Chapter 1

SAFETY

Ind 1.01 Definitions. (1) GUARDED. When used in these orders, the term "guarded" unless otherwise specifically provided, shall mean so covered, fenced or enclosed that a person in the course of employment, or a frequenter is not likely to come in contact with the point of danger and be injured.

(2) EXPOSED TO CONTACT. When used in these orders, the term, "exposed to contact", unless otherwise specifically defined, shall mean that the location of the mechanical contrivance is such that it is likely to cause injury to a person while in the course of employment, or to a frequenter.

Ind 1.02 Standards and specifications. (1) RAILINGS AND TOEBOARDS. Where standard railings and toeboards are called for in these orders, they shall conform to the following specifications:

(a) Railings shall be 42 inches in height except where otherwise specified and shall be equipped with toeboards unless the space between the lower rail and floor is filled with material as specified in section Ind 1.02 (2) (b).

(b) They shall be of substantial construction, shall be permanently fastened in place, and shall be smooth and free from protruding nails, bolts and splinters. An intermediate rail shall be provided between top rail and the floor, unless this space is filled with substantial wire mesh work, expanded metal, or other suitable material complying with the requirements of section Ind 1.02 (2).

(c) If constructed of pipe, the inside diameter of the pipe shall not be less than 1¼ inch.

(d) If constructed of metal shapes or bars, each part shall have a cross section at least equal in strength to that of a 1½" x 3/16" angle.

(e) If constructed of wood, the posts shall not be smaller than the sizes commercially known as 2" x 4" or 3" x 3". The top rail shall be at least as large as the size known as 2" x 4", unless it is constructed in the manner shown in Fig. 1. The dimensions shown in Fig. 1 are the nominal size, and the finished size after planing is usually only about 3¾" x 13/16". The intermediate rail shall not be smaller than the size commercially known as 1" x 4".

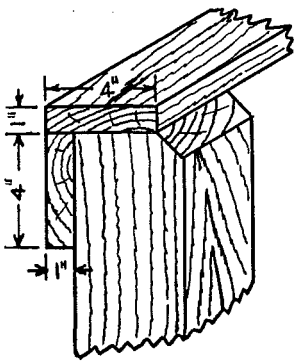


Fig. 1

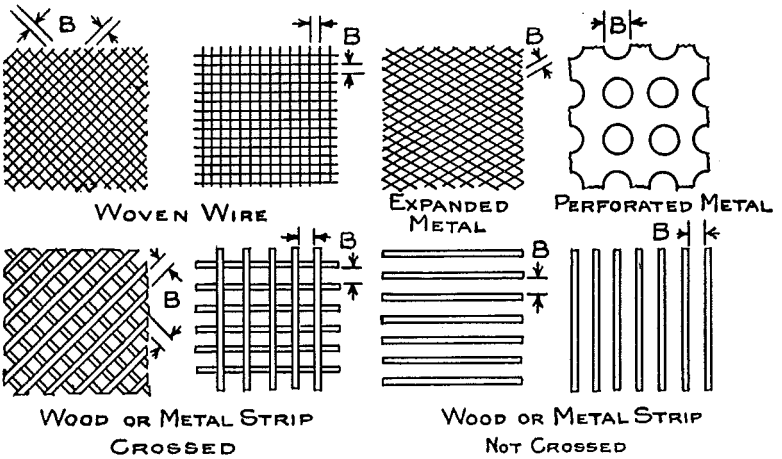
(f) Wooden posts and uprights shall be spaced no more than 8 feet apart, and if of steel, not more than 10 feet apart.

(g) Toeboards shall be at least 4 inches in height and be constructed of wood, metal, metal grill with openings not exceeding 1 inch or other suitable material.

(h) Intermediate rails and toeboards, and top rails which are attached to side of posts, shall be placed on the side of the posts away from the engine, belt, floor opening, etc., to be guarded, so that any blow or pressure against them will be taken up by the posts instead of tending to push the rails away from the posts.

(2) GUARDS. (a) If guards are made of wire mesh work, perforated or expanded metal, crossed strips or bars of wood or metal, etc., the width or diameter of the holes shall not exceed 2 inches (see note below). If parallel strips or bars of wood or metal are used, the space between them shall not exceed 1 inch. There shall be no opening more than ½ inch in width or diameter within 4 inches of any gear, belt, pulley or flywheel, or other dangerous moving part. Wood slats shall be smooth and free from splinters, and the holes in perforated or expanded metal shall be free from sharp, cutting edges.

Note: If the material of which the guard is constructed has openings wider than ½ inch, it shall be covered at all points within 4 inches of belts, etc., with wire, mesh work or sheet metal or some other suitable material having no openings wider than ½ inch. If the hole is diamond shape, the width shall be measured along one side of the opening. If the hole is oblong, the greatest dimension shall not exceed that specified above for "width".



(b) The thickness of material used for guards shall not be less than is specified in the following table:

Material	A Clearance from Moving Part at All Points	B Largest Mesh Opening Allowable	C Minimum Gauge (U.S. Stand.) or Thickness
Woven Wire	Under 4"	½"	½"– #16
	4"–15"	2"	2"– #12
Expanded Metal	Under 4"	½"	½"– #18
	4"–15"	2"	2"– #13
Perforated Metal	Under 4"	½"	½"– #20
	4"–15"	2"	2"– #14
Sheet Metal	Under 4"	---	#22
	4"–15"	---	#22
Wood or Metal Strip Crossed	Under 4"	½"	Wood ¾" Metal #16
	4"–15"	2"	Wood ¾" Metal #16
Wood or Metal Strip Not Crossed	Under 4"	½" width	Wood ¾" Metal #16
	4"–15"	1" width	Wood ¾" Metal #16
Solid Wood*	---	---	---

*If plywood is used it shall be not less than ⅜" thick and not less than 3 ply.

Note 1. If the width or diameter of the opening is less than ½ inch, the thickness of the material shall be at least as great as is specified above for a ½ inch opening.

Note 2. The material commonly known as "chicken wire" is not suitable for guards and does not meet the requirements of this section.

(c) The supporting frames shall be of substantial construction, such as angles varying from 1" x 1" x ⅛" to 1½" x 1½" x 3/16", or iron pipe with inside diameter varying from ¾ inch to 1½ inch, according to the weight of the filling material, the size of the panels, and the exposure of the guard to collision with trucks, etc. Any panel which measures more than 42 inches in both width and length shall be substantially supported across its narrowest dimension at intervals of not more than 42 inches.

(d) The filling material shall be bolted, riveted, or welded or otherwise securely attached to the frame in such a manner that no sharp points or edges will be exposed.

Bolts and rivets shall be at least 3/16 inch in diameter and shall be spaced not more than 10 inches apart. Where welded construction is used, it shall be such as will give equivalent strength.

Flat bars or strips used for clamps shall not be smaller than ¾" x ⅛" of metal or 1" x 1" if of wood.

Perforated or solid sheet metal may be bolted, riveted or welded directly to the angle iron frames.

(e) Guards shall be securely and permanently fastened in place, except as specifically otherwise provided.

Ind 1.03 Maintenance. (1) All equipment, machine tools and power driven machinery shall be maintained in safe condition.

(2) Hand tools shall be maintained in safe condition.

Ind 1.04 Belts, pulleys, etc. (1) The provisions of this order shall cover all types of belts, chains, cables and ropes together with pulleys, sprockets and sheaves in connection therewith, and for the purpose of simplification shall be referred to as belts and pulleys.

(a) All vertical and inclined belts within 6 feet of floor or platform level, and all pulleys and all horizontal belts within 7 feet of floor or platform level, except flat belts that are one inch or less in width and single round belts ½ inch or less in diameter, that move so slowly and are so located that there is no possibility of danger, shall be completely enclosed or effectively guarded. Belts protected by railings shall be guarded in accordance with section Ind 1.02(1). Belts protected by guards other than railings shall be guarded in accordance with section Ind 1.02(2).

(2) VERTICAL AND INCLINED BELTS. (a) If the guard is within 4 inches of a belt or pulley, it shall extend from the floor or platform level to a height of at least 6 feet. If the guard is within 15 inches but not within 4 inches of the belt or pulley it shall extend from the floor or platform level to a height of at least 5 feet except in each case as follows:

1. If any part of a pulley is more than 5 feet but less than 7 feet above the floor or platform level the guard shall extend to the top of the pulley, but need not exceed a height of 7 feet above the floor or platform level. See Fig. 2.

2. If the top of the pulley is not more than 5 feet above the floor, the guard need not extend above a point midway between the top of the pulley and a height of 5 feet, provided that in no case shall it extend less than 42 inches above the floor unless it covers the top as well as all sides of the belt and pulley, in which case there shall be no requirement as to height. See Fig. 4.

3. If it is an overhead belt, the guard may be a basket or box, suspended from above and extending across the bottom of the pulley and all around the pulley to a height of 6 feet, except where the top of the pulley exceeds such height when the guard shall extend to the top of the pulley but need not exceed 7 feet. See Fig. 5.

4. Where no pulley hazard is involved:

a. Vertical belts having a standard railing (See section Ind 1.02 (1)) placed not less than 15 inches or more than 20 inches from the belt, shall be considered sufficiently guarded. See Fig. 6.

b. For inclined belts the height of the guard or the distance of the guard or railing from the belt shall be such that the vertical clearance between the floor and the lower run of the belt at any point outside of the guard or railing, shall not be less than 6 feet 6 inches. See Fig. 7.

(3) HORIZONTAL BELTS. (a) Where both runs of the belt are within 7 feet of the floor or platform level, the guard shall extend at least 15 inches above the upper run or to a height of 7 feet above the floor. In no case shall the guard extend less than 42 inches above the floor; however, if it covers the top as well as sides of the belt and pulley, there shall be no requirement as to height. See Fig. 8.

(b) Where the upper run of the belt is more than 7 feet above floor or platform level and the lower run is within 7 feet of the floor, the pulleys shall be guarded on sides and outer face to a height of 7 feet above floor or platform level, and the belt guard between the two pulleys shall extend at least 15 inches above the lower run, but need not exceed a maximum of 7 feet and shall be a minimum of 42 inches above floor or platform level unless completely enclosed. Unless the guards extend across the inner face of each pulley to a height of 7 feet, the guard for the lower run of the belt shall be carried to the same height as the pulley guards at all points within 15 inches horizontally from the inner face of either pulley. See Fig. 9.

(c) Where pulleys are so located and of such dimensions as to permit passage between the upper and lower runs of the belt, the space between the pulleys shall be completely barred or shall be provided with a passageway guarded on the sides and top and bottom.

(d) Horizontal belts 6 inches or more in width, 7 feet or more above passageways and work places and used for transmitting power from a prime mover, including motors, to a line shaft or between two line shafts shall be guarded.

Note: See American Standards Association Bulletin, "Safety Code for Mechanical Power Transmission Apparatus" (B-15) for details of guard construction that will be acceptable.

(4) CONES, PULLEYS AND BELTS. (a) Cone pulley belts more than 2½ inches in width shall be equipped with mechanical belt shifters and all cone pulley belts shall be guarded to a point 3 inches above nipping point of belt and pulley and not less than 3 feet 6 inches from floor or platform where any part of the lower cone is less than 3 feet above floor or platform level. See Fig. 10.

(b) Where both upper and lower cones are within 7 feet of floor or platform level, as for example on some vertical drill presses and other machines and for which conditions are such that mechanical belt shifters are not required and none furnished, the belt and cone pulleys shall be guarded as specified in section Ind 1.04 (2) (a) 1, with a hinged self-closing section to permit shifting.

(c) All belts regardless of width shall be provided with belt shifters when joined together with: 1. Metallic fasteners or,

2. Any other fastener which by construction or wear will be a hazard.

(5) GENERAL INTERPRETATIONS. (a) Where belts are so located with reference to other equipment or to parts of buildings that they are guarded just as effectively as would be by standard guards as herein prescribed, no further guards shall be required.

(b) Where belts and other transmission apparatus are located in locked enclosure not used for manufacturing or storage purposes, and are inaccessible except when the machinery is not in motion, such locked enclosures will be accepted in lieu of other guarding.

(c) Belts which are within 18 inches horizontally from the vertical plane of the edges of any balcony or working platform shall be subject to the same requirements as if they were directly over such balconies or platforms.

Note: (a) See section Ind 1.02 for requirements as to construction of guards, enclosures or casings.

Note: (b) The following illustrations and descriptive matter are intended to be helpful in meeting the requirements for the guarding of belts and pulleys.

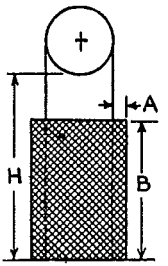


Fig. 2

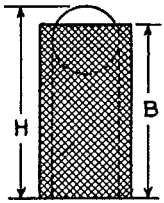


Fig. 3

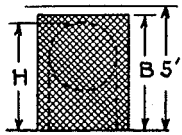


Fig. 4

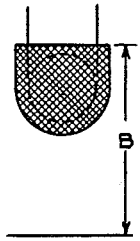


Fig. 5

Fig. 2. Where H is more than 7 feet and A is 4 inches or less, B shall be at least 6 feet. If A is within 15 inches but more than 4 inches, B shall be not less than 5 feet.

Fig. 3. Where H is more than 5 feet but less than 7 feet, B shall extend to the top of pulley but need not exceed 7 feet.

Fig. 4. If H does not exceed 5 feet then B shall be such that the top of guard is midway between the top of pulley and 5 feet, but B in no case to be less than 42 inches unless top as well as sides is covered, in which case there is no restriction as to height.

Fig. 5. B to extend to a height of 6 feet except if the top of the pulley is more than 6 feet, B shall extend to the top of the pulley but need not exceed 7 feet.

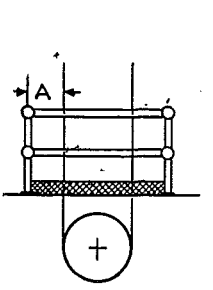


Fig. 6

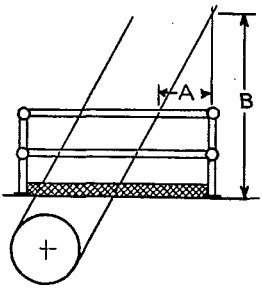


Fig. 7

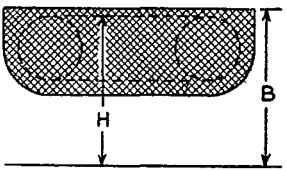


Fig. 8

Fig. 6 and Fig. 7 normally A to be between 15 inches and 20 inches but may exceed 20 inches in order to secure a distance of 6 feet, 6 inches for B.

Fig. 8. Where H does not exceed 7 feet, B to equal H plus 15 inches, but in no case need the sum of H plus 15 inches exceed 7 feet or shall it be less than 42 inches unless entirely enclosed.

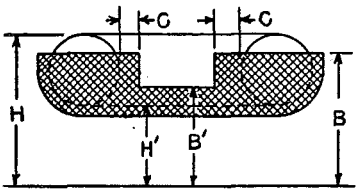


Fig. 9

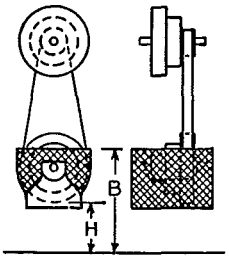


Fig. 10

Fig. 9 H exceeds 7 feet and H′ less than 7 feet. B to equal 7 feet. B′ to equal H′ plus 15 inches but in no case need B′ exceed 7 feet. If inner faces of pulleys are not enclosed C to equal 15 inches.

Fig. 10. Where H is less than 3 feet, B shall be such a height that it will be 3 inches above nipping point of belt and pulley and in no case less than 3 feet 6 inches.

Ind 1.05 Pulleys and sprockets. Every pulley without a belt and every sprocket without a chain, exposed to contact shall be guarded in accordance with the requirements of section Ind 1.02 (2).

Ind 1.06 Machine control. (1) Every machine shall be equipped with a loose pulley, clutch, switch, or other adequate means within reaching distance of the normal operating positions of the operator for the purpose of disconnecting the machine from the source of power.

(2) Machines on which two or more persons work shall be equipped with one or more controls so located that more than one of these persons can quickly disconnect the machine from the source of power.

(3) In each room where a line shaft drives machinery from a source of power located outside the room, means shall be provided to disconnect the power from the line shaft.

(4) Conveyor systems passing through more than one room shall be provided in each room, where exposed to contact, with means to disconnect the power.

Ind 1.07 Belt shifters. (1) Every set of tight and loose pulleys shall be equipped with a permanent belt shifter so located as to be within easy reach of the operator. The belt shifter shall be so constructed as to make it impossible for the belt to creep from the loose pulley to the tight pulley.

(2) Every belt shifter shall be equipped with an interlocking device which will prevent accidental shifting.

(3) Where overhead belt shifters are not located directly over a machine or bench, the handles shall be cut off 6 feet 6 inches above floor level.

Ind 1.08 Pulleys—location on shafts. (1) Every pulley near a shaft hanger, shaft bearing, or other fixed object shall be placed so as to allow a side clearance at least ½ inch greater than the width of the belt between the pulley and the nearest part of such shaft hanger, shaft bearing or other fixed object or a guard shall be placed adjacent to the pulley to prevent the belt from running off on the side next to the shaft hanger, shaft bearing, or other fixed object.

(2) Where pulleys must be closer together on the shaft than the width of the wider belt plus ½ inch, the pulleys shall be guarded so that the belt on either pulley cannot run off between the pulleys.

Ind 1.09 Clutches. (1) Every clutch exposed to contact shall be covered or enclosed in accordance with the requirements of section 1.02 (2).

(2) Every clutch shall be equipped with a device which will prevent accidental starting.

(3) Where an overhead clutch is not located directly over a machine or bench, the clutch lever shall be cut off 6 feet 6 inches above floor level.

Ind 1.10 Abrasive wheels, hoods and guards. (1) ABRASIVE WHEEL. An abrasive wheel is a power-driven wheel consisting of abrasive particles held together by artificial or natural, mineral, metal or organic bonds. Metal, wooden, cloth or paper wheels or disks having a layer or layers of abrasive on the surface are not included. Natural sandstones (quarried) are not included.

Note: Exhaust systems are required to comply with the requirement of the general orders on dusts, fumes, vapors and gases issued by the industrial commission.

(a) Every stationary abrasive wheel and those portables used in stationary positions shall be equipped with a guard of the hood type strong enough to withstand the shock of a bursting wheel.

(b) A hood type or band type guard strong enough to withstand the shock of a bursting wheel shall be used on every portable wheel where the operation and the nature of the work will permit.

(c) The spindle end, nut and flange projections, if any, shall be guarded.

(2) EXPOSURES PERMITTED. (a) *Bench and floor stands.* The maximum angular exposure of the grinding wheel periphery and sides for hoods used on machines known as bench and floor stands shall not

exceed 90 degrees or one-fourth of the periphery. This exposure to begin at a point not more than 65 degrees above the horizontal plane of the wheel spindle, except that wherever the nature of the work requires contact with the wheel below the horizontal plane of the spindle, the exposure shall not exceed 125 degrees. This exposure shall begin at a point not more than 60 degrees below the horizontal plane of the wheel spindle.

(b) *Cylindrical grinders.* The maximum angular exposure of the grinding wheel periphery and sides for hoods used on cylindrical grinding machines shall not exceed 180 degrees. This exposure shall begin at a point not more than 65 degrees above the horizontal plane of the wheel spindle.

(c) *Surface grinders and cutting machines.* The maximum angular exposure of grinding or cutting wheel periphery and sides for hoods used on surface grinding or cutting machines which employ the wheel periphery shall not exceed 150 degrees. This exposure shall begin at a point not less than 15 degrees below the horizontal plane of the wheel spindle.

(d) *Swing frame grinders.* The maximum angular exposure of the grinding wheel periphery and sides for hoods used on machines known as swing frame grinders shall not exceed 180 degrees, and the top half of the wheel shall be protected at all times.

(e) *Top grinding.* In operations where the work is ground on the top of the wheel, the exposure of the grinding wheel periphery shall be as small as practicable, with a maximum exposure of 60 degrees.

(f) *Portable grinders.* Guards shall be used on every portable wheel where the operation and nature of the work will permit.

(3) HOODS. Hoods for bench and floor grinders shall be constructed so that the peripheral protecting members can be adjusted to the constantly decreasing diameter of the wheel by means of an adjustable tongue or its equivalent, and proper angular protection specified in section Ind 1.10 (2) (a) above shall be maintained for the life of the wheel. The maximum distance between the wheel periphery and the tongue or end of peripheral band at top of opening shall not exceed ¼ inch.

(4) WORK RESTS. Where work rests are used they shall be rigid in construction and kept adjusted close to the wheel with a maximum distance of ⅛ inch to prevent the work from being caught between the wheel and rest; shall be securely clamped after each adjustment, and the working surface shall be kept in good condition.

(5) PERIPHERAL SPEED OF ABRASIVE WHEELS. Abrasive wheels shall not be run at greater peripheral speed than is recommended by the wheel manufacturers.

Exceptions: Section Ind 1.10 (1) (a) and (2) (f) shall not apply on wheels used for internal grinding while the wheel is actually performing work, nor to wheels 3 inches or less in diameter running at a peripheral speed not exceeding 3,000 feet per minute.

(6) FLANGES. All abrasive wheels with the following exceptions shall be mounted between suitable flanges; mounted wheels and

points; threaded wheels; inserted nut wheels; plate mounted wheels; cylinder, cup or segmental wheels that are mounted in chucks.

Note: For detailed specifications for hoods and flanges that will comply with the requirements of this order, see the American Standard Safety Code, entitled "The Use, Care and Protection of Abrasive Wheels", issued by the American Standards Association, 70 East 45th Street, New York 17, N. Y.

Ind 1.11 Fly wheels. (1) Every fly wheel exposed to contact within 6 feet of the floor or working platform shall be guarded in the same manner as belts, etc. in section Ind 1.04.

(2) Fly wheels located in engine rooms may be guarded by standard guard rails and toe boards, placed not less than 15 inches nor more than 20 inches away from the wheel.

Ind 1.12 Friction drives. The faces of every friction drive together with all openings and projections exposed to contact, shall be covered or enclosed in accordance with the requirements of section Ind 1.02 (2).

Ind 1.13 Gears. All gears shall be guarded in accordance with one of the following specifications: (1) A solid enclosure.

(2) Gears without spokes or holes in the web may be guarded by a band guard with flanges extending inward beyond the root of the teeth.

(3) Gears on presses or other machines, the tops of which extend more than 7 feet above the floor or platform level and on which it is not considered practicable to use an enclosure, need be guarded only to a height of 7 feet above the floor or platform level if the mesh point of the gears, regardless of height, is guarded.

Ind 1.14 Keys and keyseats. (1) Every projecting key in revolving shafting where exposed to contact, shall be cut off or enclosed.

(2) Every keyseat in revolving shafting, where exposed to contact, shall be filled or enclosed.

Exception: Keys and keyseats in shafting of machines where it is not possible to guard or fill the keyseats without interfering with the operation of the machinery.

Ind 1.15 Ladders. (1) DEFINITION. A ladder is an appliance usually consisting of two side rails joined at regular intervals by cross pieces called steps, rungs or cleats, on which a person may step in ascending or descending.

(2) GENERAL REQUIREMENTS. (a) All ladders shall be substantially constructed and so maintained.

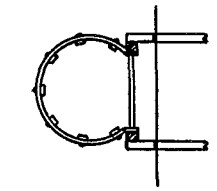
(b) Wood side rails shall be of sound straight grained spruce, or of other material which will give equivalent strength and resiliency.

(c) Wood treads and cleats shall be of material at least equivalent in strength to that required for side rails.

(d) Wood rungs shall be of oak, hickory or white ash.

(e) Treads, cleats and rungs shall have uniform size and a uniform spacing not exceeding 14 inches center to center.

Note: For all new ladders it is recommended that the spacing of treads, cleats and rungs should not exceed 12 inches center to center.



(f) No wood ladder shall be painted with an opaque pigment. If preservation is needed, a transparent oil or varnish shall be used.

(g) Metal parts or fittings of ladders shall be of mild steel, malleable cast iron, or their equivalent.

(3) FIXED LADDERS.

(a) Every fixed ladder shall be installed with a minimum clearance of 6 inches from the back of the rung to the nearest permanent object.

(b) A cage or basket guard shall be placed on permanent fixed ladders, with or without side rails, if of 20 feet or more in length, and on fixed ladders 12 feet or more in length if the top of the ladder is 20 feet or more above the level to which a person might fall.

Exception: This requirement shall not apply to mine ladders, or to smoke stack ladders, the bottom of which terminates 10 feet or more above the ground, or to ladders used exclusively for fire purposes.

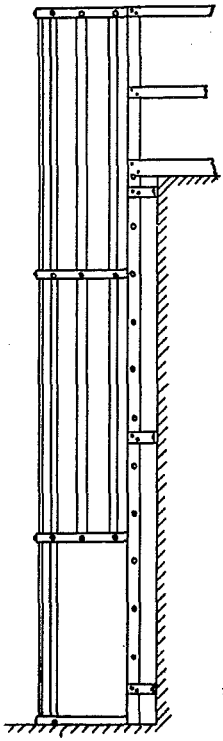


Fig. 11

1. Fixed ladders making an angle of not exceeding 75 degrees with the horizontal need not be provided with cages. All fixed inclined ladders making an angle of less than 75 degrees with the horizontal shall be equipped with handrails 30 to 36 inches high on both sides, measured vertically from the top of the rung or tread, where consisting of 4 or more rungs or treads.

(c) The cage shall extend from the top of the ladder to a point 7 feet above the base with the bottom flared 4 inches, or the portion of the cage opposite the ladder shall be carried to the base.

(d) The cage shall be substantially built and securely fastened to the ladder, and shall be not less than 24 inches in width.

Note 1: Fig. 11 shows a typical cage arrangement.
Note 2: The following statement as to construction details for a cage that will comply with this order is given for the convenience of those who may require the information:

(e) Material to be of open hearth steel or wrought iron conforming to the requirements of Ind 53.24 and Ind 53.26, respectively, of the building code.

(f) The vertical members to consist of not less than 5 bars of ¼" x 1½" minimum dimensions.

(g) When hoops or rings are spaced not more than 4 feet on centers, the material shall be ¼" x 2" minimum dimensions. If the hoop spacing is increased, the dimensions of all bars are to be increased in proportion.

(h) The component members of the cage are to be securely fastened together. If bolts are used, the heads are to be placed on the inside. The order requires that the cage shall be securely fastened

to the ladder; before doing so, however, an investigation of the ladder and its supports will need to be made to determine whether or not they are capable of supporting the additional dead load of the cage in addition to the necessary live load.

(4) PORTABLE LADDERS. All non-self supporting portable ladders shall be equipped with adequately maintained non-slip bases reasonably effective to prevent slipping. However, where conditions of use are such that non-slip bases are not reasonably effective to prevent slipping, additional precautions, such as lashing, blocking or holding the ladder shall be provided.

(5) STEP LADDERS. (a) A step ladder is a ladder having rungs or flat treads and so constructed and used as to be self-supporting.

(b) Step ladders shall be built in accordance with the general requirements of section Ind 1.15 (2).

(c) An attendant shall hold the step ladder when it is in use if the ladder is more than 10 feet in height, unless it is securely lashed or blocked.

(d) The use of a step ladder more than 20 feet in height is not permitted.

(e) A spreader with an automatic locking device to hold the front and back securely in the open position shall be a component part of each step ladder.

Ind 1.16 Passageways and working spaces. (1) Adequate passageways and gangways shall be provided.

(2) Adequate working space shall be provided for the safe operation of every machine, and such working space shall not be obstructed, either by storing or piling material or other objects.

(3) In so far as the nature of the work will reasonably permit, floors, passageways, gangways and areas around machines shall be reasonably even, kept in good repair, free from obstructions over which persons may trip, and means provided to furnish secure footing.

Ind 1.17 Elevated walks, runways and platforms. (1) Every elevated walk, runway, platform or other surface on which employees work shall be substantially constructed and so maintained, and so far as the nature of the work will reasonably permit, kept free from obstructions or substances over which or on which persons may stumble, slip or fall.

(2) In all other cases where a slipping hazard exists, a non-slip surface or other effective means to prevent slipping, where the nature of the work will reasonably permit, shall be provided.

(3) Every platform, or other surface on which employees work, more than 24 inches in height shall be equipped with standard guard rails and toe boards unless guarded by location.

Exception: Guard rails and toe boards will not be required on the loading or unloading sides of shipping platforms with the exception of lumber yard platforms where guard rails only will be required. However, it is recommended that protection be furnished in all cases wherever possible.

(4) Every permanent elevated platform shall be provided with one of the following means of access:

(a) A stairway, the steps of which shall have a uniform rise of not more than 8 inches, a uniform tread of not less than 9 inches and

equipped with handrails and maintained in accordance with section Ind 1.22.

(b) A fixed vertical ladder, the side rails of which extend at least 42 inches above the platform.

(c) A fixed inclined ladder equipped with handrails on both sides and from 30 inches to 36 inches high measured vertically from the nose of the tread.

Exception: This order does not include platforms supporting single units of equipment which receive no attention other than oiling or repairs, nor does it include platforms used exclusively in connection with such equipment as steam traps and sprinkler valves. However, it is recommended that permanent ladders or stairways be used wherever possible.

Ind 1.18 Scaffolds or platforms for the installation, operation, maintenance or changing of occupancy equipment. (1) Where employees are required or permitted to work in elevated places, scaffolds or platforms shall be provided, except that ladders may be used if the work to be performed is of a transitory nature and extent, but only then if ladders can be used with a reasonable degree of safety.

(2) Scaffolds where used shall comply with the scaffold requirements of the general orders on safety in construction.

(3) Platforms where used shall comply with section Ind 1.17.

Note: For equipment other than occupancy equipment, see general orders on safety in construction.

Ind 1.19 Set screws. Every projecting set screw in moving parts, where exposed to contact, shall be guarded.

Ind 1.20 Shafting. (1) All exposed parts of transmission shafting shall be protected by a stationary casing enclosing shafting completely. Horizontal shafting may be guarded by a trough enclosing sides and top or sides and bottom of the shafting and extending at least 2 inches below or above the shafting as location requires.

Exception: Shafting more than 7 feet above the floor, oiling runway or other working level, need not be guarded provided the shafting ceases to revolve before any work of a character which would expose any person to contact with such shaft is permitted.

(2) Shafting under bench machines shall be enclosed by a stationary casing, expanded metal or wire mesh paneling or by a trough at sides and top, or sides and bottom, as location requires. The sides of the trough shall come within 6 inches of the underside of the table, or if the shafting is located near floor, within 6 inches of floor. In every case the sides of trough shall extend at least 2 inches above or below the shafting as the case may be. For specifications of material see section Ind 1.02 (2).

(3) Revolving shafting and spindles forming part of and integral with individual machines where such part is exposed to contact, shall be guarded as much as the functions of the machine will permit.

(4) Projecting shaft ends shall present a smooth edge and end and shall not project more than one-half the diameter of the shaft unless guarded by non-rotating caps or safety sleeves.

Ind 1.21 Projecting parts on shafts. Every projecting part on a revolving shaft such as a collar, clamp, pin, coupling, oiling device, etc., where exposed to contact, (which shall include exposure while oiling machinery in motion), shall be guarded.

Ind 1.22 Stairways or steps. (1) Stairways or steps not required as exits by the Wisconsin state building code shall have a uniform rise of not more than 8 inches and a uniform tread of not less than 9 inches.

(2) Every stairway or steps of four or more risers shall be equipped with a substantial smooth handrail from 30 inches to 36 inches high, measured vertically from the nose of the tread and placed on the left hand side as one mounts the stairs and on the open side, if any. If 5 feet or more in width, or open on both sides, they shall have a handrail on each side.

Exception: Portable steps used in connection with erection or other shop operations shall have a uniform rise and tread, but not necessarily that specified above, and need have a rail on one side only.

(3) Interior stairways or steps which are more than 8 feet wide shall be divided by center rails into widths of not more than 8 feet nor less than 3 feet 8 inches.

(4) Exterior stairways or steps shall have a handrail at each side and if the stairway or steps is more than 50 feet wide, one or more intermediate handrails shall be provided.

(5) Railings on open sides of stairways or steps shall be provided with an intermediate member at mid-height, or with vertical members having a maximum spacing of 11 inches or its equivalent in safety.

Note: Section Ind 51.16 of building code for stairways as required exits.

(6) Every stairway or steps shall be maintained in good repair, free from protruding bolts, screws, nails, etc., unnecessary material, dirt and slippery conditions. Treads shall be renewed when the surface, including the nosing, shows wear to the extent of one-half inch or more.

(7) Stairways shall not be used for storage purposes, and any equipment shall be so located that its presence or use will not unnecessarily obstruct or interfere with free passage.

(8) All metal treads shall have a surface which will reasonably prevent slipping.

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Ind 1.23 Swinging doors—windows. Every door swinging both ways in a stairway or in a general passageway shall be equipped with a window. The windows shall be kept free from dust or other obstruction to the vision. One window shall be provided for each section of double swinging doors. Adequate artificial light shall be provided on each side of every such door and shall be used whenever the natural light is not equal to the requirements of the industrial lighting code. The area of window shall not be less than 200 square inches. Guards shall be placed over the window to protect the glass from being broken by protruding parts on trucks, etc.

Ind 1.24 Revolving, oscillating or reciprocating parts of engines and other machines. (1) Cranks or crank discs, crank shafts and connecting rods, where exposed to contact, shall be guarded.

(2) Eccentrics and cams, where exposed to contact, shall be guarded.

(3) Machine parts having a reciprocating or oscillating motion such that a shearing or crushing hazard is created, shall be guarded.

(4) Any moving part of a machine which at any time leaves a space of less than 18 inches between it and any fixed object not a part

of the machine, or between it and a moving or stationary part of any other machine, shall be guarded.

Ind 1.25 Oiling devices. (1) All machines lubricated while in motion and having lubricating devices so located as to make it hazardous to reach them shall be equipped with an automatic oiling device or some equally efficient means to protect the oiler.

(2) Machines shut down for oiling or maintenance shall be so marked, locked or otherwise protected so as to prevent starting the machine while such work is in progress.

Ind 1.26 Drop hammers. (1) Every drop hammer, the operation of which requires the hands to be placed between the dies, shall be provided with a positive stop that will prevent the descent of the hammer until the operator's hands are withdrawn.

(2) A shield or screen shall be provided for every drop hammer except where guarded by location when the operation is such that sparks or scales are liable to be thrown off.

(3) On every board drop hammer a substantial guard shall be provided around the board above the roll to prevent the board falling in case the board breaks or comes loose from the ram.

Ind 1.27 Machines for shearing or cutting—knives guarded. (1) The knife or knives of each machine used for shearing or cutting material of any kind shall be guarded.

(2) Machines that are set in motion by a two-hand tripping device will comply with this order provided the design and construction of the two-hand device is such that the employee cannot place his hands in the path of the descending knife after tripping the machine.

Ind 1.28 Presses—guards. (1) Protection from the dies of every press, except hot-metal presses, shall be provided by means of the following:

(a) Complete enclosure, or,
(b) Full automatic feed, or,
(c) Semi-automatic feed with ram enclosure, or,
(d) Limited opening (⅜") between dies.

(2) The maximum width of opening in the enclosure or between the enclosure and working surface shall be not greater than shown in the following table:

Distance of Opening from Nip Point (Inches)	Maximum Width of Opening (Inches)
0 to 2½	⅜
2½ to 3½	½
3½ to 5½	⅝
5½ to 6½	¾
6½ to 7½	⅞
7½ to 8½	1¼

(3) Only in case none of the methods in section Ind 1.28 (1) above can be applied, then a device which will reasonably prevent injury by contact with the dies shall be installed as follows:

(a) A two-hand tripping device for each person engaged in the operation of a single press, so designed and arranged as to prevent

tying, wedging or otherwise securing one handle or button and operating the press with one hand only, or,

(b) An interlocking gate guard operated by the tripping device of the press, which interposes a barrier on the front and sides of the ram before the plunger descends and will not permit the press to operate until the hand or hands of the operator have been removed from the danger zone, or,

(c) A sweep or gate guard with the sweep arm, or gate interconnected to the ram and so designed and constructed as to sweep the hands of the operator from the die zone as the ram descends; with each single sweep arm provided with a flag or barrier attached thereto so that the operator cannot reach behind the sweep; or,

(d) A pull-out protective device attached to the operator's hands or arms and connected to the ram, or outer slide of the press in such a way that the operator's hands or fingers will be withdrawn from the danger zone as the ram or outer slide descends; and designed so that where the open distance between the top of the work and the lower extremity of the punch is less than 2 inches that the multiplying action of this guard shall be such that the hands will be withdrawn a safe distance from the nip point during the first quarter of the stroke, or,

(e) Any other device approved in writing by the industrial commission previous to use as providing equivalent protection.

(4) Special hand tools shall be accepted only as an accessory to the guards listed herein and not as a substitute for any guard.

(5) Guards which are attached to the ram and which move downward so that the operator's hand or fingers may be caught between the gate and lower die shall not be used.

(6) Where the speed of the ram is so slow that the operator might beat the ram on the down stroke after the press has been tripped, no device shall be used which permits the insertion of the hands until the completion of the downward stroke without stopping the ram.

(7) Every hand-fed power press shall be equipped with,

(a) An arrangement which disconnects the treadle or hand-operated lever from the clutch mechanism after each stroke, or,

(b) A device that will, within its own action, automatically lock the clutch mechanism into place so that the press cannot make a second stroke until the treadle or hand-lever is again pressed to its lowest position, or,

(c) By some other method which will accomplish the results outlined above; unless the danger zone protection is such that the guard remains in its protective position during the second stroke of the press.

Ind 1.29 Platen presses. (1) Platen presses with or without mechanical power shall be provided with one of the following:

(a) An automatic feed which does not require the operator's hands to be placed between the platen and bed, or an automatic stop which will prevent the platen from closing if the hand or hands of the operator are caught between the platen and the bed, or,

(b) A guard, gate or sweep motion, which will throw the operator's hands out of the way as the press closes. If, of the type which lifts the hands out of the danger zone, the guard shall rise at least

4 inches above the platen as the press closes and shall descend by gravity or by mechanical means. The guard shall be arranged so that it will prevent a shear between the guard and the top of the platen, or,

(c) Any other device that will prevent the platen from fully closing before the operator's hands are removed from between the platen and the bed.

Ind 1.30 Tripping devices. Every machine set in motion by a tripping device shall be guarded against accidental tripping by means of a guard over the tripping pedal or bar, or a treadle that will automatically lock shall be used.

Ind 1.31 Revolving stock. All revolving stock projecting from machines shall be guarded by pipe enclosure or other means to prevent contact with the stock.

Note: It is desirable to reduce to the minimum the noise incident to the operation of these machines, especially where there are a number placed close to each other.

Ind 1.32 Fans. The blades of every fan when exposed to contact, shall be guarded in accordance with section Ind 1.02 (2).

Exception: Fans more than 7 feet above the floor or working level need not be guarded providing the blades cease to revolve before any work of a character which would expose any person to contact with such fan is permitted.

Note: This order also applies to the ordinary office fan.

Ind 1.33 Revolving drums and cylinders. (1) Revolving barrels, drums or other containers, where exposed to contact, shall be guarded by an enclosure or standard guard rail in accordance with the specifications given in section Ind 1.02.

Exception: For butter churns a single rail located approximately 6 inches from the churn may be used.

(2) Tanning drums, where exposed to contact, shall be guarded by an enclosure built in accordance with the specifications of section Ind 1.02 (2), to a height of 6 feet.

(3) Every drum or other revolving container, which must be loaded or unloaded shall be equipped with a brake or lock which will enable the operator to lock the drum while loading or unloading it.

Ind 1.34 Counterweights, tension weights and springs. (1) Every counterweight, where exposed to contact, shall be enclosed or be equipped with a safety chain that will prevent the weight from falling to a distance of less than 7 feet from the floor or working level.

(2) Every tension weight exposed to contact, shall be enclosed or securely fastened to the tension bar.

(3) All springs shall be guarded or otherwise equipped to eliminate any hazard due to breakage of spring or failure of the mounting.

Ind 1.35 Overhead trolleys and monorail cranes. (1) Every overhead trolley and every monorail crane operating with a load on a horizontal track, or on a track having a slope less than 15°, shall be constructed and maintained so as to prevent its leaving the track.

(2) Where trolleys are operated without a load, and in all cases where the slope of the track is 15° or more, a guard rail shall be

installed which will prevent the trolley from falling if it leaves the track.

(3) In all installations, a safety stop shall be provided and maintained at all switches and at the ends of all rails to prevent the trolley from leaving the rail at such points.

Note: No guard rail is required on overhead trolley tracks operating with a load on the trolley unless the slope of the track is 15° or more.

Ind 1.36 Valves, access to. Where a valve in daily use is located higher than ten feet above the floor, a platform equipped as required in section Ind 1.17 shall be provided.

Exception: Valves which are operated from the floor by means of chains or other such long range control devices.

Ind 1.37 Cranes. (1) SCOPE. The requirements of sections Ind 1.37 to 1.41, inclusive, and section Ind 1.43 shall apply to power-driven overhead traveling cranes, storage bridges, gantry cranes, and portal cranes, and modifications of these types which retain their fundamental features.

(2) BUFFERS, BUMPERS, FENDERS AND GUARDS. (a) A bumper shall be provided at each end of the trolley travel. It shall be fastened to the bridge girder, or, if the rail is prevented from sliding lengthwise, it may be fastened to the rail. A bumper engaging the tread of the wheel shall be of a height at least equal to the radius of the wheel. Bumpers engaging other parts of the crane are acceptable. If there is more than one trolley on the same bridge, girders, buffers or cushioning devices shall be placed between the trolleys.

(b) If there is more than one crane on the same runway, buffers or cushioning devices shall be placed between the cranes, at both ends of the bridges.

(c) Bridge trucks and trolley trucks shall be equipped with fenders which extend below the top of the rail and project in front of the truck wheels.

(3) BRAKES. (a) Each independent hoisting unit of a crane shall be equipped with two braking means except worm-geared hoists, the angle of whose worm is such as to prevent the load from accelerating in the lowering direction.

(b) One brake shall be applied directly to the motor shaft or some part of the reducing gear, and may be either electrically operated, or mechanical. The other brake may be either mechanical or electrical. If mechanical it shall lock the load when hoisting is stopped, and shall also control the speed during lowering so as to prevent undue acceleration. Electric dynamic braking for direct-current and electric braking for alternating-current hoists may be used to control the lowering speed.

(c) Each brake shall be capable of sustaining one and one-half times the rated load.

(d) Worm-geared hoists referred to in this order shall have at least one electrically operated or mechanical brake.

(e) On cage-operated cranes with the cage mounted on the bridge girders, a foot brake to properly retard and stop the motion of the bridge shall be installed. Brakes for retarding the motion of the bridge shall be capable of retarding at the rate of one foot per second while full load is being carried.

(4) LUBRICATION. Lubricating devices shall be arranged so that they can be reached without danger to the oiler while the crane is not in operation. They shall also be arranged so that it is not necessary to remove any guards or other parts for lubrication purposes.

Ind 1.38 Crane footwalks. (1) If sufficient headroom is available on cage-operated cranes, a footwalk shall be provided on the drive side along the entire length of the bridge of all cranes having the trolley running on the tops of the girders. To give sufficient access to the opposite side of the trolley, there shall be provided either a footwalk mounted on the trolley, a footwalk or platform in the building, or a footwalk on the opposite side of the crane at least twice the length of the trolley.

(2) If possible, footwalks shall be located so as to give a headroom of not less than 78 inches. Otherwise a headroom of not less than 48 inches may be used.

(If it is not possible to provide a headroom of 48 inches or more, footwalks shall be omitted from the crane, and a stationary platform built at the edge of the runway to be used by workmen when making repairs, or else a landing stage built alongside the crane when repair work is done.

(3) Footwalks shall be not less than 18 inches in clear width and the inner edge shall extend at least to the line of the outside edge of the lower cover plate or flange of the girder. They shall be provided with standard guard rails and toe boards complying with the requirements of section Ind 1.02(1).

(4) When footwalks are required on both sides of the bridge, provision shall be made for a passage between them at the end of the bridge, or by means of a platform in the building adjacent to and outside of the crane runway.

Ind 1.39 Electrically operated traveling cranes—electrical equipment. (1) ALL EQUIPMENT. All electrical equipment shall comply with the requirements of the Wisconsin state electrical code.

(2) SWITCHES. (a) A main switch shall be installed in the cage of every electrically operated traveling crane for disconnecting the power supply to the crane and shall be so placed as to be readily accessible to the operator. This switch shall be completely enclosed, externally operated, and provided with padlocking facilities so that the operators or others working on the crane will be protected, and shall have provision for locking in the open position.

(b) The runway trolley wires shall be controlled by a switch or circuit breaker, accessible from the floor, arranged to be locked in the open position.

(c) The hoisting motion of all electric overhead traveling cranes and overhead electric hoists shall be provided with an over-travel limit switch in the hoisting direction.

(3) TROLLEY CONDUCTORS. Trolley conductors shall be so located or so guarded that persons entering or leaving the cage are not likely to come into contact with them.

Ind 1.40 Cranes—stairways. (1) Every overhead traveling crane operated from a cage shall be provided with a stairway or permanently and immovably fixed ladder between the cage and the crane footwalk, and between the cage and the floor.

(2) Stairways shall be equipped with rigid and substantial metal handrails as required in section Ind 1.22, and shall be at an angle of not more than 50 degrees with the horizontal.

Ind 1.41 Crane cages—enclosures. (1) The cage floor of every indoor overhead traveling crane shall be solid except that grating with openings not exceeding ½ inch in width may be provided where necessary for vision.

(2) The sides of the cage of every indoor overhead traveling crane shall be enclosed as follows:

(a) Solid to a height of 42 inches, or,

(b) With not less than No. 10 wire screen with mesh openings not greater than 3 inches, to a height of 42 inches, with toe board, or,

(c) With a standard guard rail and toe board.

(3) The cage of every outdoor traveling crane shall be fully enclosed with windows on three sides of the cage. The windows shall give ample vision for operators and may be fixed at the front and back but shall have the side windows arranged to open. The door shall swing inward or shall slide, and shall be arranged to close automatically. A temperature reasonably comfortable for the operator shall be maintained in cold weather.

Ind 1.42 Hoists. (1) LIMIT SWITCHES. Each overhead electric or air operated hoist motor shall be equipped with an effective limit switch so placed and arranged as to disconnect the motor and apply the brake in time to stop the motor before the hook passes the highest point of safe travel.

(2) BRAKES. (a) Each electric or air operated hoist motor shall be provided with an electrically or mechanically operated brake so arranged that the brake will be applied when the power is cut off from the hoist. This brake shall have sufficient holding torque to sustain not less than 1½ times the rated load.

(b) The hoisting drum of all hand power hoists shall be equipped with an effective brake, and shall be provided with a ratchet and pawl of sufficient strength to hold the load in any position.

(3) CAPACITY MARKING. The rated load of each hoist, in pounds or tons, shall be legibly marked on the hoist or load block.

(4) CONTROL EQUIPMENT. Operating controls shall be marked to indicate the resultant direction of travel.

Ind 1.43 Cables, ropes and chains. (1) Chains, ropes, cables, hooks, rings, slings, and other devices and accessories used for hoisting and lifting shall not be subjected to greater working loads than recommended by their manufacturers.

(2) They shall be frequently inspected and shall be renewed when inspection reveals unsafe conditions.

(3) Bolts or nails shall not be used to connect, splice or shorten chains. Knots shall not be tied in the chain.

(4) A hoist cable shall be considered unsafe and shall be renewed when because of broken wires, wear, rust, undue strain, or other cause the strength of the cable becomes reduced 25 per cent. Hoist cables will be considered unsafe when upon inspection 10 per cent or more of the total number of wires are broken in a length equal to eight diameters of the cable.

Note: Crane hoist cables should be lubricated and inspected at frequent intervals. Proper lubrication adds much to their durability.

Ind 1.44 Eye protection. (1) Eye protection shall be provided where persons are exposed to any hazard which may reasonably be expected to cause injury to the eyes.

Such hazards are:

(a) Relatively large flying particles.

Note: There are many operations and processes where this hazard occurs. Some of these are chipping, calking, coarse grinding, some riveting operations and sledging in quarries.

(b) Dust and small flying particles.

Note: There are many operations and processes where this hazard occurs. Some of these are scaling, light grinding, stone dressing, spot welding and some woodworking and metal working operations.

(c) Splashing metal.

Note: There are many operations and processes where this hazard occurs. Some of these are babbitting, casting of hot metal and dipping in hot metal baths.

(d) Injurious gases, fumes and liquids.

Note: There are many operations and processes where this hazard occurs. Some of these are encountered in the handling of acids and caustics.

(e) Injurious radiant energy.

Note: There are many operations and processes where this hazard occurs. Some of these are electric arc welding, oxyacetylene and oxyhydrogen welding and cutting, furnace tending and irradiation with ultra violet light.

(2) The eye protection for the various operations shall be individual goggles, the face of which shall be of a material complying with the mechanical and optical requirements listed below and shall be used as provided for in this section.

(a) The face piece or lens shall be of a quality as free as possible from air bubbles, opalescence, waves, or other injurious defects or flaws. Except where ground to provide proper optical correction for defective vision, the front and rear surfaces shall be smooth and parallel within 9 minutes of arc (⅛ prism diopter). It shall not be negative in refractive power in any meridian, shall not have a positive refractive power in any meridian greater than 0.12 diopter, and shall not have a greater difference in refractive power between any two meridians than 0.06 diopter. All face pieces or lenses shall be of slow-burning material.

(b) Face pieces or lenses shall transmit not less than 85 per cent of the incident visible light, except for the protection required for injurious radiant energy.

(c) The dimensions of any individual face piece or lens shall be not less than 1.5 inches (38 mm.) in the vertical direction and 1.75 inches (44.5 mm.) in one horizontal direction.

(3) Eye protection against hazards listed under section Ind 1.44 (1) (a), (b), (c) and (d) shall meet the following drop and penetration test requirements:

(a) A spherical steel ball, 44 grams in weight, approximately ⅞ inches in diameter, shall be dropped from a height of 55 inches on the center of the horizontal outer surface of the lens or face piece. This test to be made on the assembled goggle as ready for use. If one out of 6 lenses or face pieces is fractured in this test, 4 more shall be tested, and if any one of these is fractured the lot shall be rejected.

(b) A dart weighing 44 grams and provided with needle point shall be dropped from a height of 55 inches at varying temperatures of 0, 75 and 125 degrees Fahrenheit on the horizontal outer surface

of the material to be tested. All materials showing a protrusion of the point of the needle of more than ⅛ inch shall be rejected.

(4) Eye protection against hazards listed under section Ind 1.44 (c) and (d) shall have a minimum thickness of 0.05 inches.

(5) Side shields shall be made of material of suitable durability for the protection required. No quick-burning material shall be used. The material shall be sufficiently pliable to permit adjusting the shield to the contour of the face. The edges coming in contact with the face shall be finished in a manner to prevent irritating or cutting the skin. Adequate ventilation shall be provided. All side shields shall be required to withstand the same impact test as required for face pieces or lenses, but shall not be subject to the penetration test.

(6) The term "goggles" as used herein shall mean an optical device worn before the eyes, the predominant function of which is to protect the eyes.

(7) Goggles shall be designated according to type as follows:

Type 1. One that provides protection mainly from the front.

Type 2. One that provides protection from the front and sides, but does not form a complete seal with the face.

Type 3. One that provides complete protection and forms a seal with the face for its entire periphery.

For both Types 2 and 3 the maximum permissible openings in the goggles shall be 1/25 of an inch in diameter.

(a) For hazards listed under section Ind 1.44 (1) (a), (b) and (c) above, goggles of Types 2 and 3 may be used, except that for some metal and woodworking operations such as boring, cutting and sawing, Type 1 goggles will be acceptable.

(b) For hazards listed under section Ind 1.44 (1) (d) above, goggles of Type 3 shall be used.

(c) For hazards listed under E section Ind 1.44 (1) (e) above, goggles of Types 1, 2 or 3 with lenses of hardened glass of proper density appropriate for the particular operation may be used.

Note: For recommended shades of lenses see federal specifications for welders' goggles and welders' helmets.

(8) All eye protection devices shall be properly fitted, maintained in a sanitary and serviceable condition, and shall be replaced when they become warped, scratched or pitted so as to impair the vision of the user.

(9) Employees whose vision requires the use of corrective lenses and who are required by this order to wear protective goggles, shall be provided with goggles of one of the following types:

(a) Goggles whose lenses provide the proper optical correction and withstand the drop and penetration tests specified in this order. Such lenses are exempted from the requirements for parallelism of surfaces.

(b) Goggles which can be worn over personal corrective lenses without disturbing the adjustment of the lenses.

(10) The employer is not required to bear the expense of obtaining the prescription for protective corrective lenses of goggles.

Ind 1.45 Corner staying machines. The pressure head of every machine, such as is used to fasten the corners of cardboard boxes

shall be provided with a positive stop device, that will prevent the dies from closing until the operator's hands are removed from between the dies.

Ind 1.46 Machines with revolving cylinders in leather industries. Machines with revolving cylinders used for surfacing hides and leather shall be guarded.

Note: In guarding shaving machine cylinders, a band guard should extend over the ends of the cylinder blades and a rod (finger grip) guard should be placed above the opening of the machine.

Ind 1.47 Jacks in leather industries. Jacks used for glazing, rolling, pebbling, and setting out shall be guarded.

Ind 1.48 Setting out machines. All setting out leather machines shall be equipped with a tripping bar across the feeding sides of the machine, or other equally effective device, so arranged that upon being actuated, it will stop the machine quickly.

Ind 1.49 Rolls, wheels and brushes. (1) Rolls, wheels, brushes and other revolving parts of machines not otherwise specifically covered elsewhere in these orders, when revolving in such a way with respect to other parts as to create a hazard, shall be guarded or equipped with a device to prevent injury.

Note: The most effective method of accomplishing this is by means of an enclosure.

(a) A feed table, where used, will be acceptable as a guard, provided it is of sufficient width from front to rear and equipped with side protection, so as to prevent a person's hands from entering the danger zone.

(2) Vertical feed rolls shall be guarded on the sides, front (in-feed) and open ends by an enclosure. The enclosure for the front and open sides shall extend to within one-half inch of the plane formed by the working edge of each roll.

(3) Horizontal feed rolls shall be enclosed by a cover over the top, front (in-feed) and open ends. The lower edge of the cover shall come down to a point one-half inch above the plane level with the bottom edge of the roll.

(4) In the case of rolls where it is impracticable to install fixed guards, a positive quick stopping device shall be provided.

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Ind 1.50 Excavations. (1) All excavations when so located that persons may accidentally fall into them shall be guarded by adequate barriers not less than 36 inches in height and in addition shall be marked with torches or red lights at night.

(2) The walls of all excavations in which persons are required or permitted to work shall be sloped or shored in accordance with the requirements for trenches given in section Ind 6.10 of the general orders on tunnel, caisson and trench construction.

Definition: Excavation, for the purpose of this order, is an open cut in the surface of the ground.

Ind 1.51 Vats, tanks and hoppers. (1) Open tops of vats, tanks and hoppers, the tops of which are less than 36 inches above the floor or platform level, shall be covered or protected by railings, the tops of which shall be at least 36 inches above the floor or platform and otherwise constructed in accordance with section Ind 1.02 (1), ex-

cept that in tannery beam houses only vats in which operations are not being actively conducted by workers need be guarded. Working surfaces on vats shall be level and at least 30 inches wide.

(2) Before any person is permitted to enter an open or closed vat, tank or hopper used for the handling or storage of liquids, compounds or other contents, the chemical elements of which cause the formation of toxic fumes, vapors or gases, the vat, tank or hopper shall have its liquid contents drained off and the drain outlet left wide open. Any person entering such a vat, tank or hopper shall be provided with and wear an air-supplied mask or respirator, or its equivalent, and shall also be supplied with and wear a safety belt and life line. An attendant shall be furnished for each individual entering such container, whose duty shall be to control the other end of the life line in order to offer aid in case of emergency.

(3) Before repairing tanks or containers used for explosive liquids or substances, all gases shall be exhausted and all sediment removed. Non-sparking tools shall be used.

(4) Storage vats, tanks and hoppers containing material likely to jam or form a crust shall be equipped with one of the following methods:

(a) A substantial platform surrounding the top edge or built over the top to enable the operator to manipulate the pricker bar with safety, or

(b) A drop weight device shall be provided to be manipulated from the outside of the vat, tank or hopper.

Note: See section Ind 20.07, 20.13 general orders on dusts, fumes, vapors and gases.

Ind 1.52 Pits, openings in floors, etc. Pits, manholes and openings in floors, platforms and sidewalks shall be guarded. If a trap door is used, the door and hinges shall be flush with the floor and the door shall have a rough and non-slip surface.

Ind 1.53 Window cleaning. (1) For protection of window cleaners in public buildings and places of employment, the tops of windows which are more than 20 feet above the ground floor, flat roof, balcony or permanent platform shall be equipped with means to protect such cleaners; such means shall consist of:

(a) Approved attachments for window cleaners' safety belts, to which such belts may be fastened at each end. Said attachments shall be permanent devices that shall be firmly attached to the window frame, or to the building proper, and so designed that a standard safety belt may be attached thereto; or

(b) An approved portable platform that is projected through the window or supported from the ground, floor, roof or platform level, for the window cleaner to stand upon and that is designed, constructed, maintained and equipped with handrail and toe board in compliance with the requirements of the general orders on safety and of the general orders on safety in construction; or

(c) A swinging scaffold or chair scaffold designed, constructed, equipped and maintained in compliance with the requirements of the general orders on safety in construction, and in the case of a chair scaffold equipped with a safety belt; or

(d) Other equally efficient devices.

(2) For cleaning the insides of skylights (the highest parts of which are more than 20 feet above ground, floor, balcony or permanent platform, to which access cannot be gained by any of the means described in section Ind 1.53 (1), scaffolds as specified in section Ind 1.18 shall be provided.

(3) All equipment, including building parts and attachments, used in connection with window cleaning shall be maintained in reasonably safe condition while in use and shall be inspected at least once each month while in use, and within thirty days before their use.

(4) Every employer of window cleaners who are required or permitted to clean windows or skylights referred to in section Ind 1.53 (1) and (2) shall, before permitting any of such work, make reasonable inspection of the equipment provided for the safety of the window cleaners; and if no such equipment, complying with the provisions of this order, is provided by the owner, lessee or occupant of the building or place of employment, said employer shall provide the same before permitting his employees to do such work. Where the attachments specified in section Ind 1.53 (1) (a) are relied upon for compliance with the provisions of this order, said employer shall furnish or see that there is provided, on each job, for the use of his employees, a sufficient number of approved safety belts in good condition for one to be available for each employee while cleaning windows, and he shall inspect them as provided in section Ind 1.53 (3), and ascertain that they may be fastened to the permanent devices. Every such employer shall take reasonable measures to assure that each window cleaner uses the safety equipment provided at all times while cleaning such windows or skylights.

Note: It will be the policy of the industrial commission to accept anchors and safety belts which have been tested and approved by the Underwriters' Laboratories. 9 Wis (2d) 217 Singleton v. Wagner

Ind 1.54 Doorways near railway tracks and driveways. (1) When a doorway or corner of a building is located near a railway, trolley track or driveway, so that a person is likely to walk into the path of any moving vehicle, a barrier shall be installed as follows:

(a) A swinging barrier located at the door opening or corner, extending across the doorway or from the corner, or,

(b) A fixed barrier situated outside the building parallel to the door opening and approximately 36 inches away from it, or,

(c) A fixed barrier situated at the corner parallel to the tracks or driveway and extending for a distance of not less than 6 feet outward from the corner, or,

(d) Any other equally efficient devices.

Ind 1.55 Trestles and walks. (1) When used for walking, the portions of trestles on which cars run shall be equipped on one edge with a walkway so located as to give safe clearance from cars. Such walkways shall be equipped with standard guard rails and toe boards as required by section Ind 1.02, except such parts as are used for loading or unloading purposes.

(2) If the walkway is inclined it shall be equipped with cleats.

(3) Where a trestle crosses an established driveway or passageway, the floor of the trestle over such points shall be solid.

Ind 1.56 Steam pipes. All steam pipes within 7 feet of the floor or working platform, that are exposed to contact, shall be covered with an insulating material, or guarded in such manner that contact will not cause personal injury by heat.

Ind 1.57 Flyers on spinners. Spinners, such as are used in twine mills, when the flyers are exposed to contact, shall be equipped with guards so adjusted as to completely cover the flyers and so locked that they cannot be opened when the flyers are in motion.

Ind 1.58 Paper machine calendars. (1) On all machine calendars used in paper mills each roll shall be equipped with a doctor so constructed as to minimize the necessity for manual cleaning and to prevent the paper from adhering to the rolls.

(2) The nipping point of top machine calendar rolls, used as weight rolls only, shall be guarded by: angle iron, pipe, rod, or other equally efficient device.

(3) On all machine calendars, where the paper is taken over the top roll to be fed into the first nip, a feeding belt or other efficient device shall be provided to conduct the paper into the first nip.

(4) Wherever possible the hazard of the nipping points of all paper machine calendar rolls shall be eliminated or minimized by means of,

(a) Angle iron, pipe, or other equally efficient device, or

(b) By feeding the paper into the rolls by means of a rope carrier, air jets or manually operated feeding device.

Ind 1.59 Super calendars. All the nipping points of super calendar rolls shall be guarded by angle iron, pipe, board or other equally efficient device.

Ind 1.60 Driers. On all paper machines with drier felt, each lower drier shall be equipped with a doctor so constructed as to minimize the necessity for manual cleaning and to prevent the paper from adhering to the rolls.

Ind 1.61 Drum winders. On all drum winders of paper machines where the drum and paper run in on the operating side, the point of contact shall be guarded by either automatic or manually operated barrier guard or other equally efficient device.

Ind 1.62 Rewinders. The nipping point of all rewinders, where the roll runs in on the operator's side, shall be guarded by either automatic or manually operated barrier guard, or other equally efficient device.

Ind 1.63 Reels. (1) On stack reels, a clearance of at least 9 inches between the reels of paper shall be maintained by means of a 9 inch wheel between the reels, or a stop below the bottom reel and above the top reel, or other equally efficient device.

(2) A stationary enclosure guard or rail approximately the same diameter as the drum and sufficiently close thereto shall be provided at the exposed ends of all English type drum reels.

Ind 1.64 Digesters. The blow-off valves of digesters used in the sulphite process shall be arranged so as to be operated from the test-

valve floor, the top floor of the building, or other location outside the digester room, or at protected points remote from the valves.

Ind 1.65 Stakes and binders. Stakes or binders used on logging cars or trucks to hold the load of logs in place when being transported, must be so designed as to make it possible for the operator to loosen or disengage such stakes and binders when standing in a safe position.

Ind 1.66 Dough mixers, baking and confectionery. (1) Horizontal tilting type dough mixers shall be provided with a cover over the top of the mixer. An interlocking device shall be provided, so arranged that power can not be applied to the agitators unless the mixer is in operating position, with cover in place.

(2) The mixer when tilted shall be operated with the cover open only:

(a) If equipped with an electric push button, that will require the operator to keep his finger on the button when operating the mixer with the cover open; the button shall be located so that the operator can not reach into the mixer while pressing the button, or,

(b) If belt driven, the belt shifter shall be so arranged that it will move the belt to the loose pulley and hold it there while the mixer bowl is tilted and uncovered, unless the operator holds the belt on the tight pulley. The belt shifter must be so located that the operator can not reach into the bowl while holding the shifter, or,

(c) If clutch driven, the clutch lever shall be so arranged that it will move the clutch out of engagement and hold it out while the mixer is tilted or uncovered, unless the operator holds the clutch in engagement. The clutch lever shall be so located that the operator can not reach into the bowl while holding the lever.

Note: When a push button circuit is used, it is recommended that there should be installed in the circuit a loose fitting piston type inverse time relay designed to open the circuit at the end of one second operation.

(3) Horizontal non-tilting type dough mixers shall have a cover with an interlocking device so arranged that power can not be applied to the agitators unless the cover is in place on the mixer.

Ind 1.67 Food grinders. All power driven food grinders of the worm type shall be so constructed that meat or other foods can be safely fed to the worm by one of the following methods.

(1) By a mechanical method of feeding the worm.

(2) By the use of a permanently attached feed throat to the cylinder enclosing the worm which shall have an opening not exceeding 2 inches in diameter at a distance of at least 6 inches above the worm.

(3) By other effective means which will make it impossible for any operator to reach the worm while it is in motion.

Ind 1.68 Conveyors. (1) The nipping and shearing points of conveyors when exposed to contact shall be guarded in accordance with section Ind 1.02 (2).

(2) The tops of screw conveyor troughs, where screw is exposed to contact, shall be kept covered. Openings into which persons may step, reach or fall shall be protected by standard handrails as required by section Ind 1.02, or other equally efficient protection.

Ind 1.69 Man lifts. (1) Man lifts may be used in places of employment where it is necessary for employees to travel from one elevation to another. Man lifts may also be used for transporting materials, provided that in no case shall men and materials be transported simultaneously. The use of each man lift shall be restricted to employees who have been fully and personally trained in the operation and use of this equipment. In using the man lift no employee shall carry tools or material in either hand.

(2) Each man lift and all mechanical parts thereof shall be designed with a factor of safety of not less than 6, and shall operate at a speed not to exceed 90 feet per minute.

(3) Treads or steps shall be not less than 10 inches deep and at least 12 inches wide and shall have a non-slip surface. All steps shall be designed to withstand a load of 400 pounds without misalignment or undue deflection and shall be so attached to the step brackets that they will be at right angles to the belt in ascending and descending. The steps shall have rollers of a sufficient lap so as to be properly guided throughout the length of the man lift. The frame guiding the steps shall be of such construction and so braced so that there will be no chance of any step roller being disengaged from its guide. The distance between step treads shall not be less than 16 feet.

(4) The belt shall be at least 12 inches wide and shall withstand a simultaneous load of 200 pounds on each step of one run of belt without loss of traction.

(5) Hand-holds shall be securely attached to both runs of the belt at points not less than 4 feet nor more than 4 feet 8 inches above the step tread. There shall be neither step nor hand-hold available for use in either direction without a corresponding hand-hold or step. Only closed type hand-holds shall be used.

(6) Man lifts shall not be installed with the boot pulley stand in a pit. The boot pulley stand shall be supported on a normal floor landing. A mounting platform shall be provided in front of or to one side of the belt for the up run at the lowest landing and shall be high enough to meet the steps when they reach a level position. A landing shall be provided on the down side in front of or to one side of the lowest landing, at such a height that the step will be at a 45 degree angle when the outside edge of the step reached the same level as the platform when traveling around the boot pulley.

(7) Clearance shall be provided above the top floor landing of at least 10½ feet vertically and there shall be at least 5 feet clearance between the center of the head pulley shaft and any ceiling obstruction. The minimum distance for the location of the center of the head pulley shaft in relation to the top floor landing shall be 5½ feet.

(8) An automatic stop device shall be provided which cuts off the power within 12 inches above the upper landing and stops the belt within 2 feet when a step tread carrying an employee passes the top floor landing. After the automatic stop device has been thrown by a loaded step, it shall not be possible to start the man lift except by resetting the automatic stop switch at the top floor or landing. This automatic stop device shall be located so that the person resetting it has a clear view of both the up and down runs of the

man lift, and so that it cannot be reset by a person standing on a step of the man lift.

(9) An emergency stop line shall be provided, accessible throughout the entire travel of the man lift and within easy reach of the ascending or descending employees. It shall be directly connected to an automatic stop device and shall stop the man lift when pulled in the direction of travel.

(10) The floor openings on both the up and down runs for man lifts shall be of uniform size, approximately circular and shall provide for a clearance on each side of the tread of not less than 7 inches or more than 9 inches, with a clearance of not less than 14 inches or more than 15 inches at the front of the tread. All floor openings at every landing shall be guarded on all sides not used as a means of entrance or exit by standard guard rails and toe boards as specified in section Ind 1.02 (1). Such guards shall be located not more than 12 inches from the edge of the floor opening. The entrances and exits at all floors affording access to the man lift shall be guarded by a maze or staggered railing with toe boards or by a self-closing gate located approximately 2 feet from the edge of the floor opening and arranged to swing away from the opening.

(11) On the ascending side of the man lift, the landings shall be provided with smooth beveled guards or cones set directly under the landing, the slope of which shall be not less than 45 degrees nor more than 60 degrees from the horizontal and shall extend at least 42 inches back from the hand-hold.

(12) The floor space adjacent to all openings shall be kept clear and unobstructed at all times and the floor shall have a non-slip surface.

(13) Signs containing instructions for use of man lifts shall be conspicuously posted at each landing, and in addition warning signs shall be provided warning of the approach of the upper and lower landings.

Ind 1.70 Gas welding and cutting. (1) All cylinders for compressed gases shall be constructed, marked and maintained in accordance with interstate commerce commission specifications and regulations effective at the time of their manufacture. Gas generators, regulators, consuming devices and other fittings for welding and cutting shall be of a type approved by the industrial commission.

Note: It will be the policy of the industrial commission in general to approve devices listed as standard by the Underwriters' Laboratories.

(2) Acetylene shall not be generated or utilized at a pressure in excess of 15 pounds per square inch gauge pressure. This requirement is not intended to apply to the storage of acetylene dissolved in suitable solvents in cylinders manufactured in accordance with the requirements of section Ind 1.70 (1).

(3) Gases shall not be transferred from one cylinder to another.

(4) Gas shall not be used from a cylinder except through an approved pressure reducing regulator.

(5) Cylinders not provided with hand wheel valves shall have spindle keys on valve spindles or stems while cylinders are in service. Empty cylinders shall be plainly marked EMPTY, or MT, and valves shall be closed.

(6) Cylinders shall be so located or protected that they will not be exposed to open flames or excessive heat, and shall be located so they will not fall or be struck by other objects.

Note: Compressed gas cylinders should be handled carefully and never dropped.

(7) While gas is being used in a small confined space the cylinders shall be located outside of such space, and a helper shall be present at all times to attend to the cylinder valves or assist in any emergency.

(8) Fuel gas or oxygen shall not be used as a substitute for compressed air.

(9) Welding or cutting shall be done by or under the supervision of a trained operator.

(10) Reasonable precaution shall be taken to prevent oxygen and apparatus used in conjunction with an oxygen supply from coming into contact with oil or grease.

(11) Fuel gas and oxygen hoses shall be identified by different colors, using red for fuel gas and green for oxygen.

(12) Hand trucks for portable welding equipment shall be provided with chains or steadying devices to prevent cylinders from being knocked over while being moved or while in use, and also with a steel baffle plate extending the full length of the equipment to act as a fire wall between the cylinders.

Note 1: Hose should be firmly secured to the blow pipes and regulators before using. Cylinder valves should be opened slowly.

Note 2: Welding should be located in well ventilated locations. Particular attention should be given to welding operations on bronze, brass, galvanized metal, stainless steel, etc., due to the high toxicity of their fumes. See general orders on dusts, fumes, vapors and gases for ventilation requirements.

Ind 1.71 Jointers, hand feed. (1) Every hand feed jointer with a horizontal cutting head shall be equipped with a cylindrical head the throat of which shall not be more than 7/16 inches in depth by not more than ⅝ inches wide.

Note: It is strongly recommended that no cylinder be used in which the throat exceeds ⅜ inches in depth, or ½ inch in width.

(2) Each hand feed jointer with a horizontal cutting head shall be equipped with a guard that will automatically cover the head. For surfacing work a floating type guard shall be used.

(3) Every hand feed jointer with a horizontal cutting head shall be equipped with a guard which will automatically cover the section of the cutting head back of the gauge.

(4) Every jointer head shall be enclosed on the under side of the jointer frame or table.

(5) Every wood jointer with a vertical cutting head or with a disc cutter head shall be equipped with an exhaust hood or other guard arranged in either case so that the revolving head or disc shall be completely enclosed, except that a slot shall be provided of the proper size to accommodate the material to be jointed.

Recommendation: A safety pusher stick should be provided and used when small pieces are being cut.

Ind 1.72 Band saws and band resaws. (1) All portions of the saw blade shall be enclosed or guarded, except that portion of the blade between the guide rolls and the table. Band-saw wheels shall be fully enclosed.

(2) The outside periphery of the enclosure shall be solid. The front and back of the band wheels shall be either enclosed by solid material or by wire mesh or perforated metal. Such mesh or perforated metal shall be not less than 0.037 inch (U. S. Gage No. 20) and the openings shall be not greater than ⅜ inch. Solid material used for this purpose shall be of an equivalent strength and firmness. The guard for the portion of the blade between the sliding guide and the upper saw wheel guard shall enclose the saw blade or protect the saw at the front and both sides. This portion of the guard shall be self-adjusting to raise and lower with the guide. The upper-wheel guard shall be made to conform to the travel of the saw on the wheel.

Ind 1.73 Circular saws. (1) Every self-feed rip saw shall be guarded and shall be equipped with a spreader fastened securely at the rear of the saw in alignment with the saw blade, except where a roller wheel is provided back of the saw. The spreader shall be slightly thinner than the saw kerf and slightly thicker than the saw disc. Every self-feed rip saw shall also be equipped with an anti-kick-back device installed on the in-feed side. Such anti-kick-back device shall be designed to be effective for all thicknesses of material.

(2) Every hand feed circular rip saw shall be equipped with a hood type guard which will completely enclose the portion of the saw above the table and the portion of the saw above the material being cut. The hood and mounting shall be so arranged that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut.

(3) Every hand feed circular rip saw shall be equipped with a spreader fastened securely at the rear of the saw in alignment with the saw blade. It shall be slightly thinner than the saw kerf and slightly thicker than the saw disc. The provision of a spreader in connection with grooving, dadoing or rabbeting is not required. On completion of such operations the spreader shall be immediately replaced.

(4) Every hand-fed circular rip saw shall be equipped with one or more non-kick-back fingers or dogs mounted on the hood and so located and constructed as to oppose the thrust or tendency of the saw to pick up the material or to throw it back toward the operator.

(5) Every circular cut-off saw shall be equipped with a hood type guard which will completely enclose the portion of the saw above the table and the portion of the saw above the material being cut. The hood and mounting shall be so arranged that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut.

(6) Every circular saw shall be enclosed under the saw frame or table.

(7) Gang trimmers, gang slashers and equalizers shall be guarded by front and rear fences.

(8) The practice of drilling holes at the ends of cracks in circular saws shall be prohibited, and cracked saws shall not be used.

(9) Circular saws shall not be operated at speeds in excess of 10,000 peripheral feet per minute unless especially tensioned for higher speeds in which cases the manufacturer will etch upon the saw the speed at which it should operate. These etched speeds shall not be exceeded.

Ind 1.74 Woodworking machines with cutting heads. (1) Every cutting head on shapers, hand feed panel raisers and similar heads of other machines, not automatically fed shall be guarded by an enclosure guard, or by the use of forms in which the work shall be securely fastened. Such guard or forms shall be so designed and constructed as to effectively protect the operators' hands.

(2) On double spindle shapers when only one head is being used, knives shall be removed from the other head unless the machine is equipped with a starting and stopping device for each spindle.

(3) Every cutting head of power feed machines such as molders, stickers, planers, matchers, tenoners, jointers, dado machines, rabbeting machines and similar heads of other machines shall be guarded. Exhaust hoods when properly constructed and attached constitute an acceptable guard for the cutting heads of these machines.

Ind 1.75 Swing and pull-out cut-off saws, automatic return and limit stops. (1) Every swing cut-off and pull-out saw shall be equipped with an effective device to return the saw automatically to the back of the table when released at any point of its travel; such device shall prevent the saw from rebounding and shall not depend on fibre rope or cord, or on any spring for its functioning.

(2) Limit chains or other positive stops shall be provided to prevent the saw from swinging beyond the front edge of the table.

Ind 1.76 Sanders. (1) Belt sanders shall have both pulleys and the unused run of the sanding belt guarded. However, pulleys with smooth disc wheels may be equipped with rim guards provided that on-running nip points are guarded.

(2) Disc sanders shall have the periphery and back of revolving disc guarded, and the space between revolving disc and edge of table or guide shall not be greater than ¼ inch.

(3) Drum sanders shall have the exposed parts of the drum guarded except that portion where the material comes in contact with the abrasive surfaces.

Ind 1.77 Flat work ironers. (1) All flat work ironers, including those ironers equipped with the so-called doffer roll, or idle roll, shall be provided with an automatic stop guard in front of the first power-driven roll, which will disengage the power when the hand of the operator strikes the guard. This guard shall extend the entire length of the rolls with the lower edge to be placed not more than ½ inch above the feed table or apron, and be not less than 4 inches in width.

Exception: If automatic stop guard is located 4 inches or more away from the roll nip point, the distance above the feed table or apron may be increased one inch.

Note: Section Ind 22.26, general orders on sanitation issued by the industrial commission, requires that excessive steam and heat produced by flat work ironers be removed at their source.

Ind 1.78 Collar and cuff ironers. All collar and cuff ironers shall be equipped with guards in front of the first rolls to prevent the hands of the operator from being drawn into the rolls.

Ind 1.79 Washing machines and tumblers. (1) Each cylinder type washing machine or tumbler, other than the open end type, shall be equipped with a brake which will enable the operator to lock the cylinder when it is being filled or emptied.

(2) Each cylinder type washing machine or tumbler shall be provided with a device which shall hold open the covers of the outer and inner cylinders while being filled or emptied.

Note 1: For floor drainage of wash rooms, see section Ind 22.27, general orders on sanitation.

Note 2: For control of harmful fumes created by the washing of greasy towels, coveralls, etc., see section Ind 20.05, general orders on dusts, fumes, vapors and gases.

Ind 1.80 Extractors. (1) Each centrifugal extractor shall be equipped with a safety cover or shield so constructed that the machine cannot be started by power until the cover or shield is closed and so that the cover or shield cannot be opened until the basket is brought to a full stop. Any openings in the safety cover shall not exceed ½ inch.

(2) Each hydraulic "squeezer" type extractor shall be equipped with a device to prevent the operator's hands from becoming caught between the door enclosure or press at the feed side.

(3) Such device shall consist of one of the following:

(a) A quick stopping device, controlled by a bar across the opening immediately below the door or enclosure.

(b) A complete enclosure at the feed side, so arranged that the door or press cannot be operated until the opening or door is closed.

(c) A sweep or gate guard, which is positive in action, sweeping across the entire opening or enclosing the opening with each descending stroke of the press or door.

Ind 1.81 Starching machines and roll wringers. (1) Each starching machine, roll wringer or similar type machines shall be equipped with:

(a) A guard, or

(b) A bar across the entire face or front of the feed or first pressure rolls, so that the striking of the bar by the operator will stop the rolls or instantly relieve the pressure of the rolls.

Ind 1.82 Power-driven pressing machines. (1) LAUNDRY TYPE POWER-DRIVEN PRESSING MACHINES. Each power-driven laundry type pressing machine of the swing type shall be provided with, and operated by, a manually operated two-hand tripping control to prevent the operator's hand or hands from being caught between the pressing surfaces. Such controls shall be so arranged that both must be operated simultaneously, thereby requiring the use of both hands by the operator during the closing and locking operation. Upon releasing one or both controls before the head has reached the closed position, the head shall return automatically and promptly to the open position.

(2) DRY-CLEANER TYPE POWER GARMENT PRESS. Each power-driven dry-cleaner or textile manufacturer's type press shall be provided with and operated by manual controls constructed to prevent the operator's hand or hands from being caught between the padded buck and the ironing head.

Ind 1.83 Washing facilities. Washing facilities, hot water, soap and towels shall be provided by the employer for all workers and handlers of soiled clothes, in accordance with the requirements of sections Ind 22.14 and 22.15 of the general orders on sanitation.