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Krieg

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[54] **PRESS BRAKES**

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[52] **U.S. Cl.** **72/389,** 72/447, 72/470

[51] **Int. Cl.** **B21j 13/02**

[58] **Field of Search** 72/389, 446, 447, 412, 72/414, 470, 404, 413

[56] **References Cited**

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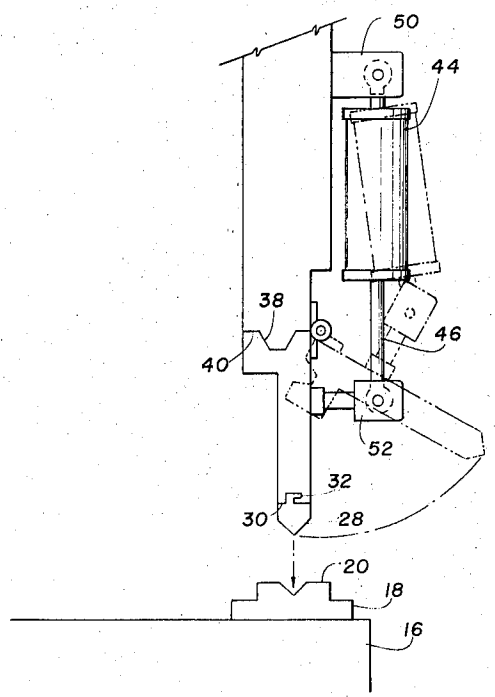
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Assistant Examiner—Gene P. Crosby
Attorney, Agent, or Firm—Murray Schaffer

[57] **ABSTRACT**

A press brake comprising a frame and having a top beam and a bottom beam. The top beam is mounted in the frame to move in a vertical plane toward and away from the bottom beam and carries a working tool. The work engaging tool is pivotally attached to the beam and is provided with means for securing the tool in the plane of the beam movement, and for swinging it outwardly therefrom to enlarge the space between top and bottom beam for entry of a work piece.

4 Claims, 2 Drawing Figures



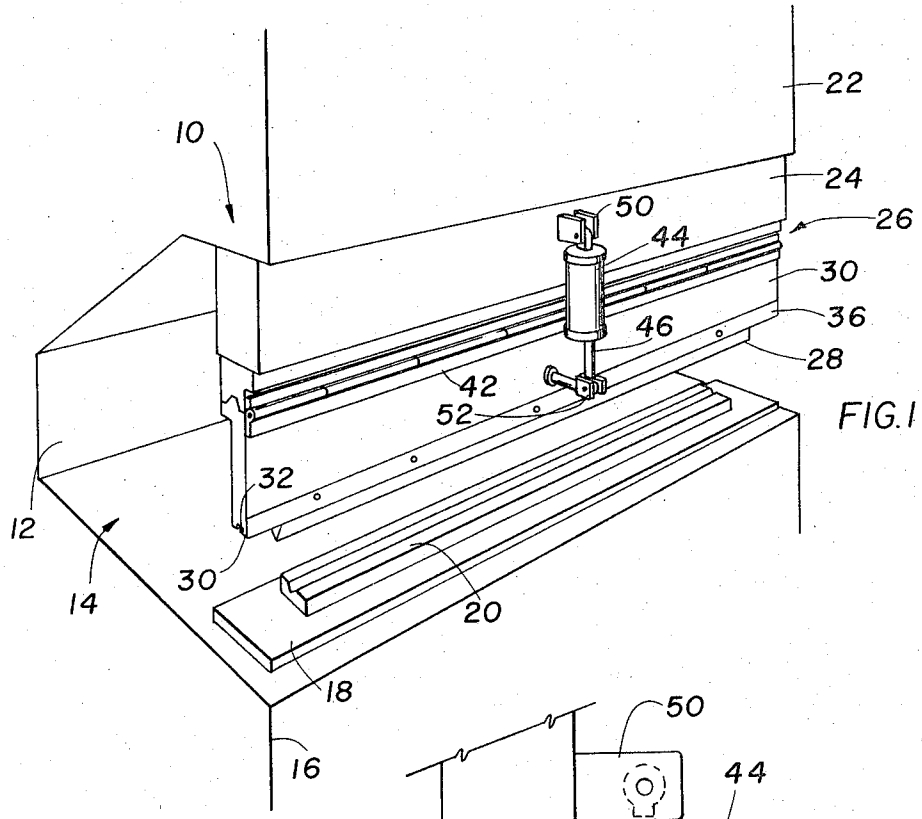

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FIG. 1

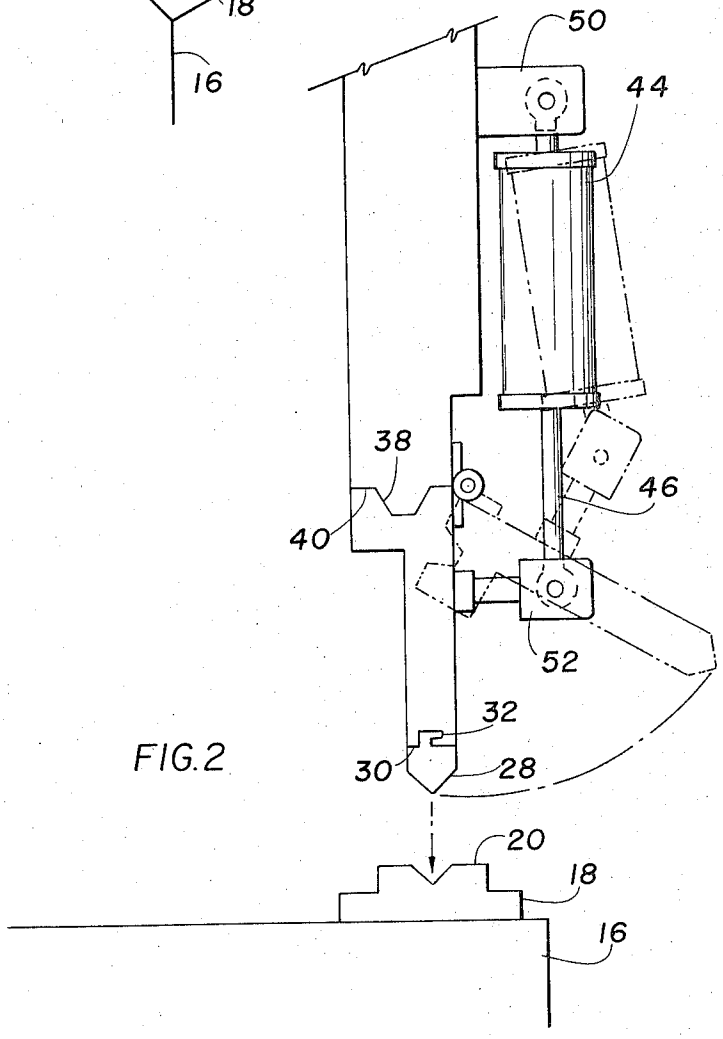

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FIG. 2

PRESS BRAKES

BACKGROUND OF INVENTION

The present invention relates to an improvement for sheet metal folding presses and in particular to the construction of a brake press adapted to accomodate large and irregular pieces of stock material.

Sheet metal stock material is conventionally folded, bent or shaped along longitudinal lines in a folding press commonly referred to as a brake press. Such a press comprises an overly large and massive frame on which an upper tool is carried by a beam which is hydraulically moved downwardly in a vertical path against a bottom shaping tool. The tools are elongated along a linear path and consequently have a breadth several times greater than the height or depth of the device.

Because of restrictions created by the size and weight of the machine, the extent of movement of the top beam and thereby the extent of the opening between the upper and bottom tools is very limited. Generally, this limited opening is satisfactory only for the folding or bending of standard gauge sheet metal. This has presented little problems up till now, since sheet metal by its own nature is generally relatively thin. Nevertheless, with recent advances in the finished designs of sheet metal constructions, sheets of relatively large thickness as well as compound folded sheets are required to be further worked on before fully completed. Unfortunately existing presses are generally unable to operate on these pieces, not because of the power limitations but solely because of the lack of sufficient opening between the top and bottom tools through which the sheet metal workpiece can be inserted and positioned.

It is the object of the present invention to provide an improved brake press in which the disadvantages of the prior art are overcome.

It is another object of the present invention to provide a brake press, in which both thin and relatively thick sheets of metal can be worked.

It is a further object of the present invention to provide a brake press in which irregular shaped objects may be inserted and worked on.

These objects, as well as others together with numerous advantages will be seen from the following description of the present invention.

SUMMARY OF INVENTION

According to the present invention a brake press is provided comprising a frame having a top and bottom beam in which the top beam is adapted to move in a vertical plane toward and away from the bottom beam. The tool for engaging the work piece is pivotally attached to the top beam so as to be swingable outwardly thereby permitting the mouth of the press to be opened or closed by swinging it relative to the plane of movement of the top beam. In this manner the opening for the entry of the sheet material can be enlarged to accept and permit location of large and irregular sheets or partially formed or bent objects.

Preferably, the working tool is attached to a supporting bar in the conventional manner and the supporting bar itself is pivotally attached to the top beam. In this manner a simple hinge can be located along the edges of the top beam and supporting bar and the edges can

be made to abut each other to provide a frim, solid and non-separable construction of the beam and support for the hammer or press stroke.

It is also preferable that the supporting bar be automatically pivotable as by the use of a hydraulic or pneumatic motor, although manual latch means may be used. A simple piston cylinder may be used. The hinge and fluid motor is preferably located on the outer face of the beam so as to pivot the supporting bar forwardly and to avoid interference with the workpiece in the press.

Full details of the invention follow and will be seen in the accompanying drawing.

BRIEF DESCRIPTION OF DRAWING

In the drawing:

FIG. **1** is a perspective view of the front of a press brake showing the present invention; and

FIG. **2** is an end view of the press showing the pivoting action of the tool.

DESCRIPTION OF INVENTION

Turning to FIG. **1** a press brake or folding press for sheet metal or the like is generally depicted by the numeral **10.** The press is only schematically shown since its construction follows well known techniques and designs. Briefly the press comprises a frame **12** of generally U-shaped cross section having a horizontal bight **14** in which the workpiece is inserted. The frame has, at its lower portion a bottom bolster **16** on which is secured a filler block **18** holding a bottom die or tool **20.** At the upper portion of the frame **12** there is provided a cross beam enclosure section **22** which supports a vertically reciprocable top beam **24** to which is secured in accordance with the present invention a tool holding assembly **26** in which a top die or tool **28** such as a V-bend tool is clamped. Located within the cross beam section **22** are the requisite hydraulic or pneumatic motors, the gear casing, transmissions and guide and support means for forcing the top beam **24** in a suitable hammer or press stroke downwardly in the vertical plane to urge the top tool **28** into mating engagement with the bottom tool **20.**

In accordance with the present invention the tool holding assembly **26** comprises a supporting bar **30** having a slot or key way groove **32** formed along the entire length of its bottom edge **34.** The top tool **28** has a conforming or mating key and is retained in the bottom edge **34** by a nipping or clamping jib **36** which is bolted or screwed to the supporting bar in generally conventional manner.

The supporting bar **30** is placed so that its upper edge **38** and the lower edge **40** of the top beam **24** abut against each other and are preferably provided with a longitudinal set of conforming key surfaces. The key surfaces are advantageous in that they insure perfect interlock of the edges and prevent lateral movement of the members when placed in vertical arrangement.

The supporting bar **30** is hinged by means of suitable hinges **42** to the top beam **24.** The hinges **42** may be singular or formed in a continuous strip such as a piano hinge. In any event it is preferred that they be located on the front faces of the top beam and the supporting bar so as to be non-interfering with the workpiece and so as to allow the supporting bar and tool to be swung outwardly toward the machine operator. The hinges **42** preferably extend along the entire length of the abut-

ting edges of the top beam and the supporting bar to provide full support.

The supporting bar **24** may be manually pivotable; however, it is preferred that it be automatically actuated. To this end a fluid motor **44** having a piston **46** and cylinder **48** is used. The motor actuator may be pneumatic or hydraulic. The cylinder **48** is pivotally connected via a clevis bracket **50** to the top beam **24** while the extending piston **46** is pivotally connected via a clevis bracket **52** to the supporting bar **30.** The cylinder **48** is connected to a source of fluid under pressure via conduits **54** and may be controlled by solenoid valves by the operator through a foot pedal or push button or automatically by synchronous action through the general control panel.

The supporting bar **30** can thus be pivoted to open the entry mouth of the press a distance equal to the height between the top beam and the bottom tool. That is by a distance substantially equal to the height of the supporting bar and the distance of press stroke. As a consequence, thicker sheet material may be accommodated.

The fluid actuator in addition to providing automatic operation, as well as relatively easy manipulation, insures that the supporting bar is locked in place in either its open or closed position, the latter being most important since the bar in the vertical condition must be rigidly fixed to insure a perfect press stroke. While one such actuator is shown it may be desired, in order to insure symmetrical construction of the machine, to use two or even more such motors. It is also possible to substitute mechanical over-the-center latches or similar non-fluid actuator means for the fluidic actuator. Over-the-center latches are known which would provide efficient, simple and secure manipulation and positioning of the supporting bar either when open or in vertical position.

The present invention may be employed on newly manufacture presses or on existing equipment. The modification of existing equipment is simple and requires only the substitution of conventional top beams for a shorter one to which a supporting bar is attached. The working tool remains the same as does its clamping gib. The remainder of the machine also remains intact and requires no modification whatsoever.

It will thus be seen that the present invention satisfies the object enumerated earlier in that it enables the conventional press brake to be used in handling thick objects as well as preshaped forms. In generally, the disadvantages noted for the prior art devices are overcome.

Various modifications and changes have been suggested and others will be apparent to those skilled in this art. Therefore, the present disclosure is intended to be illustrative of the present invention and not limiting of its scope.

What is claimed:

1. A brake press comprising a frame, an elongated top beam and a bottom beam, said top beam being mounted in said frame to have a bottom edge movable in a vertical plane toward and away from said bottom beam, a tool having an upper edge substantially coextensive with the bottom edge of said top beam for engaging a workpiece, hinge means attached to the upper edge of said tool and the lower edge of said top beam pivotally connected to said tool and top beam for conjoint movement therewith and for swinging movement relative thereto and means for moving said tool about said hinge into and out of the plan of said top beam movement.

2. The brake press according to claim **1** wherein said top beam has a lower edge and a front face, and includes a supporting bar for holding said tool, having a front face and an upper and lower edge, said hinge means connecting said top beam and said supporting bar on the front faces thereof and arranged to permit the adjacent edge of said supporting bar to abut the lower edge of the top beam when said supporting bar is located in the vertical plane of movement.

3. The brake press according to claim **2** wherein said abutting edges of said top beam and supporting bar are provided with mating means.

4. The brake press according to claim **2** wherein said means for pivoting said supporting bar comprises a fluid motor.

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