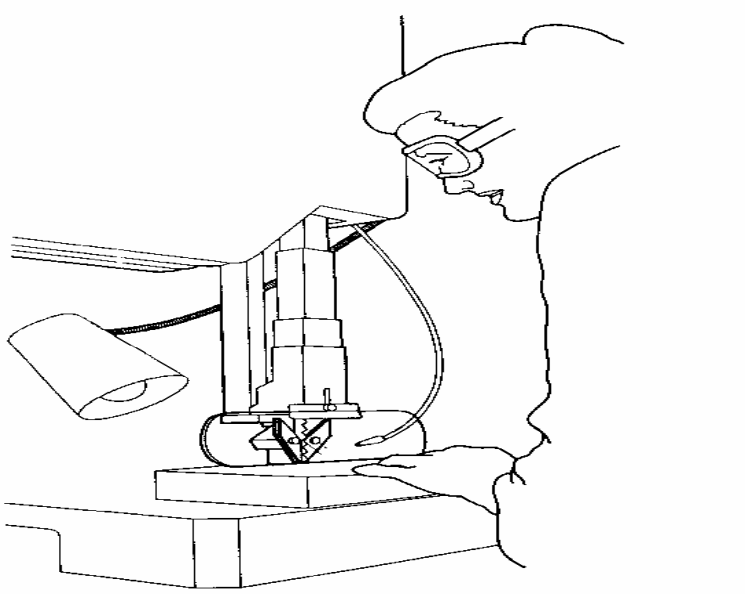
Adjustable Guard On Horizontal Bandsaw

The exposed portion of the blade should only be large enough for the material being cut.

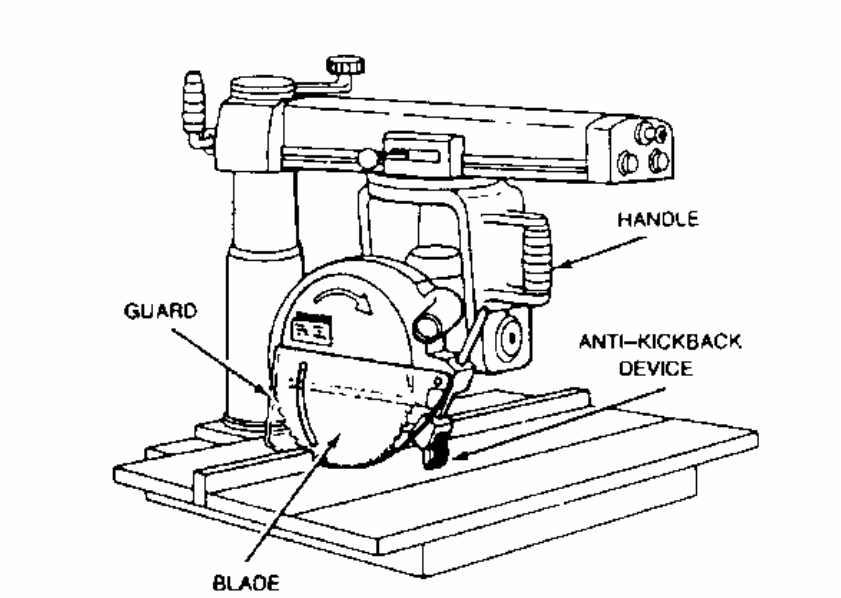


Adjustable Guard On Pedestal Grinder

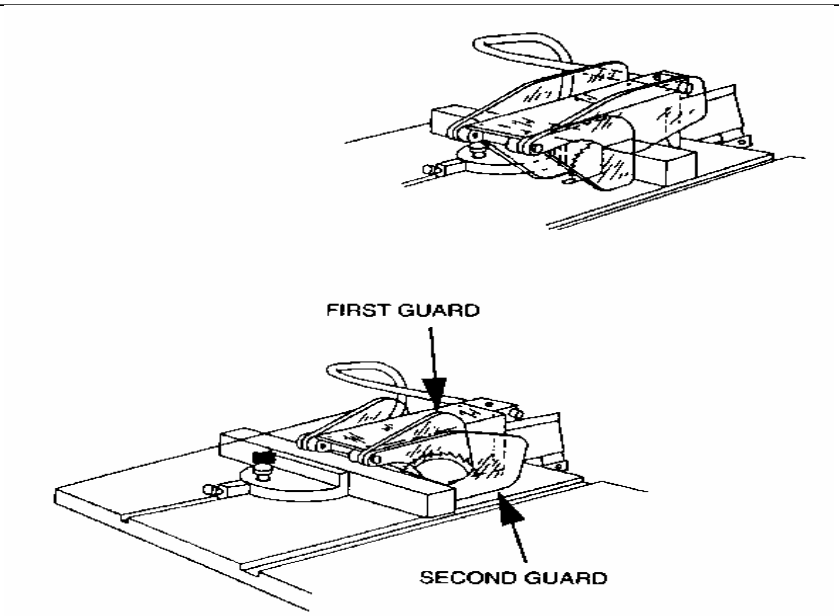
Work rests should be adjusted to one eighth inch from the wheel. Peripheral or tongue guards should be adjusted to one quarter of an inch from the wheel. These guards are to prevent material or the wheel from flying out at the operator in the event the wheel would fracture. The spindle nut guard is a fixed guard that must be in place as well. Pedestal grinders as well as all fixed machinery must be mounted to the floor.



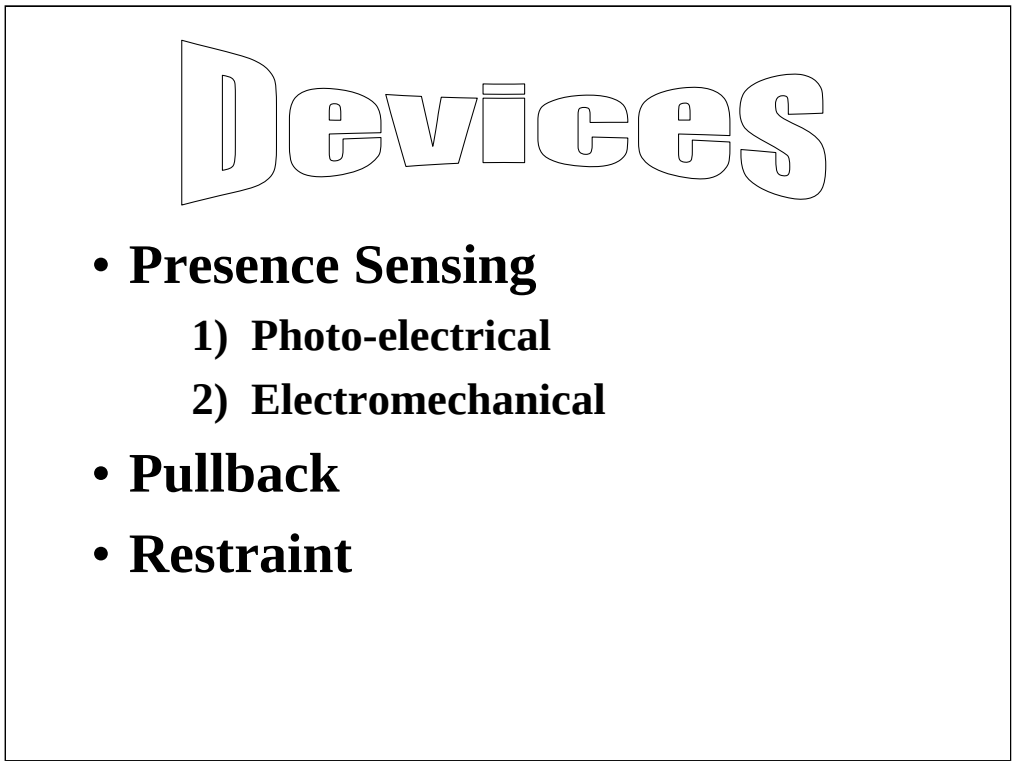
Adjustable Guard On Bandsaw



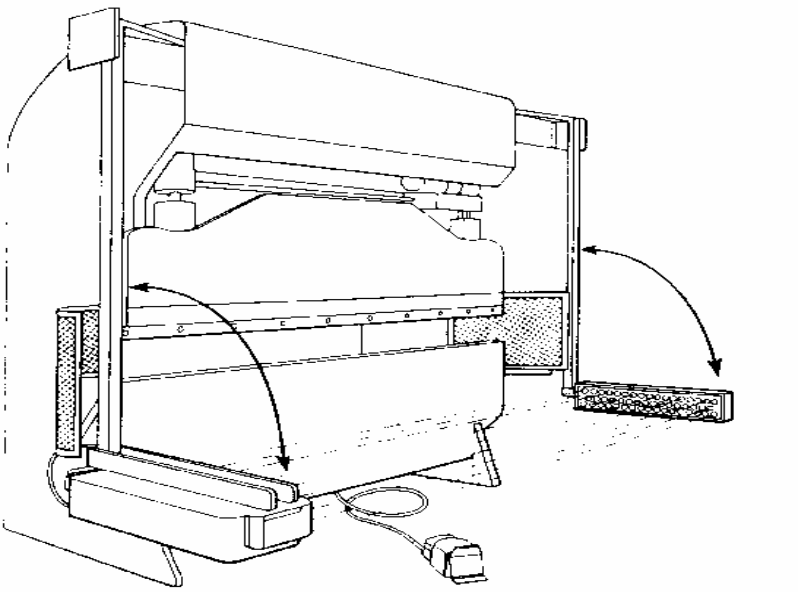
Self-Adjusting Guard On Radial Arm Saw



Self-Adjusting Guard Table Saw

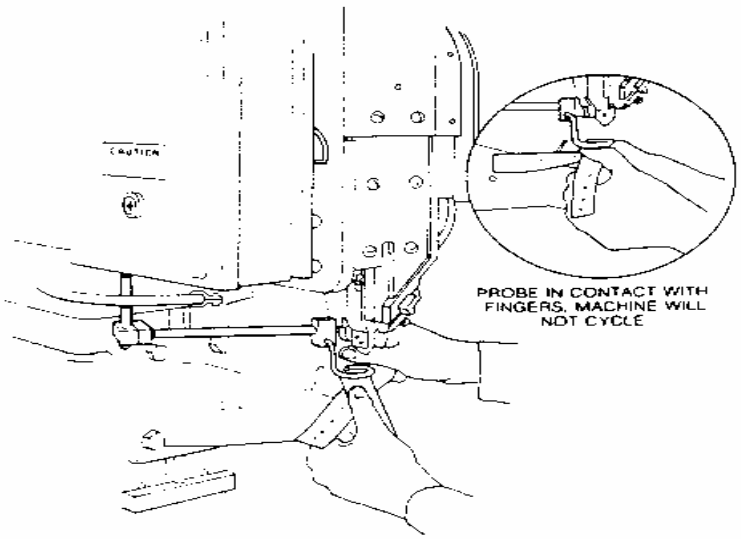


Devices are used in lieu of guards.



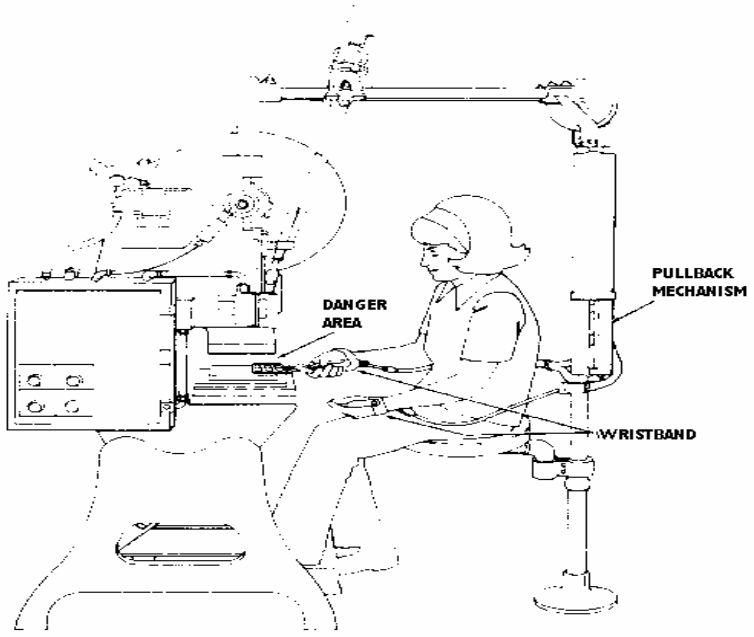
Photoelectric Presence Sensing Device On Press Brake

Photoelectric presence sensing devise, commonly called light curtain, prevent someone reaching into the point of operation by the use of light beams. If someone breaks the beams, the machine stops or will not operate. This shows that the light curtains can be set at horizontal or vertical depending on the material size being fed to the machine.



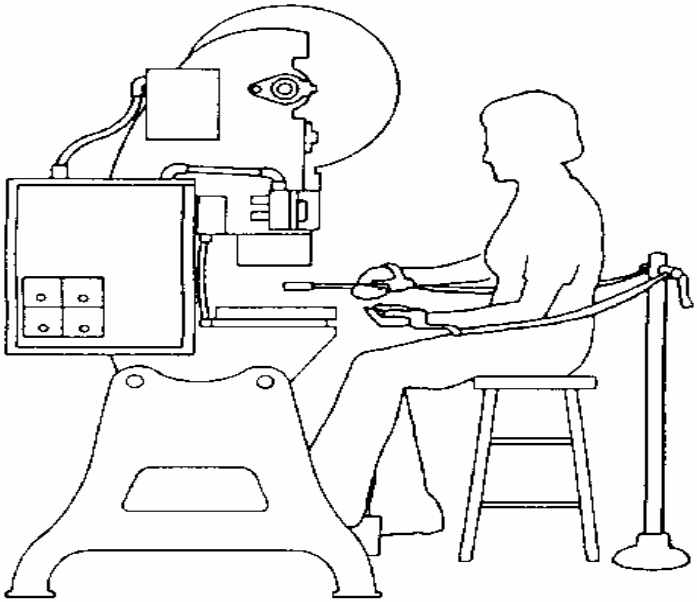
Electromechanical Sensing Device On An Eye-letter

This type of device is used on eye-letters, punches, riveters, and fastening machines. The sensing device that surrounds the point of operation, if touched during operation, will stop the function being performed.



Pullback Device On A Power Press

Pullback devices are commonly used on power presses and press brakes, but may be used to limit access to any point of operation. Pullbacks are connected directly to the flywheel or ram so that as the equipment cycles, the pullback device pulls the hands away from the point of operation.

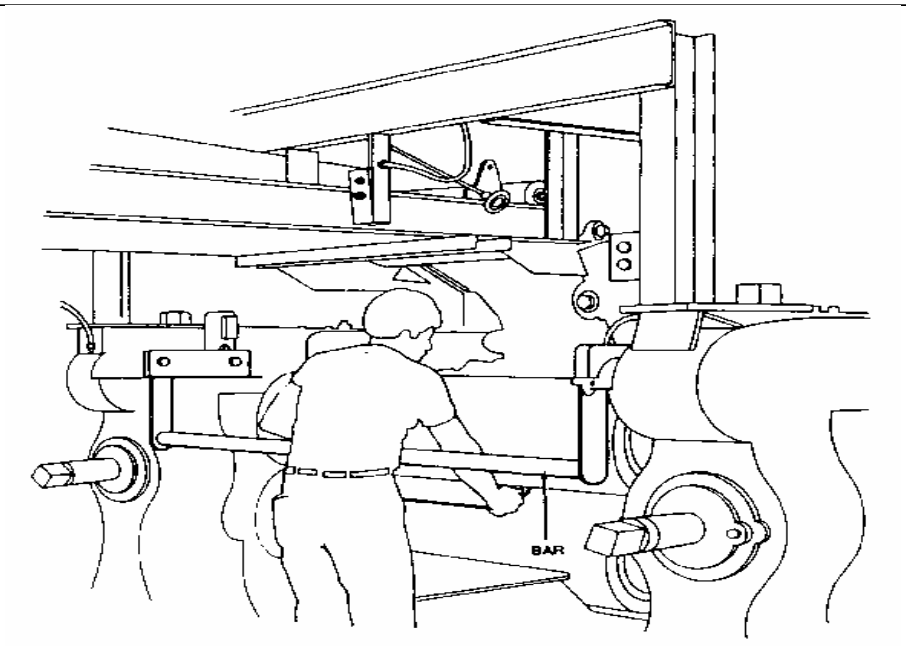


Restraint Device On A Power Press

This device limits the operator from ever reaching into the point of operation. This device as well as the pullbacks require continuous monitoring and supervision. Each time the equipment is set up or operators change, the pullbacks or restraints must be re-adjusted to ensure that the operator cannot reach the point of operation. Documentation of these adjustments should be kept for each machine.

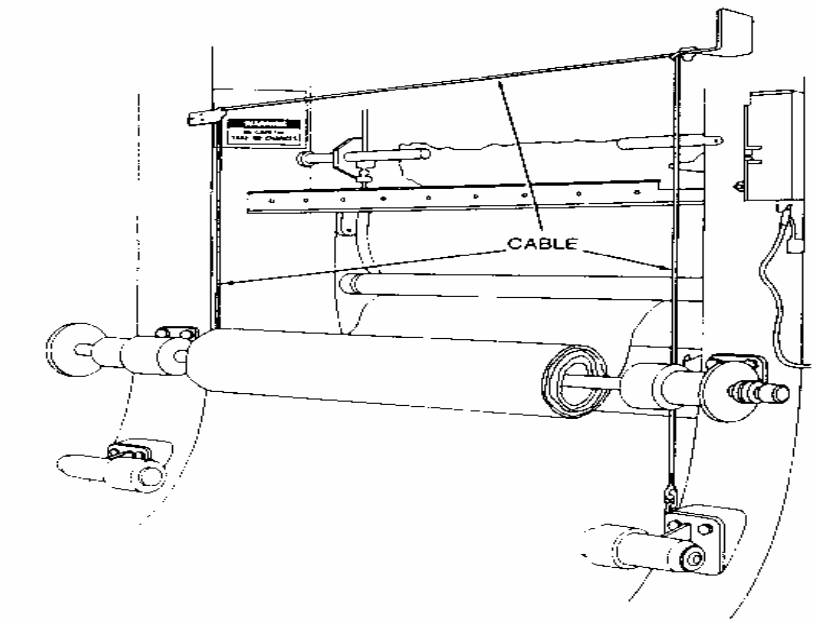
Devices

- **Safety Controls**
  - **(a) Pressure-sensitive body bar**
  - **(b) Safety tripwire cable**
- **Two-hand control**
- **Two-hand trip**



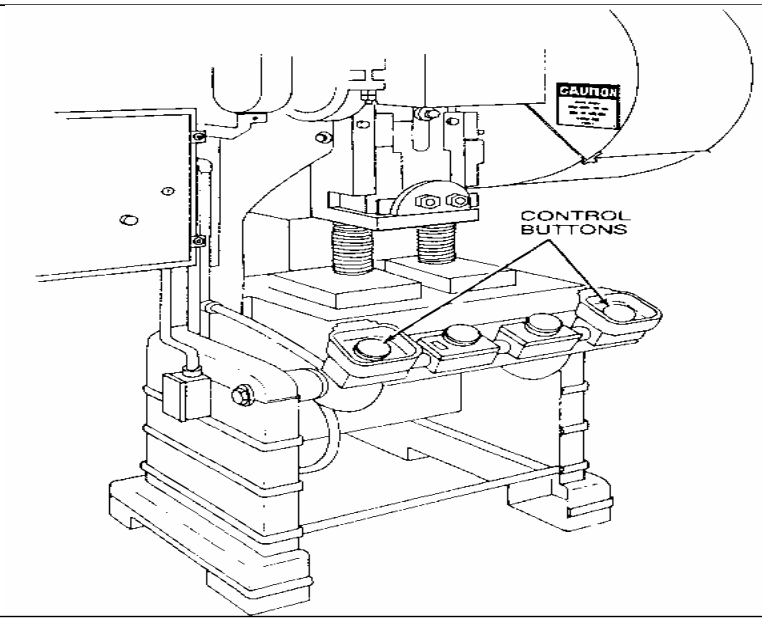
Pressure-Sensitive Body Bar On Rubber Mill

Pressure-Sensitive body bars are used particularly in the rubber industry but may be used where large materials must be fed into a point of operation. There is typically no way of guarding this type of operation. A pressure-sensitive bar, when hit, will stop the machine or in some cases reverse the direction of the machine.



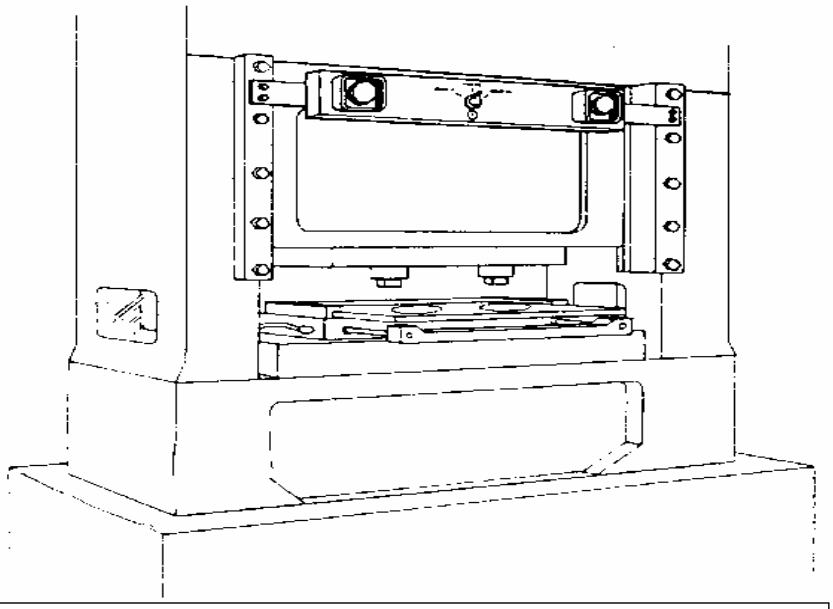
Safety Tripwire Cable On A Calendar

This device is meant to provide emergency stopping of equipment by pulling the cable. Stop cables are commonly used on conveyor systems where it is not feasible to guard the entire conveyor.



Two-Hand Control Buttons On A Part-Revolution Clutch Power Press

Two-hand controls differ from two-hand trips based on engaging points that the press may be stopped at. Two-hand controls can also be used on other equipment such as hydraulic presses. Two-hand controls allow the operator to stop functions at multiple points whereas two-hand trips, once activated, will continue through the full cycle. Two-hand controls will also have emergency stop buttons located between them.

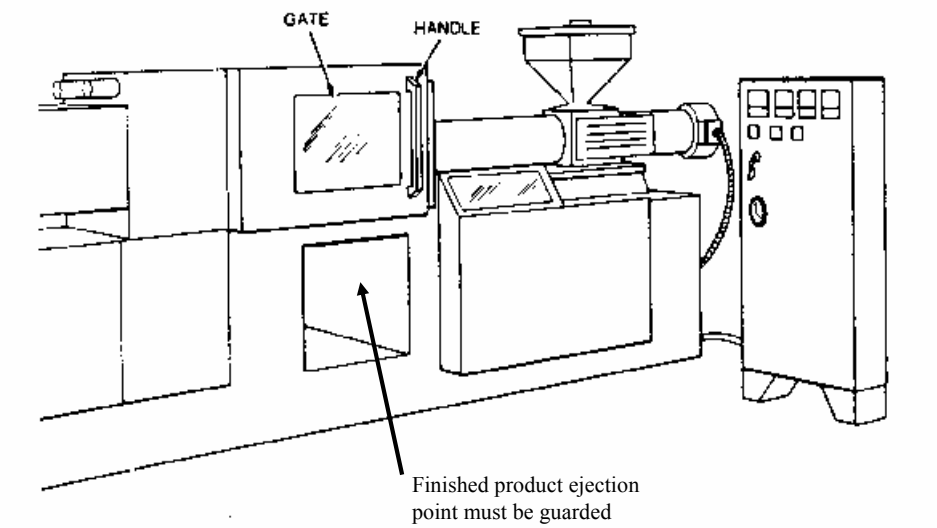


Two-Hand Trip Buttons On A Full-Revolution Clutch Power Press

Two-hand trips do not have emergency stops because once the cycle is started you cannot stop it until it reaches the top of the stroke.

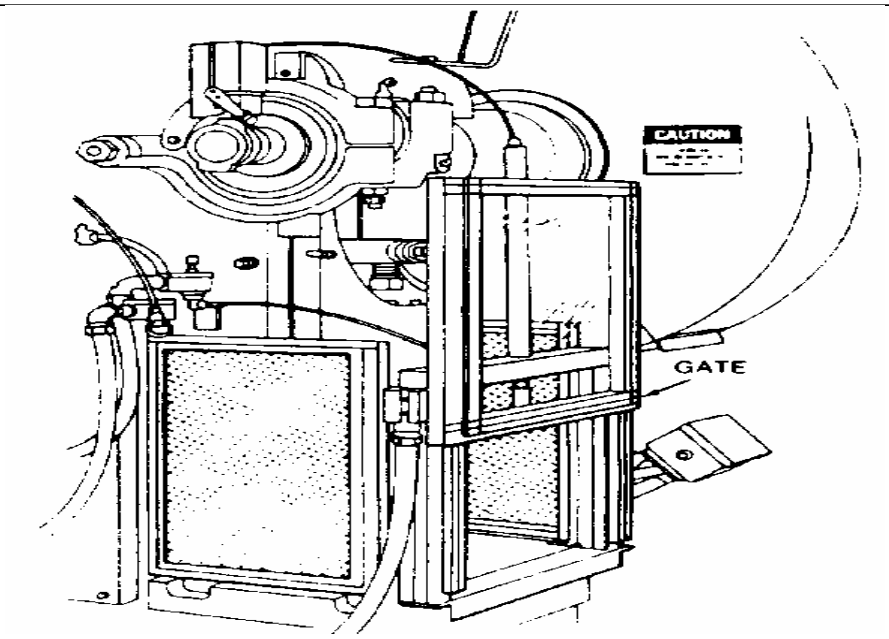
Devices

- **Gates**
- **Location/Distance**



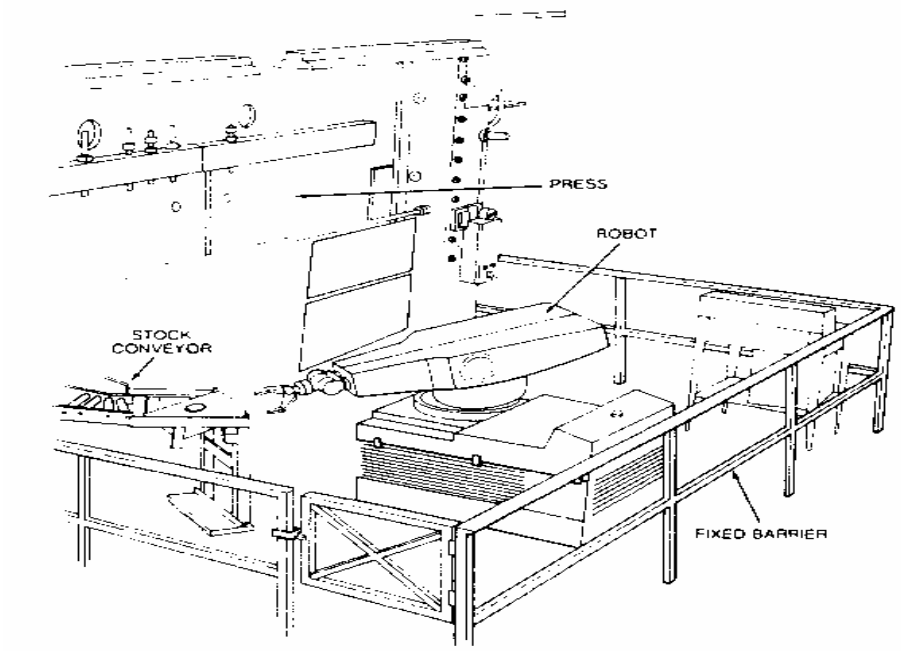
Horizontal Injection Molding Machine With Gate Guards

This shows an example of a gate guard that has been interlocked. If the door were to be opened, the machine would stop based on the interlock switch located behind the door. On molding machines you must also insure that the ejection points are guarded. Many parts on these machines fall out below the die and you must insure that the operator cannot reach up into the die through that opening.



Power Press With Gate Guards

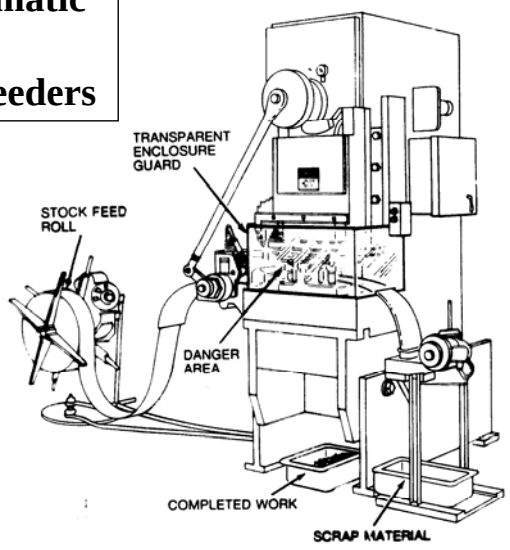
There are two types of gate guards for power presses, Type A and Type B. Type A, when the machine is activated, the gate guard will come down, the die will close and then open. When the die opens the gate guard will then come up. Type B functions the same except when the die opens, the gate guard opens. The concern with Type B is if the press malfunctions and cycles a second time, the point of operation is not guarded. So most people that use gate guards use a Type A.



Robot With Fixed Barrier Guards

In this case, the guard rail is acting as the barrier but is not necessarily a good method. Many employers will use pressure sensitive mats inside the guard rail area to insure that no one is in that area while the machine is operating. They may also interlock gates to stop operations of the machines when the gates are opened.

Power Press With Automatic Feed Guarding feeders



Although this press has the point of operation guarded adequately, there is a need to insure that the feeders and scrap handlers are properly guarded as well. The arm for the feeder must be guarded as well as the raw stock on the spool. The same would hold true for the scrap handler. Any point of operation for these devices that presents nip points or pinch points must be guarded.

Student Handouts

Machine Guarding

Subpart O – MACHINE GUARDING

- **1910.211 Definitions**
- **1910.212 General Requirements for all Machines.**
- **1910.213 Woodworking Machinery**

Subpart O

- **1910.215 Abrasive Wheel Machinery**
- **1910.216 Mills and Calendars**
- **1910.217 Mechanical Power Presses**
- **1910.218 Forging Machinery**
- **1910.219 Mechanical Power-Transmission**

Basics of Machine Safeguarding

- **A good rule to remember is: Any machine part , function, or process which may cause injury must be safeguarded.**
- **And a guard should not allow someone to reach over, under, around or through.**

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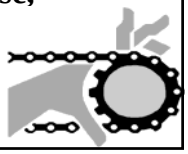
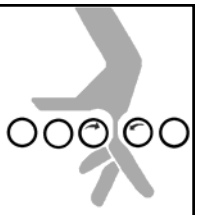
Machine Guarding

Basics Areas of Safeguarding

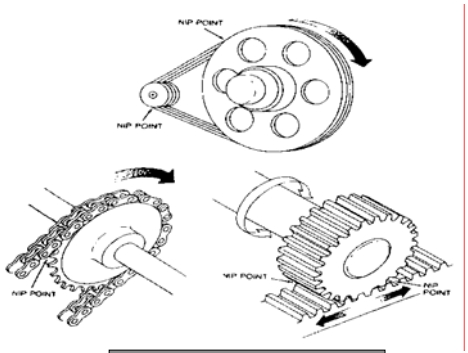
- **The point of operation**
- **Power transmission apparatus**
- **Other moving parts (reciprocating, transverse, or rotating)**



Motions



- **Motions**
  1) **Rotating (including in-running nip points)**
  2) **Reciprocating**
  3) **Transverse**



Nip Points

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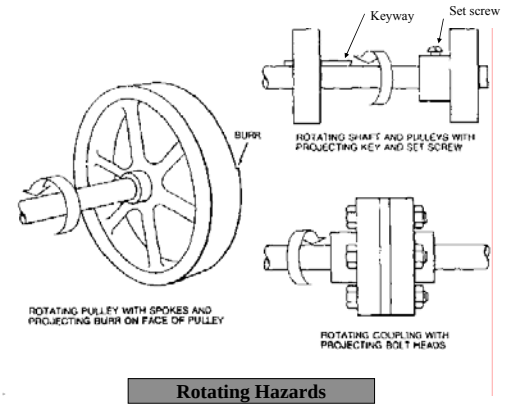

Rotating Hazards

Safeguarding

- **Guards--- Prevents access to the danger areas.**
- **Devices---Controls access to the Point of Operation.**

Actions

- **Cutting**
- **Punching**
- **Shearing**
- **Bending**

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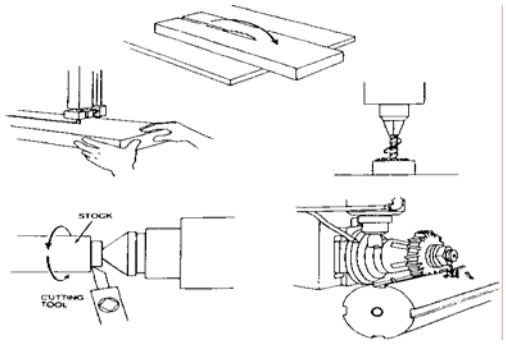
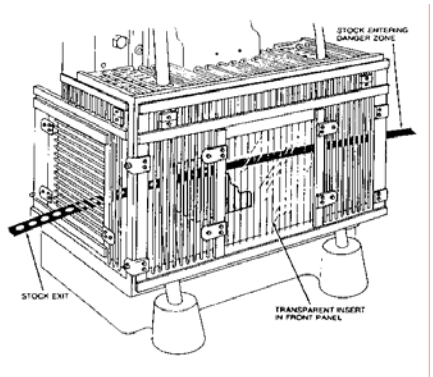


Different Actions

Guards

- **Fixed**
- **Interlocked**
- **Adjustable**
- **Self-adjusting**



Fixed Guard On A Power Press

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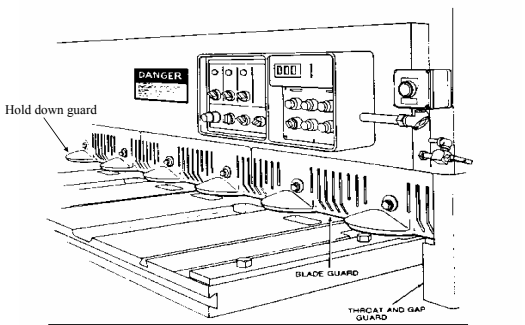
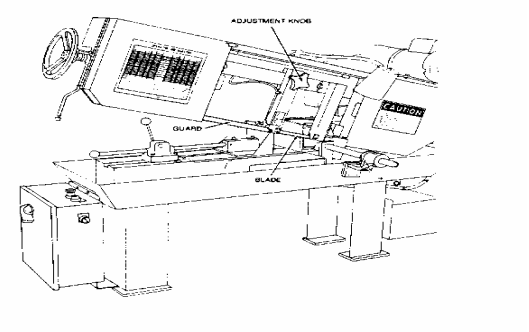
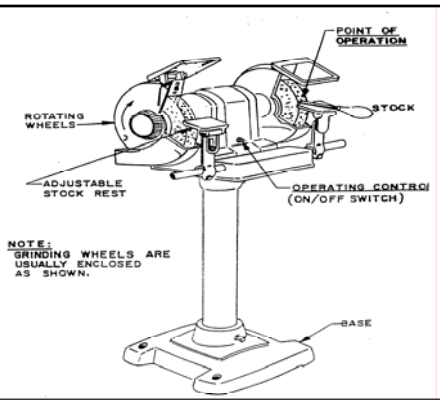
Machine Guarding



Fixed Guard on a Power Squaring Shear



Adjustable Guard On Horizontal Bandsaw



Adjustable Guard On Pedestal Grinder

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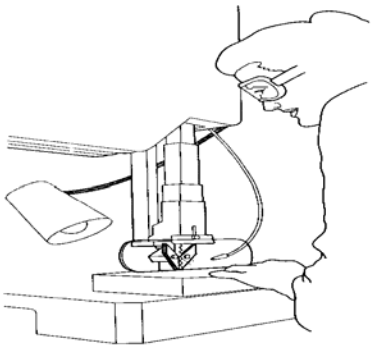
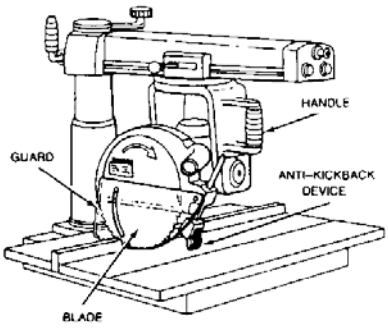
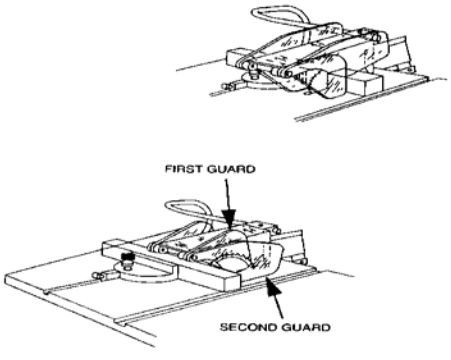


Adjustable Guard On Bandsaw



Self-Adjusting Guard On Radial Arm Saw



Self-Adjusting Guard Table Saw

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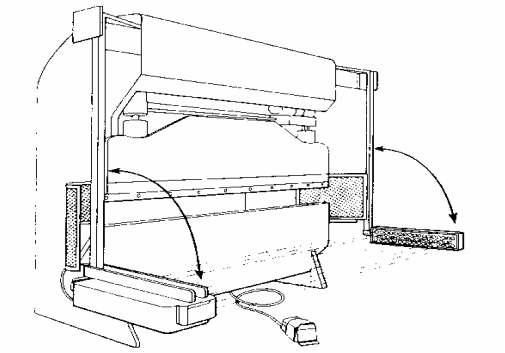
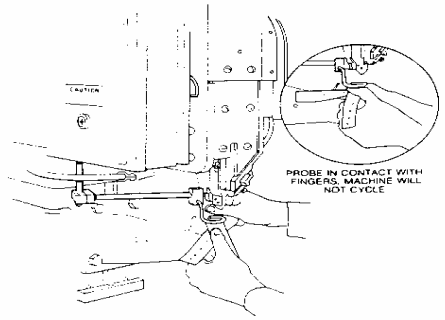
Machine Guarding

Devices

- **Presence Sensing**
  1) **Photo-electrical**
  2) **Electromechanical**
- **Pullback**
- **Restraint**



Photoelectric Presence Sensing Device On Press Brake



Electromechanical Sensing Device On An Eye-letter

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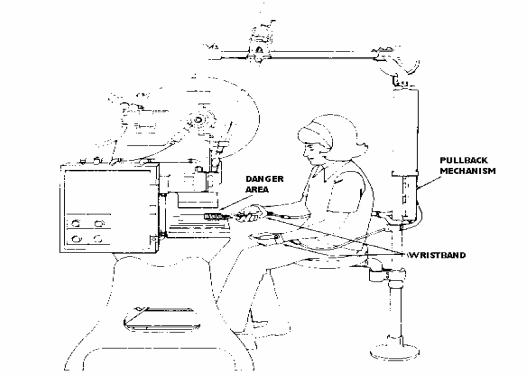
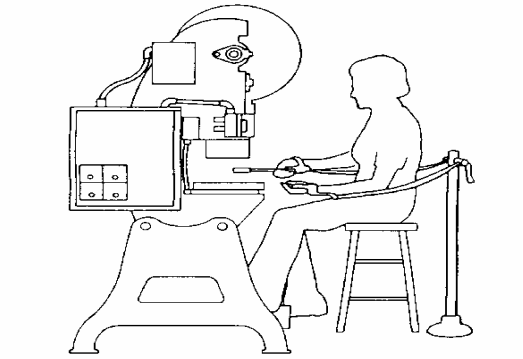


Pullback Device On A Power Press



Restraint Device On A Power Press

Devices

- **Safety Controls**
  - **(a) Pressure-sensitive body bar**
  - **(b) Safety tripwire cable**
- **Two-hand control**
- **Two-hand trip**

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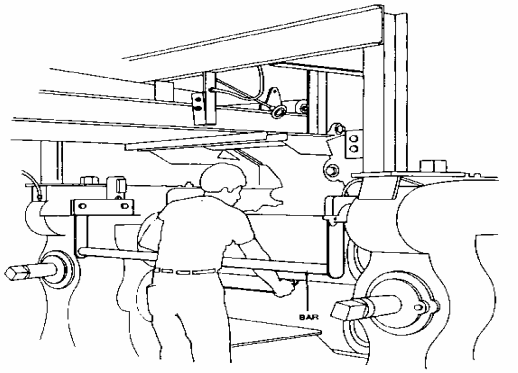
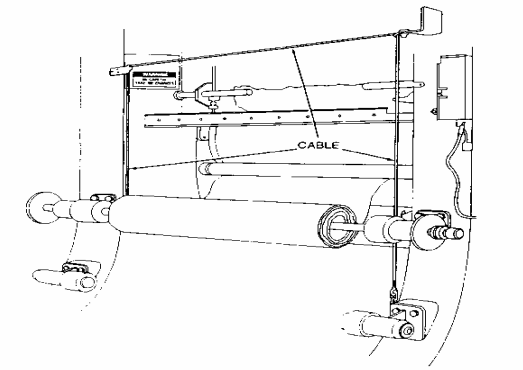
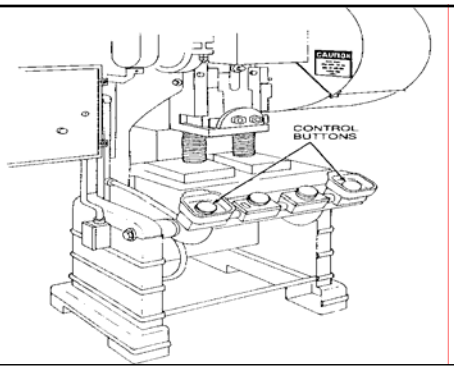
Machine Guarding



Pressure-Sensitive Body Bar On Rubber Mill



Safety Tripwire Cable On A Calendar



Two-Hand Control Buttons On A Part-Revolution Clutch Power Press

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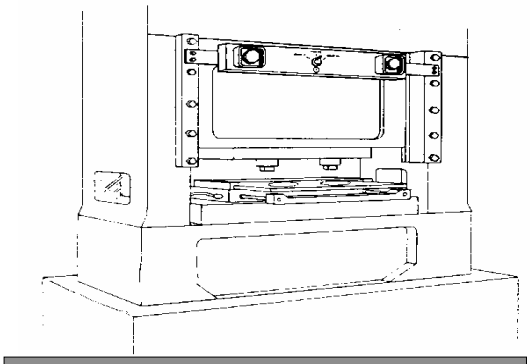
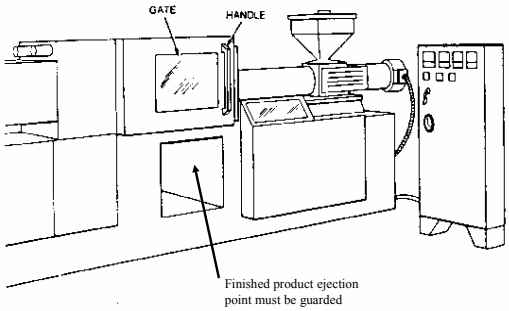
Machine Guarding



Two-Hand Trip Buttons On A Full-Revolution Clutch Power Press

Devices

- **Gates**
- **Location/Distance**



Horizontal Injection Molding Machine With Gate Guards

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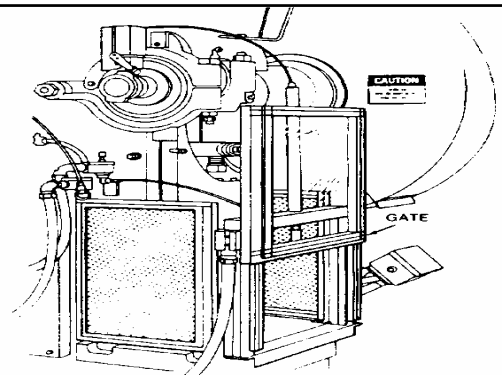
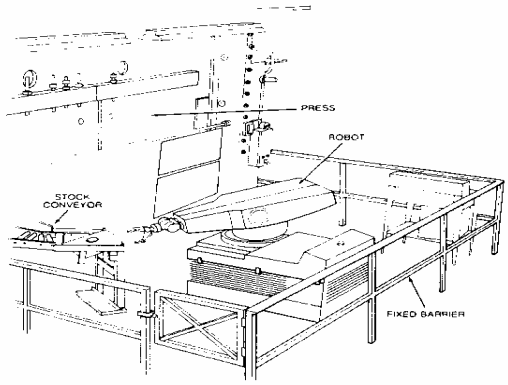
Machine Guarding

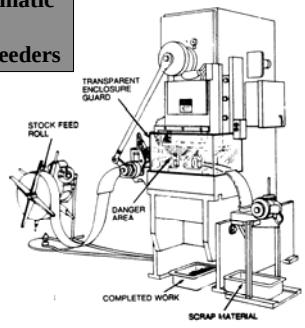


Power Press With Gate Guards



Robot With Fixed Barrier Guards

Power Press With Automatic Feed Guarding feeders



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Safety Consultant

Machines and Machine Guarding
Self-Audit Checklist

Building _____ Room _____ Supervisor _____ Date _____

Audit Performed by _____

	Y	N	NA	COMMENTS
A. General Requirements for Machines and Machine Guarding				
1. Guards prevent worker's hands, arms, or other body parts from making contact with moving parts				
2. Guards firmly secured and not easily removable				
3. Guards permit safe, comfortable, and relatively easy operation of the machine				
4. Machine controls within easy reach of the operator				
5. Procedures established to ensure machine is shut down before guard is removed				
B. Guarding of Mechanical Hazards				
1. Point-of-operation guards provided and in place				
2. Gears, sprockets, pulleys, and flywheels guarded				
3. Belts and chain drives guarded				
4. Exposed set screws, key ways, collars, and the like guarded				
5. Guards provide for any other hazardous moving part of the machine				

Key to Machine Guarding Checklist

A. General Requirements for Machines and Machine Guarding

1. Guards should be designed to prevent contact with any machine part, function, or process that could cause an injury.

2. Guards should be made of durable material that will withstand the conditions of normal use and should not be able to be easily removed or tampered with.

3. Machine guard design should allow normal operations to occur without creating any additional hazards.

4. Self explanatory

5. If possible, machine design should allow for routine lubrication and adjustment without removal of safeguards. When safeguards must be removed, safe procedures must be developed to insure that the machine has been shut down. A lockout/tagout program may be necessary.

B. Guarding of Machine Hazards

1. Point-of-operation is the point where work is performed on the material, such as cutting, shaping, boring, or forming of stock. Point-of-operation guarding is complicated by the number and complexity of machines and by the different uses of individual machines. Additional information and assistance is available through EHS.

2. Rotating parts (even smooth, slowly rotating shafts) can grip clothing or, through mere skin contact, force a hand or arm into a dangerous position. Guard should be designed to allow no contact with rotating parts. Additional information and assistance is available through EHS.

3. Belts and chain drives create in-running nip point hazards where the belt or chain contacts the pulley or sprocket. Guards should be designed to allow no contact. Contact EHS for additional information or assistance.

4. The normal hazards associated with rotating parts increase with projections such as set screws, key ways, etc., and must be guarded to prevent contact. Contact EHS for additional information or assistance.

5. Reciprocating and transverse motions of machine parts are examples of other hazards which require guarding. Contact EHS for additional information or assistance.

	Y	N	NA	COMMENTS
C. Evaluation of Non-mechanical Hazards				
1. Noise measurements taken, where necessary				
2. Substances used in machine operations evaluated				
3. Electrical cords or connectors in good repair				
4. Personal protective equipment available, where necessary				
5. Operator dressed safely for the job				
D. Training				
1. Workers trained in the recognition of machine hazards and the importance of using safeguards				
2. Lockout/tagout training provide, where necessary				
3. Electrical Safety-Related Workpractices training provided, where necessary				
4. Personal protective equipment training provided, where necessary				

Key to Machine Guarding Checklist

C. Evaluation of Nonmechanical Hazards

1. Some machines are capable of producing noise levels which require hearing protection. Contact EHS for additional information or assistance in measuring machine noise levels.

2. Cutting fluids, coolants, and any other substance used in machine operations should be evaluated before use. The substance's Material Safety Data Sheet (MSDS), container label, or other product information can be helpful in determining if additional precautions will be necessary

3. Replace frayed, exposed, or deteriorated wiring.

4. A hazard evaluation of the tasks that machine operators perform will help in determining if personal protective equipment is necessary. Sample hazard evaluation forms are available through EHS.

5. Loose-fitting clothing and jewelry should not be worn by machine operators. Long hair can also become entangled in rotating parts.

D. Training

1. General training is available through EHS.

2. Training is required for all workers authorized to apply lockout/tagout devices. Training is also required for workers who are affected by the lockout/tagout activities of authorized workers. General training is available through EHS.

3. Workers who are exposed to energized electrical circuits operating at 50 volts or more must receive training based upon their assigned tasks and level of expertise. General training is available through EHS.

4. Workers must receive adequate training on Personal Protective Equipment selection and use. Documentation of the training must be maintained. Sample forms and general training are available through EHS.