Nov. 13, 1962 C. W. BEAGLEY 3,063,320

CUTTER GUARD

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Fig. 1

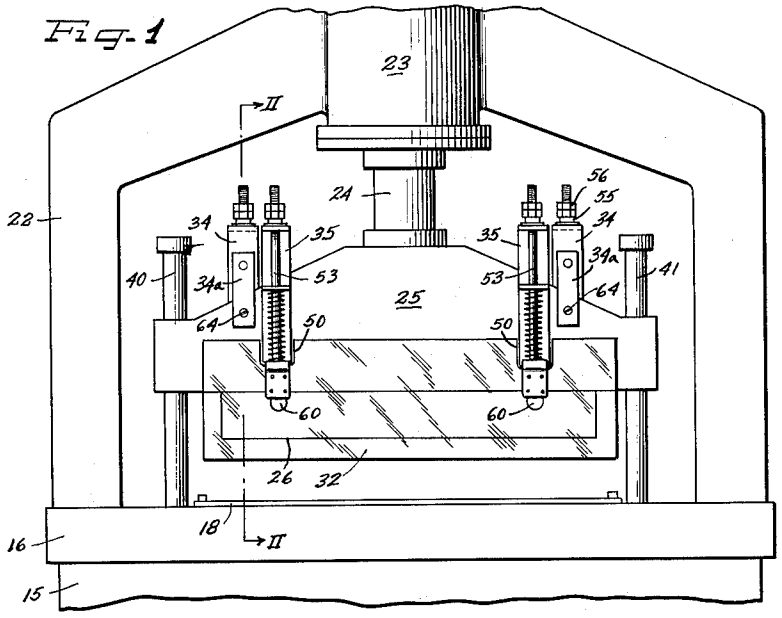


Fig. 2

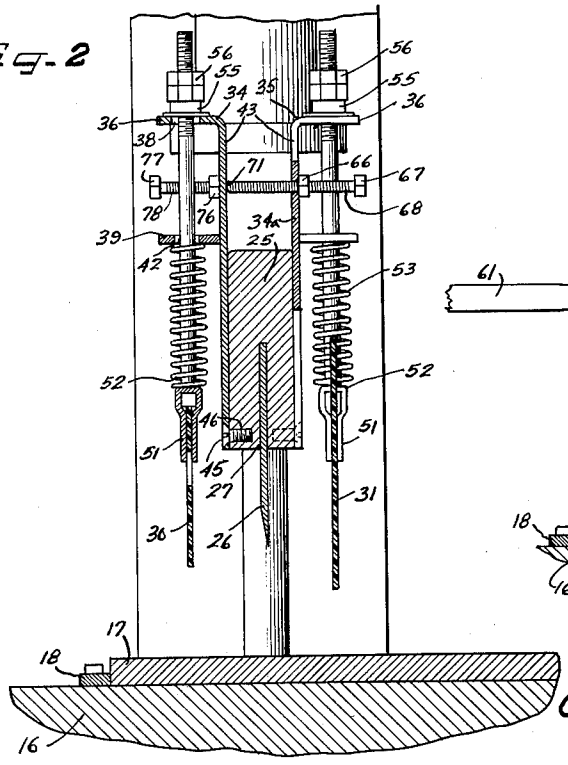
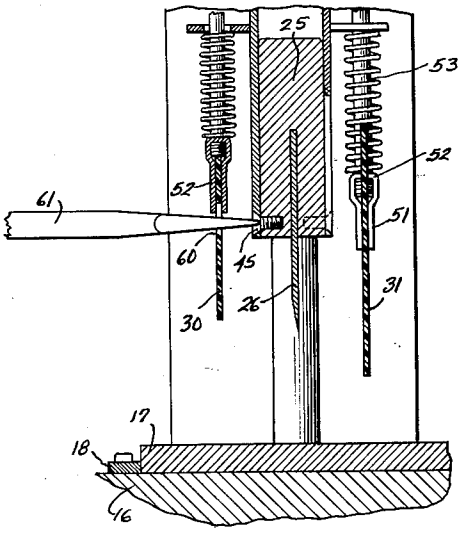


Fig. 4



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Fig. 3

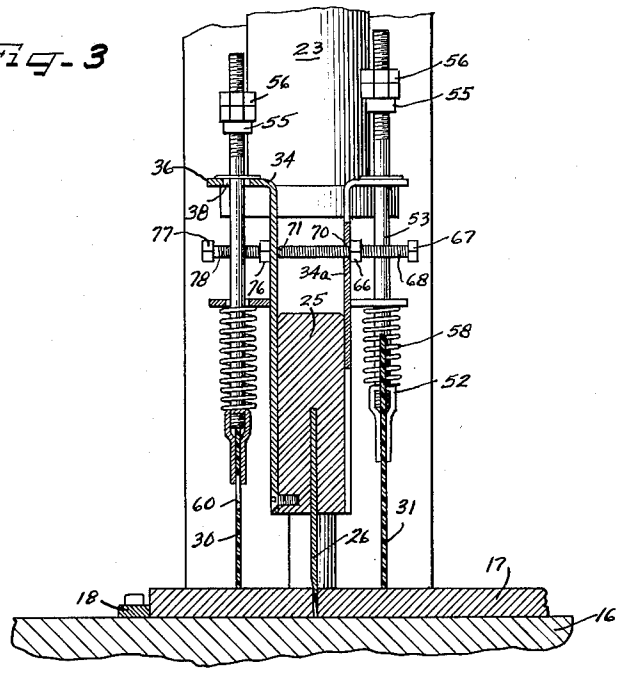


Fig. 5

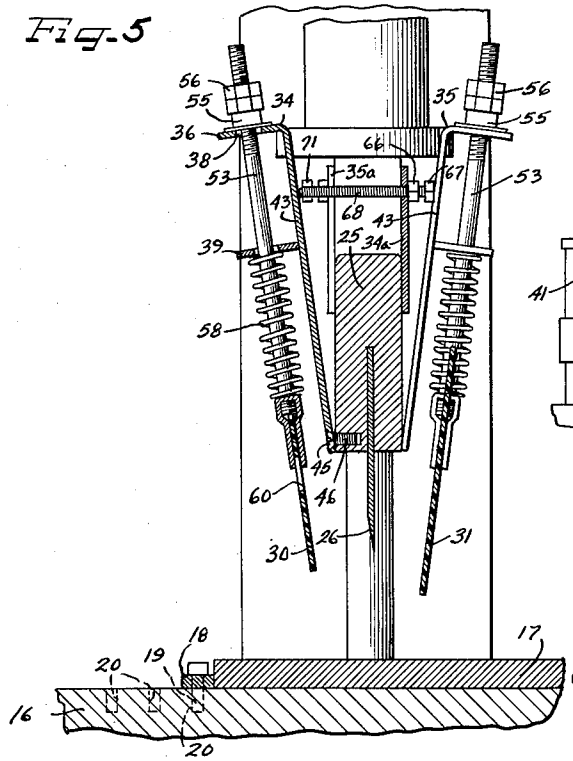


Fig. 7

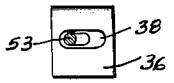
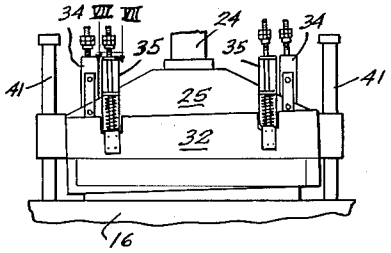


Fig. 6



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CUTTER GUARD

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6 Claims. (Cl. 83—397)

This invention relates to improvements in metal cutting devices and more particularly to an automatically operable clamping device for resiliently clamping a sheet of metal in position during a cutting operation and will be automatically moved, to release the sheet, when the cutting is completed.

It is a further object of the invention to provide a device in this character and will serve as a guard to positively prevent any possible injury, which might be the result of accidents or carelessness to a workman operating the machine, to a workman feeding material to the machine, or to a workman removing the sheared material from the machine, and which moves automatically to and from clamping position under the control of a cutting blade and requires no additional or special mechanism for controlling its operation.

It is a still further object of the invention to provide such a guard that not only protects the operator of the machine, but also makes it possible to forcibly move the sheet of metal laterally before the cutter blade is lowered and after the guard, or guards, are in contact with the sheet of metal, because of the resilient means supporting the guard, or guards.

Another object of the invention is to provide a device of the character that will embody a guard on each side of the cutting blade, the cutting blade being mounted in a block which is slidably mounted on vertical guide bars, both of the guards being resiliently and pivotally mounted upon the cutting blade supporting block to accommodate sheets of metal of variable edge thickness, both guards contacting the upper surface of the sheet of metal where the surface is disposed in a plane at an angle with the horizontal, and the guards retaining the sheet in any angular position before and while the cutting blade is lowered in its vertical direction of travel.

Still another object of the invention is to provide one or more guards for use with a cutting blade, the guards resiliently mounted thereon and for use with a machine used in cutting sheets of metal, or the like, the guards pivotally mounted upon the cutting blade supporting block and arranged forward and rearwardly of the blade edge thereof and low enough to prevent an operator, or any of the operators, from running their fingers under the guard into the path of the edge of the cutting blade, yet not to interfere with visibility of the blade edge of the cutting blade especially when both guards are lowered and in contact with the sheet of metal to be cut, the guards being rectangular in configuration and formed of a transparent sheet of material.

A further object of the invention is to provide a device of the character that will permit the use of a cutter blade block effecting straight vertical stroke, with a blade having a straight edge, or angle cut-shear blade edge therewith, the pivotal and resilient supporting means for the guards permitting surface contact of the lower edges thereof upon every downstroke of the cutter blade.

A still further object of the invention is to provide a device of this character that allows pivotal and resilient mounting of safety guards upon a cutter blade supporting block along with adjustable means for raising or lowering the same with respect to the lower edge of the cutter blade, and accommodating angular and linear shifting of the guards relative to the cutter.

Other important objects and advantages of my invention will be apparent from a reading of the following description taken in connection with the drawings, wherein for purpose of illustration I have shown a preferred embodiment of my invention.

In the drawings:

FIGURE 1 is an elevation of the upper part of the metal cutting machine, showing the position of the guards when assembled to the cutting bar;

FIGURE 2 is an enlarged vertical sectional view taken upon the line II—II of FIGURE 1;

FIGURE 3 is an enlarged vertical sectional view similar to FIGURE 2 showing the cutting blade after completion of the cutting operation and with the front and rear guards in contact with the two metal sheets for retaining same in position adjacent the cutting blade;

FIGURE 4 is a fragmentary sectional view of the device shown by FIGURE 2, showing the rear guard in raised position with a tool inserted horizontally through an opening therein for varying the adjustment of one of the securing means combined therewith;

FIGURE 5 is a sectional view similar to FIGURE 2 showing the front and rear guards inclined upwardly and outwardly with respect to the vertical arrangement of the cutting blade to permit the lower horizontal edges of the guards to be arranged closer to the cutting blade during the cutting operation;

FIGURE 6 is a reduced elevational view similar to FIGURE 1, showing a sheet of metal with its upper surface at an angle with the horizontal, the guards in an angular position and in surface contact therewith; and

FIGURE 7 is a fragmentary plan view taken on lines VII—VII of FIGURE 6.

Like reference characters referred to like-parts in the different figures of the drawings.

The metal cutting machine according to this invention is of well known construction and is designated by numeral **15**, with a flat horizontal table **16** on which the sheets of metal **17** are located, being properly positioned on the table by engagement at one edge against an adjustable gauge bar **18** held upon the table by set screws **19** inserted in vertical holes **20** drilled in the table. The gauge bar **18** is adjustable to different positions upon the table but as it forms no important part of the present invention as structure for accomplishing the adjustment is not shown or described.

Attached to and extending above the table is a frame **22** on which the hydraulic ram housing **23** is supported. The ram piston rod **24** moves upwardly and downwardly from its housing and has attached thereto a rigid, vertically-movable block **25** journaled and guided at its ends upon suitable vertical posts **40** and **41** vertically arranged and secured in the upper surface of said table **16**. A movable knife, or cutting blade, **26** is vertically and horizontally arranged and secured in the groove **27** in the lower portion of said movable block **25**. A pair of obstruction members, or guards, **30** and **31** are resiliently supported and secured to said movable block **25** upon opposite sides thereof. The movable guards **30** and **31** are formed of rectangular sheets of transparent material, preferably of plastic and having horizontal, straight lower edges as shown by **32** and spaced from the table **16**, shown in FIGURE 1. The guards **30** and **31** are mounted parallel to the knife and resiliently fixed adjacent each end thereof by pairs of brackets **34** and **35** to said movable knife supporting block **25**. The brackets **34** and **35** are of F shape configuration. A pair of brackets **34** support the rear guards **30** and a pair of brackets **35** support the forward guards **31**.

The brackets **34** and **35** each embody top, outwardly formed extensions **36**, each with an elongated aperture **38** extending transversely thereof, as clearly shown by FIGURES 5 and 7. Each of the brackets **34** and **35** having an extension **39** with an elongated aperture **42**, said

extensions 39 extending outwardly from and intermediate the ends of the vertical portions 43 thereof. The lower end 44 of each bracket is adjustably secured to the block 25 by flat headed cap screws 45 passing through an unthreaded hole therein and into a tapped hole 46 in the block 25. Each of the transparent guards 30 and 31 are provided with a pair of apertures 50 made therein a short distance from each end thereof and extending downwardly from the upper edge thereof approximately one-quarter the vertical height thereof. A bifurcated clamping jaw 51 is assembled to each guard and arranged within each aperture 50, said jaws are secured through the front and rear walls of the guards adjacent and below the apertures 50. The saddle portion 52 of each clamping jaw 51 is rigidly secured to the lower end of a bolt 53, arranged therewith and vertically thereabove. The upper ends of the bolts 53 fit loosely within the apertures 42 in horizontal members 39 and in apertures 38 of horizontal members 36 to allow tilting of the guards with respect to the horizontal as shown by FIGURE 6. The numeral 55 represents adjusting nuts on bolts 53 threaded at the upper end thereof, and 56 represents lock nuts by means of which said nuts 55 are secured in adjusted position. A spring 58 is assembled upon each bolt 53, the upper end of each spring 58 being in pressing contact with the extension 39 while the lower end of each spring 58 contacts the saddle portion 52 of each clamping jaw 51. The nuts 55 are adjusted to pull the spring 58 upwardly into contact with the projections 39 on each bracket so as to give a predetermined pressure by said springs on the guards, and said pressure determines the pressure of the guards on the sheet of metal 17 when said sheet is being cut by the blade 26. Each guard is further provided with a circular opening 60 arranged directly below each clamping jaw 51 affixed thereto, clearly shown by FIGURES 1 and 4. These openings are provided so an operator can adjust the cap screw 45 with a working tool, or screw driver, 61 shown in position by FIGURE 4. By providing the longitudinal slots 38 and 42 in the projections 36 and 39 the guards are pivotally supported by the block 25 whereby the entire guard, either front or rear, can be forced downwardly into contact with the surface of any piece of metal which is not parallel with the horizontal surface of the table 16; as shown by FIGURE 6.

In order to provide angular adjustment in a vertical plane for the guards 30 and 31, suitable means are provided whereby the lower edge portions of the guards are moved inwardly towards the cutting blade 26 and the upper portions of the F shaped brackets are forced away from the block 25. The brackets 34 are mounted to be in misalignment with the brackets 35. The brackets 34 on said rear guards 30 are mounted nearer the outer ends of the block 25 than the brackets 35 on the front guards 31; as shown by FIGURE 1. As shown by FIGURES 1 and 5, a pair of rectangular plates 34–A are vertically assembled and rigidly secured by round headed machine screw 64 to the opposite sides of block 25 and in direct alignment with bracket 34. A pair of rectangular plates 35–A are vertically arranged and rigidly secured by round headed machine screw 65 to the opposite side of block 25 and in direct alignment with brackets 35. Each plate 34–A is provided with an aperture 70 near the upper end thereof. A threaded nut 66 is welded upon the outer surface of plate 34–A and in direct alignment with said aperture 70. A bolt 68 with head 67 is assembled in said nut 66 with its free end 71 extending through the apertures 70 and in contact with the rear surface of bracket 34 as shown by FIGURE 3. When said bolt 68 is screwed inwardly through the nut 66 the free end 71 of bolt 68 will force the upper end of bracket 34 outwardly away from block 25 in a pivotal manner whereby the lower end of the guard 30 will be moved inwardly towards the cutter blade 26. Said rectangular plate 35–A is provided with an aperture, (not shown) near the upper end thereof similar to the aperture 70 in plate 34–A. A threaded nut 76 is welded upon the outer surface of the plate 35–A and in direct alignment with said aperture near the upper end thereof. A bolt 78, (see FIGURE 2) with head 77 is assembled in said nut 76 with its free end in contact with the rear surface of the bracket 35. When said bolt 78 is screwed inwardly through said nut 76 the free end thereof will force the upper end of the bracket 35 outwardly away from the block 25 in a pivotal manner whereby the lower end of the guard 31 will be moved inwardly towards the cutter blade 26. Therefore, the guards 30 and 31 each have leading active lower edges to act upon material fed in the path of movement of the cutting blade 26, whereby the lower edges thereof may be moved in close to the cutting blade in an angular position with respect to the vertical plane or they may be adjusted and secured in a vertical plane with their lower edges thereof at a distance from the cutting blade equal to one-half the thickness of the block 25. Therefore, the guards are independent of each other, whereby one may be arranged with the lower end thereof close to the cutting blade while the other guard may be secured in a vertical plane and further away from the cutting blade, as well as at a higher elevation above the table.

The improved metal cutter and automatically operable guard members may be easily and quickly adjusted to suit different requirements for cutting metal plates of different thickness. The operation of the pivotal and vertical movement of the guards is in no way dependent upon the manual operation of any movable part, other than the movable blade supporting block, or upon some action of the operator to be effective, and consequently said device is practically automatic in performing its functions and the hands of the operator are free at all times to guide the sheets of metal into position beneath the cutting blade or to manipulate the controls of the machine.

When the cutting blade 26 and its movable supporting block 25 are in raised position, as is illustrated in FIGURES 1, 2, 4 and 5, the guards 30 and 31 are maintained in a raised position due to brackets 34 and 35, and the bolts 53 with clamping jaws associated therewith. When the supporting block 25, together with cutting blade 26, is moved downward by the ram connecting rod 24, and a sheet of metal to be cut is upon the table below the cutting bar, the guards will contact the sheet of metal first and hold same in position without regard to the incline of the upper surface of the metal sheet with regard to the horizontal, thereby holding said sheet of metal upon the table top 17 while the cutting blade 26 and its supporting block 25 continue to move down and cut a strip off of the sheet 17. When the supporting block 25 and the cutting blade 26 are moved back to their raised and normal position, the guards 30 and 31 are moved upward in a raised position clearly shown in the drawing by FIGURE 1. This construction accommodates angular and lateral shifting of the guards relative to the cutter, and cutter block.

A safety device of my improved construction can be easily and cheaply manufactured, and provides a relatively simple and highly effective guard for all forms of metal cutting machines.

Obviously, the invention is susceptible of embodiments in forms other than that which is illustrated herein and applicable for uses and purposes other than as detailed, and I therefore consider as my own all such modifications and adaptations and other uses of the form of the device herein described as fairly fall within the scope of my invention.

I claim as my invention:

1. An operator guard for a machine with an upright and generally vertically moving head having a lower end carrying a downwardly projecting tool having an elongated lower edge to move into engagement with work material, said guard comprising:

(*a*) an upright and elongated guard plate,

(*b*) an upright bracket for each end portion of said

guard plate, the lower end of each said upright bracket being mounted on the lower part of said head for pivotal movement about an axis substantially parallel to said edge,

(*c*) means connected to the upper end of each said bracket and to said guard plate, said means mounting said plate for movement substantially parallel to said upright brackets and including a compression spring which yieldably biases the guard plate into a position with its lower edge normally in advance of the lower edge of said tool, and

(*d*) adjustable positioning means connected to said head and to said bracket for positioning said bracket relative to said head about said axis whereby the lower edge of said guard will be positioned at different distances relative to said cutting edge.

2. The operator guard of claim 1 in which said means connected to the upper end of each said bracket has means to permit tilting motions of said guard plate in a plane substantially parallel to said brackets.

3. The operator guard of claim 1 in which said means connected to the upper end of each said bracket has means to permit motions of said guard plate generally along its own length.

4. The operator guard of claim 1 in which said adjustable positioning means comprises screw means acting between the upper portion of said bracket and said head.

5. The operator guard of claim 1 in which said guard plate comprises a transparent sheet to permit visibility of said lower edge of said tool and of said work material.

6. The operator guard of claim 1 in which said means connected to the upper end of each said bracket comprises an upright rod means extending loosely and swingably down through a hole in said bracket and having an enlarged head at its upper portion engaging downwardly on said bracket and in which said compression spring is a coil spring around said rod means.

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