

- [54] SAFETY GUARD FOR PRESS
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192/131 H
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[58] Field of Search. 100/53; 192/131 R, 131 H;
74/615

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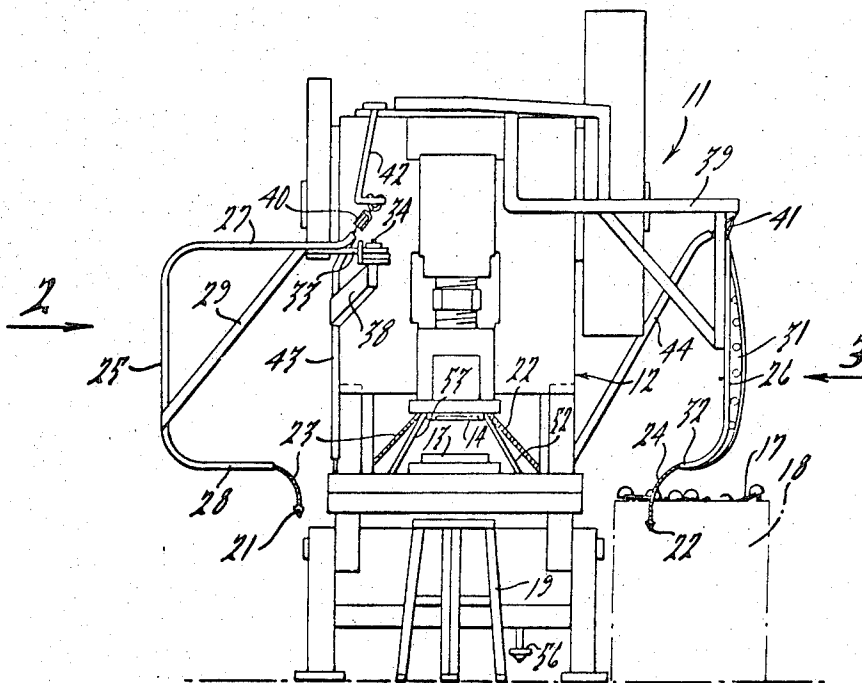
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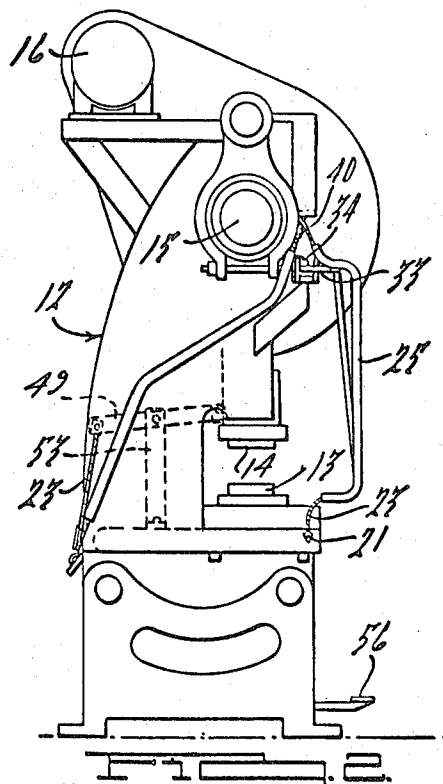
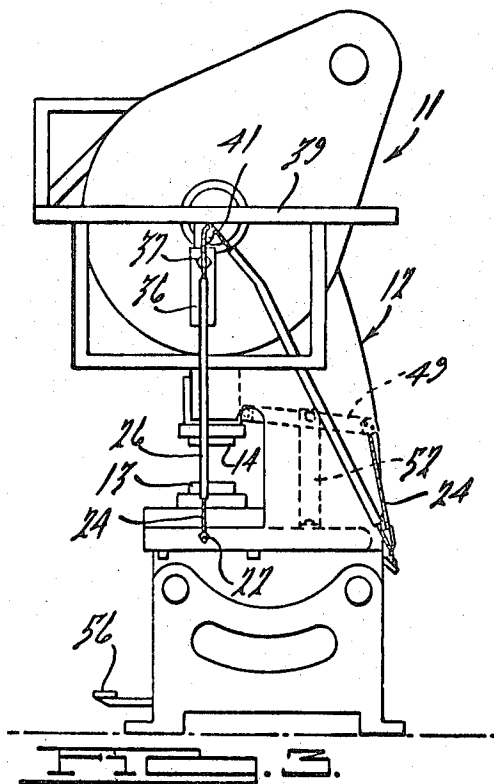
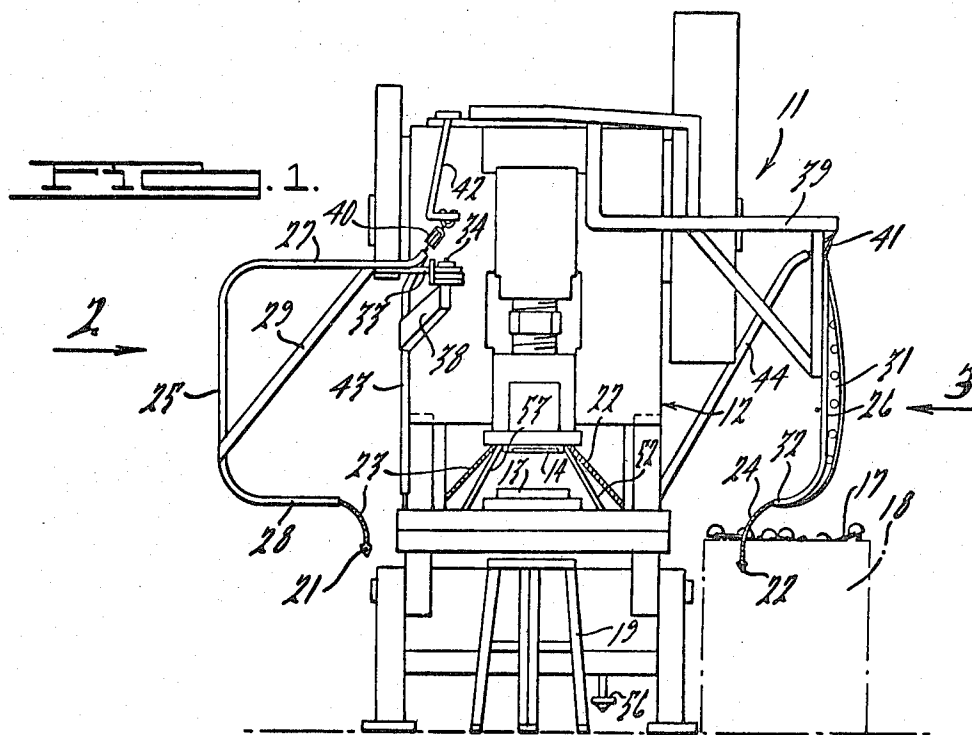
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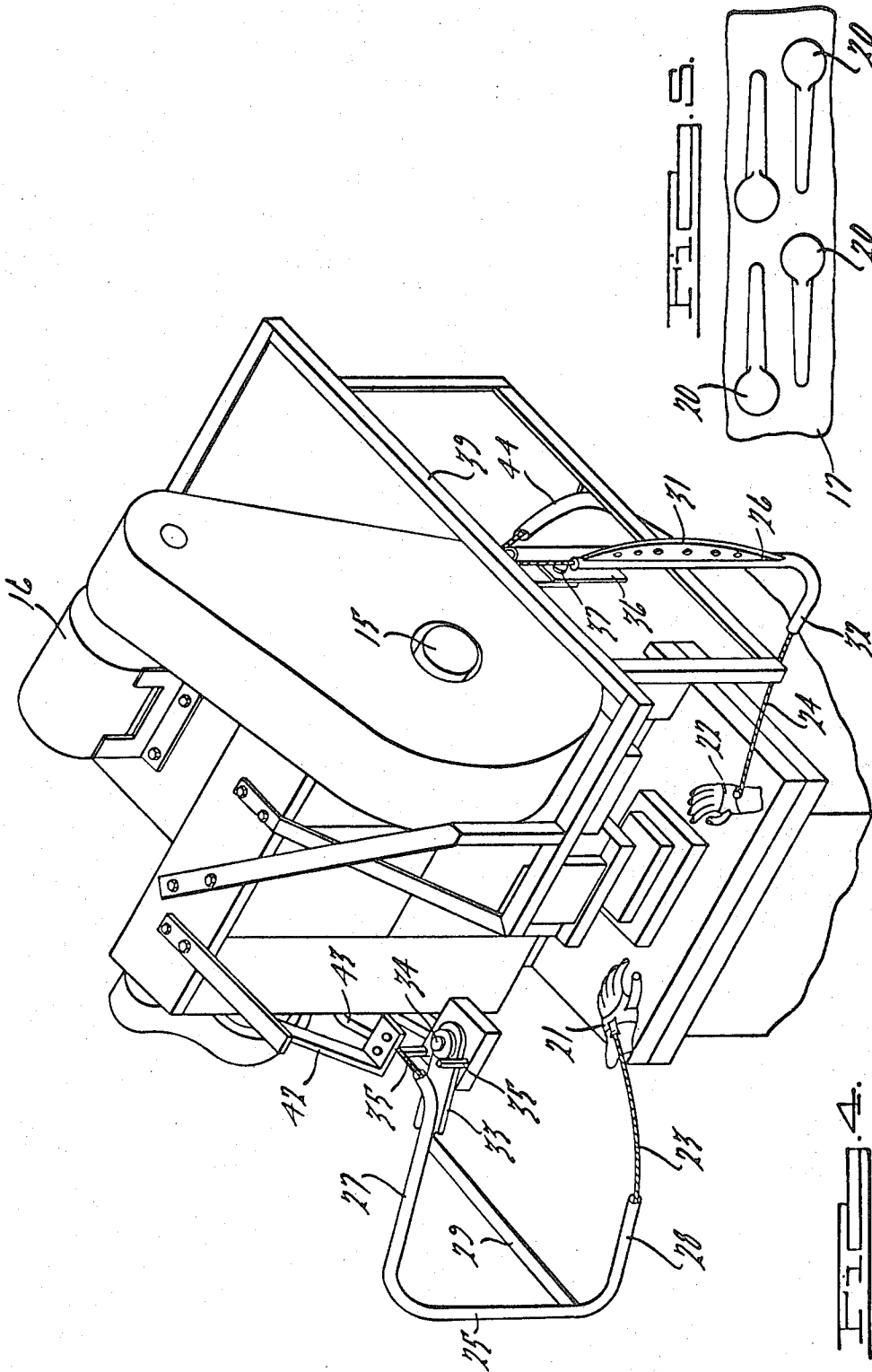
[57] ABSTRACT

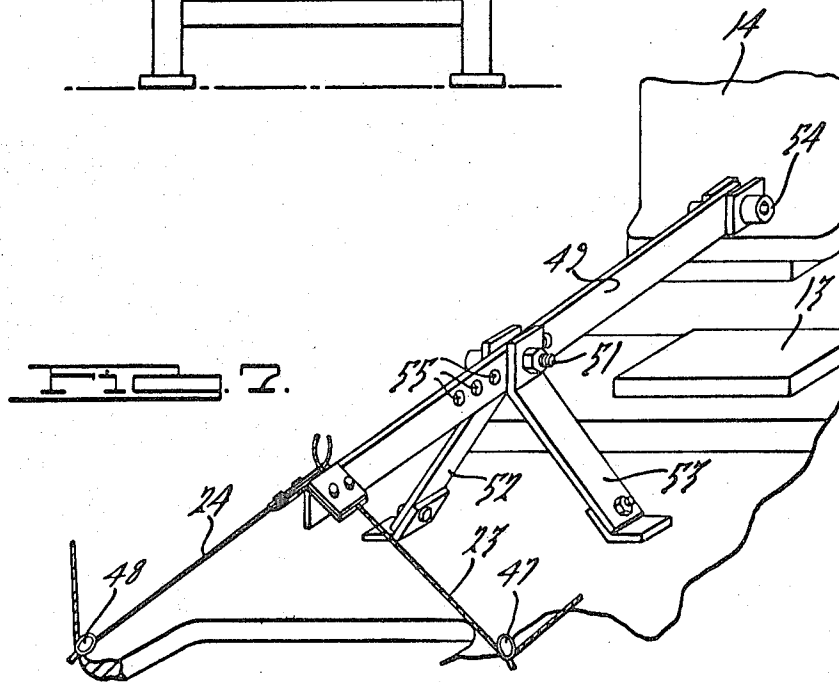
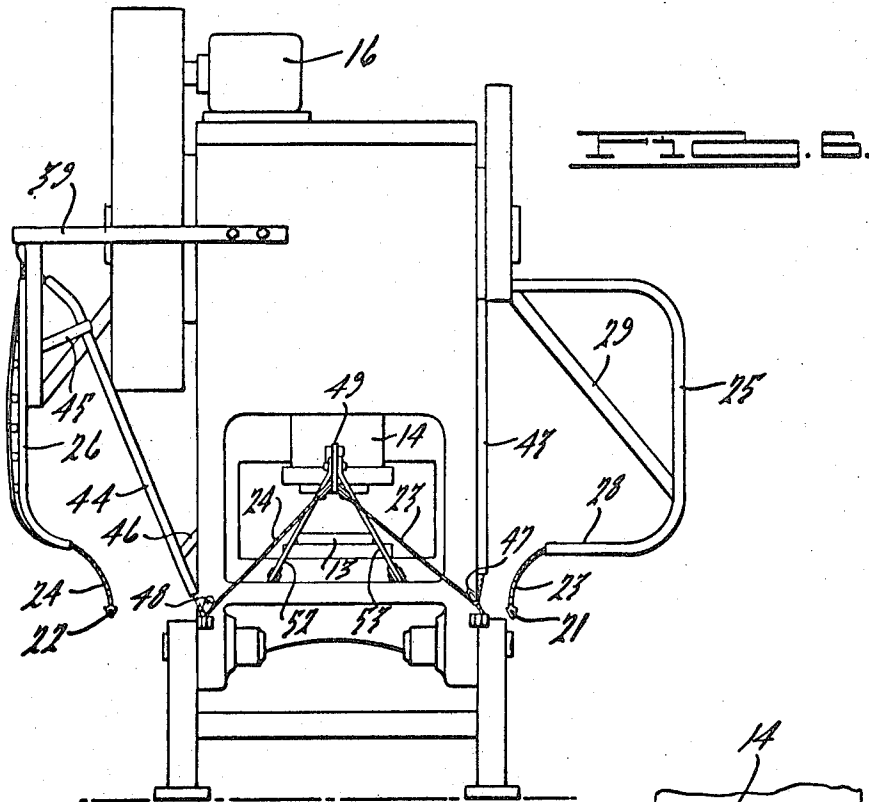
A safety device for a press operator comprising a pair of hand restraints connected to the press ram which insure withdrawal of the operator's hands as the press descends. Cables extend from the hand restraints through guides on opposite sides of the press, around pulleys and through guides at the back of the press to one end of a level connected to the ram. One of the side guides is pivoted on a horizontal axis and the other on a vertical axis, permitting the operator to control and adjust the workpiece. The lever is adjustable to obtain gentle withdrawing motion which will not injure the operator.

10 Claims, 7 Drawing Figures









SAFETY GUARD FOR PRESS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to safety devices which prevent a press operator's hands from being trapped in a press as the ram descends. The invention is applicable to various kinds of presses, whether they be mechanically, pneumatically or hydraulically operated, and regardless of whether they are automatically cycling or selectively controlled.

2. Description of the Prior Art

The following patents, discovered in a search, represent the most pertinent known prior art:

Jonor et al	1,371,426
Ferrer	2,582,023
Ganger	3,522,868

These prior devices, however, have various drawbacks which it is an object of the present invention to overcome. Among these deficiencies is the fact that these prior devices do not incorporate adequate means for permitting the operator freedom to pick up and insert workpieces in the press, hold them during operation of the press and where necessary turn, reverse or otherwise adjust the workpieces as required for certain press operations. Moreover, the hand restraints in the known prior devices are not mounted in such a way that their movement can be selectively adjusted to mitigate the abruptness and force with which the restraining movement is applied to the operator's hands. In some operations this could cause lack of control of the press or workpiece in such a way as to increase the danger of injury or of damage to the part.

Other drawbacks of the prior restraining devices will become apparent from the subsequent description of the present invention.

BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to provide a safety guard for presses which, while absolutely reliable in operation, will nevertheless permit adequate movement of both hands of the operator before, during and after the press cycle for pickup and insertion of the workpiece in the press as well as turning and other control movements of the workpiece.

It is a further object of this invention to provide a press safety guard which can be adjusted to perform its restraining action in a gentle rather than abrupt manner, reducing the possibility of injury or damage.

It is another object to provide a safety device of this nature which does not interfere with the production of the machine or the operator.

Briefly, the press safety guard comprises left hand and right hand restraints mountable on the operator's hands or wrists and connected directly to the press ram by means of cables which extend through left and right hand forward guides and rearwardly to a lever rockably mounted at the back of the press. The other end of this lever is connected directly to the ram, the position of the lever pivot being adjustable to select the proper cable movement with a minimum of abruptness and force being imparted to the hand restraints.

One of the guides is mounted for rocking movement on a vertical axis and the other guide is supported on

a horizontal axis. The first guide is therefore swingable in an arc around the side of the press. The second guide is swingable from front to rear of the press. Thus, the operator is free with one hand to reach out and take workpieces for insertion into the press, while with the other or both hands he can hold the workpiece as the press operates and also turn or otherwise adjust it as required between press strokes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a press having mounted thereon the safety guard of this invention;

FIG. 2 is a side elevational view taken in the direction of the arrow 2 of FIG. 1 and showing a mounting of the guide on the left hand side of the press;

FIG. 3 is a side elevational view taken in the direction of the arrow 3 of FIG. 1 and showing the mounting of the right hand guide;

FIG. 4 is a perspective top view of the press showing the paths of movement of the two guides and their restraints;

FIG. 5 is a plan view of a typical workpiece to be handled by the press operator;

FIG. 6 is a rear elevational view of the press showing the rear guides and connection of the cables to the actuating lever; and

FIG. 7 is a fragmentary perspective view of the actuating lever and its connections to the cable and ram.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The press is generally indicated at 11 and comprises a frame generally indicated at 12, a die surface 13 and a ram 14. Although the invention is applicable to various types of presses and in different environments, a mechanically operated press is shown having a crankshaft 15 driven by a motor 16. It is assumed for purposes of illustration that the workpieces 17 to be operated upon by the press are resting in a bin 18 to the right of the press as seen in FIG. 1, so that the operator sitting on stool 19 must reach out to his right to take a workpiece and insert it between the die and ram. A typical workpiece 17 is shown in FIG. 5, comprising four vehicle steering arms 20 connected by flashing. The arms are operated on sequentially by the press, so that the operator must turn or otherwise maneuver the workpiece between press strokes.

A safety guard comprises a pair of left hand and right hand restraints 21 and 22 respectively for the operator's wrists or hands. These restraints may be of any suitable nature such as loops or wrist cuffs which will not interfere with the maneuverability of the operator's hands and fingers but will positively pull his hands away from the die and ram when outward forces are exerted on them.

A pair of cables 23 and 24 are secured to restraints 21 and 22 respectively and passed through left hand and right hand guides 25 and 26. These guides are rigid in nature and are illustrated as a tubular shape with the cables lying inside them. More particularly, left hand guide 25 is of abbreviated C-shaped construction with a relatively long horizontal upper leg 27 and a relatively short lower horizontal leg 28, the upper leg and vertical portion of this guide being connected by a diagonal brace 29. Guide 26 is of somewhat J-shaped construction with a main vertical portion having a reinforcing rib 31 and a short horizontal portion 32. Portions 28

and 32 of guides 25 and 26 respectively point inwardly toward the center of the press.

Means are provided for rockably supporting guide 25 on a vertical axis and guide 26 on a horizontal axis. As seen in FIG. 2, the supporting means for guide 25 comprises a bracket 33 mounted on a vertical pivot 34 carried by press frame 12 above the die and ram. This pivotal mounting between stops 35 (FIG. 4) will permit arcuate movement of the lower end 28 of guide 25 in such a manner that the operator's left hand is capable of movement from a slight distance to the right of the press center line around the front of and to the left hand side of the press. This will permit the operator to turn or otherwise adjust and control workpieces 17 operated upon by the press.

Right hand guide 26 is secured at its upper end to a bracket 36 rockably mounted at 37 to the press frame at approximately the same level as pivotal mounting 34. The axis of pivot 37 extends from left to right in FIG. 1 and guide 26 is thus capable of movement forwardly and rearwardly of the press as seen in FIG. 4. This will not only facilitate control of workpieces in the press by the operator, but will permit him to reach out and take workpieces 17 from bin 18 for insertion in the press. Pivot 37 is located sufficiently to the right of the press center line, as seen in FIG. 1, to insure the operator's safety. Any suitable means such as the supports indicated at 38 and 39 may be used for mounting pivots 34 and 37 respectively on the press frame.

Cables 23 and 24 extend outwardly from guides 25 and 26 respectively and over pulleys 40 and 41. Pulley 40 is shown as being supported by a bracket 42 on the press frame while pulley 41 is carried by framework 39. These pulleys lead the cables downwardly and rearwardly through guides 43 and 44 respectively, these guides being secured by any suitable means such as brackets 45 and 46 (FIG. 6) to the press frame.

A pair of pulleys 47 and 48 are secured to the rear of press frame 12 adjacent the lower ends of guides 43 and 44 respectively. These pulleys lead cables 23 and 24 upwardly and inwardly to the outer end of a lever 49 rockably mounted at 51 to the rear of the press frame by means of brackets 52 and 53 (FIG. 6). The inner end of lever 49 is pivotally connected at 54 to the rear of ram 14, so that as the ram descends the outer end of the lever will be lifted to pull cables 23 and 24. Lever 49 is provided with a plurality of spaced pivot holes 55 so that the movement of the outer end of the lever may be preselected to achieve a gentle but firm safety stroke for the cables. Selection of a pivot hole 55 closer to the inner end of the arm of the lever will result in a longer cable stroke and thus more rapid withdrawing movement of restraints 21 and 22. The selection of the proper hole 55 will depend on the nature of the workpieces being operated upon as well as the individual requirements of the operator.

The operation of the safety guard will be apparent from the above description. Assuming an initial condition in which the ram is raised and a workpiece 17 is to be lifted from bin 18 and placed between the ram and die surface, the operator wearing restraints 21 and 22 will reach forwardly with his right hand to grasp the nearest workpiece and place it in the press. In doing so, guide 26 will swing about pivot 37. The operator may then manipulate the workpiece with one or both hands, depending on the shape and size of the part, to place it in proper position for the press operation. Left hand

guide 25 will swing in an arcuate manner about pivot 34 while right hand guide 26 swings about its pivot 37.

The operator may then depress pedal 56 to begin the press cycle. As the ram descends, lever 49 will swing clockwise in FIG. 6 to pull cables 23 and 24. Regardless of the positions of guides 25 and 26, which remain rigid, this action will pull restraints 21 and 22 sufficiently away from the area of the ram and die surface to avoid an accident. After the ram has ascended, the cycle may be repeated.

I claim:

1. In a hand safety guard for a press having a frame, a die surface and a ram, a pair of safety restraints to be worn by the operator, a pair of cables each having one end secured to and extending from one of said restraints, rigid left hand and right hand guides for said cables, connecting means between the other ends of said cables and said ram whereby descent of the ram will be accompanied by withdrawal of said restraints from the area of the ram and die, means pivotally mounting one of said guides for arcuate movement on a vertical axis, and means pivotally mounting the other guide for arcuate movement on a horizontal axis.
2. The combination according to claim 1, said pivotal mounting means being carried by said press frame a substantial distance above the area of said die and ram.

3. The combination according to claim 1, the begin mounted on a vertical axis having upper and lower horizontal portions and being pivotally supported at its upper portion.

4. The combination according to claim 3, said last-mentioned guide being of tubular shape and having a diagonal brace between its upper horizontal portion and its vertical portion.

5. The combination according to claim 3, said guide mounted on the horizontal axis having a horizontal and a vertical portion and being pivotally mounted at the upper end of its vertical portion, the axis of its pivot extending transversely to the press whereby the guide is capable of movement toward the front and rear of the press.

6. The combination according to claim 1, the shapes of said guides and the location of said pivots being such that said guide on the vertical pivot is capable of arcuate movement around one side of the press and the guide on the horizontal pivot is capable of movement toward the front and rear of the press.

7. The combination according to claim 1, said connecting means between the cables and ram comprising a lever pivotally mounted at the rear of the ram and connected at its inner end to the ram, said cables being connected to the outer end of said lever, and guide means leading said cables from said left and right hand guides to said lever.

8. The combination according to claim 7, said last-mentioned guide means comprising upper and lower pulleys for each cable and a guide therebetween, the guide means being mounted on the press frame, said cables leading upwardly and inwardly from said lower pulleys to the outer end of said lever.

9. The combination according to claim 7, said lever having a series of pivot holes whereby the length of cable stroke may be preselected.

10. In a safety guard for presses of the type having a frame and a ram and die surface, a pair of safety hand

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restraints attachable to an operator, cables extending from said hand restraints, rigid left and right hand guides for said cables extending outwardly and upwardly from the area of the die surface and ram, one of said guides being mounted on the press frame for rocking movement on a vertical axis whereby the lower portion of said guide is capable of sweeping arcuate movement around one side of said press, the other guide being mounted on the press frame for rocking movement on a horizontal axis toward the front and rear of the press, means leading said cables from the

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upper ends of said rigid guides inwardly and to the rear of the ram, a lever rockably mounted on said press frame to the rear of said ram, a pivotal connection between said lever and said ram, connections securing the ends of said cables to said lever whereby descent of the ram will cause withdrawal of said hand restraints from the area of the ram and die surface, and means for adjusting the location of the pivotal support for said lever, whereby the length of stroke of said cables may be varied.

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