Oct. 28, 1969 R. J. SPIEGEL 3,474,657

LAMINATED PRESS BRAKE DIE

Filed April 26, 1966

Fig. 1

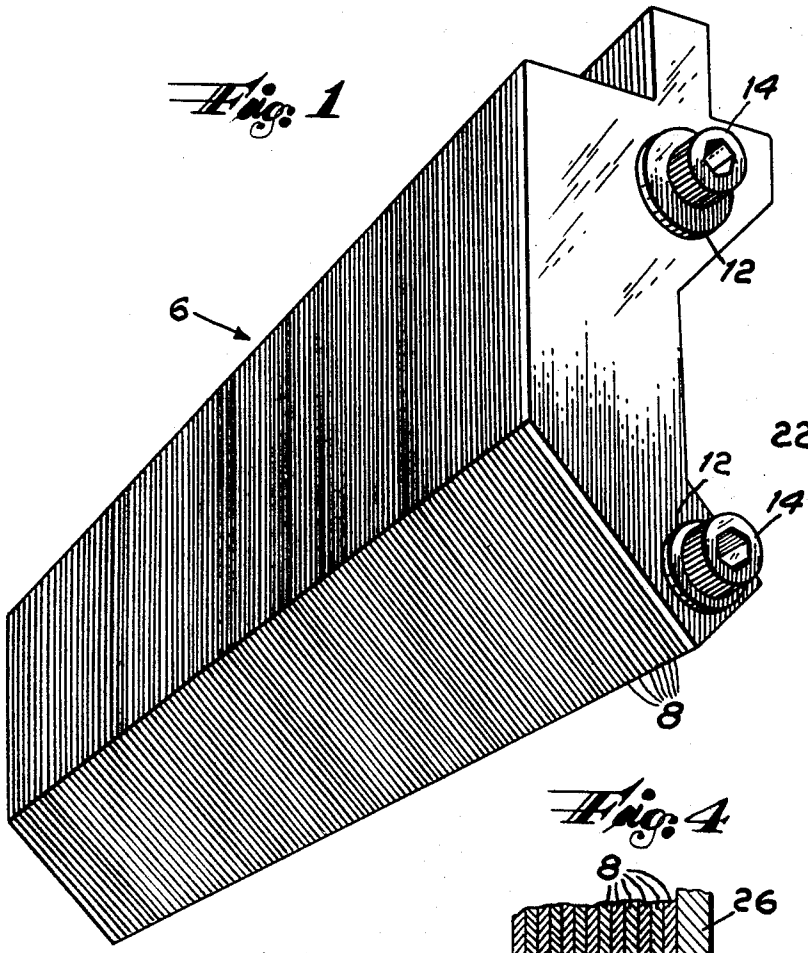


Fig. 2

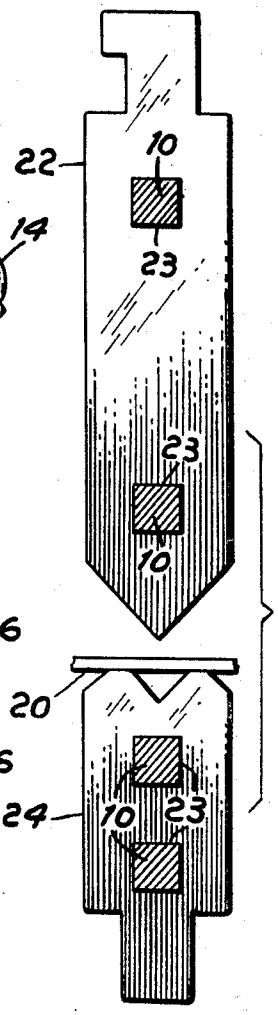


Fig. 3

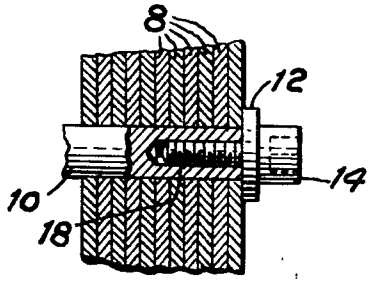


Fig. 4

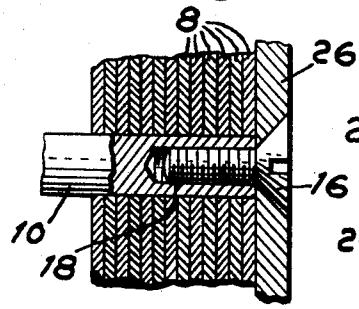
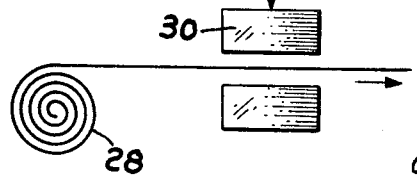


Fig. 5



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LAMINATED PRESS BRAKE DIE

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U.S. Cl. 72—478 4 Claims

ABSTRACT OF THE DISCLOSURE

A press brake tool is disclosed in which a die is formed by aligning laminated stamped pieces.

This invention relates generally to metal forming dies and more particularly to a press brake die constructed by laminating stamped pieces.

In the art of metal working the well-known press brake die has long been used to form metal work pieces. In the past these press brake dies have been constructed from solid drawn or formed pieces which require expensive steps in manufacture. The expense of design, planning, heat treating, straightening and grinding have provided press brake dies in the past which have been satisfactory from the standpoint of operation but which have been expensive to manufacture.

It is to the reduction in cost of material and labor in the manufacture of press brake dies that this invention is directed.

It is therefore an object of the invention to provide an improved press brake die.

It is a further object of the invention to provide a press brake die utilizing less expensive material than has been utilized heretofore.

It is a still further object of the invention to provide a press brake die utilizing fewer man-hours for assembly than has been needed heretofore.

It is another object of the invention to provide an improved method of manufacturing a press brake die.

It is a feature of this invention to form a laminated press brake die from the assembly of a plurality of individual die members.

It is another feature of this invention that the individual die members are stamped from bulk material.

Still another feature of the invention is the use of substantially square apertures in the individual die members so as to hold the die members in rigid alignment.

It is still another feature of the invention that the press brake dies are so formed that a long press brake die may be easily formed from abutting a plurality of short press brake dies.

These and other objects and novel features of the invention are set forth in the appended claims and the invention as to its organization and its mode of operation will best be understood from a consideration of the following detailed description of the preferred embodiment when used in connection with the accompanying drawings which are hereby made a part of the specification, and in which:

FIG. 1 is a perspective view of an upper laminated press brake die according to the invention.

FIG. 2 is a cross sectional end view showing the upper and lower press brake dies.

FIG. 3 is a partial cross sectional view of one form of securing the die members.

FIG. 4 is a partial cross sectional view showing an alternate method of securing the die members.

FIG. 5 is a representation of die members being stamped from a roll of material.

The preferred embodiment of this invention provides a laminated press brake die which is assembled by threading a plurality of stamped die members on square rods so as to secure the individual die members in rigid alignment and so as to prevent their lateral or rotational movement.

Referring now to FIGS. 1 and 2 a perspective view of an upper press brake die **6** is shown with a plurality of lamina or die members **8** being secured by rods **10**. Washers **12** and bolts **14** and **16**, as seen in FIGS. 3 and 4, secure the die members **8** together by threading into the tapped portion **18** of rods **10**.

FIG. 2 shows an upper and lower press brake die in cross section with a workpiece **20** shown horizontally between them. To form material, relative motion between the upper **22** and lower **24** press brake dies, toward each other, strike and distort the material to thereby form the material in accordance with its thickness and the angles formed by the upper and lower press brake dies.

FIG. 4 illustrates a variation in construcion in that the end plate **26** is thicker than the other die members **8**. This allows the countersinking of the bolt **16** so the outer face of the press brake die is flat. In this manner a plurality of press brake dies may be placed in abutting relation to thereby form a long die from several short ones. This provides versatility and allows large die members to be carried by hand, in short lengths.

The method of assembly involves the stamping of a plurality of die members **8** from bulk material, such as a sheet or roll. FIG. 5 illustrates this operation wherein a roll of material **28** passes a punch device **30** where die members are formed by punching or stamping. In the preferred embodiment of the invention the material **28** may be of a thickness in the range from 0.02 to 0.10 inch of high carbon spring steel having an AISI designation in the range from 1050 to 1075. Laminations of 0.05 inch have proven very satisfactory.

The apertures **23**, in the preferred embodiment of the invention are substantially square in configuration. By threading the die members **8**, **22** and **24** on a substantially square rod **10**, the die members are constrained against rotative motion around the rods **10** and great strength is provided to prevent the assembled press brake die from sagging under its own weight.

The die members may be secured, other than as just described, by welding, arc welding, butt welding or by the use of adhesive material between or along an edge of the lamina.

It should be understood that this invention is not limited to specific details of construction and arranggement thereof herein illustrated, and that changes and modifications may occur to one skilled in the art without departing from the spirit of the invention; the scope of the invention being set forth in the following claims.

What is claimed is:

1. Press brake tooling comprising a plurality of laminated members stamped from bulk material and having substantially square apertures formed therein and arranged to form a die having a linear braking surface, and securing means comprising relatively square rod members for mating with the laminated members for rigidly retaining the die members in an aligned position.

2. Apparatus according to claim **1** wherein the laminated members have a thickness of from 0.02 to 0.10 inch.

3. Apparatus according to claim **1** wherein the securing means is recessed within one or more laminated members so as to permit the abutment of two or more assembled press brake dies together so as to permit the formation of a plurality of press brake sizes.

4. Apparatus according to claim 1 wherein the press brake tooling includes an upper and lower die and wherein the die members are stamped from 0.02 to 0.10 inch thick bulk high carbon spring steel within the AISI range of 1050–1075, having a plurality of substantially square apertures formed therein and having end members of 3/16 inch thickness and wherein the securing means includes substantially square rod members having tapped end portions and bolts matingly engaged with the tapped end portions of the rod members to secure the plurality of die members in rigid laminated alignment, a larger press brake die being formable by the abutment of a plurality of smaller press brake dies.

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