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KICK-UP BACK STOP FOR PRESS BRAKE

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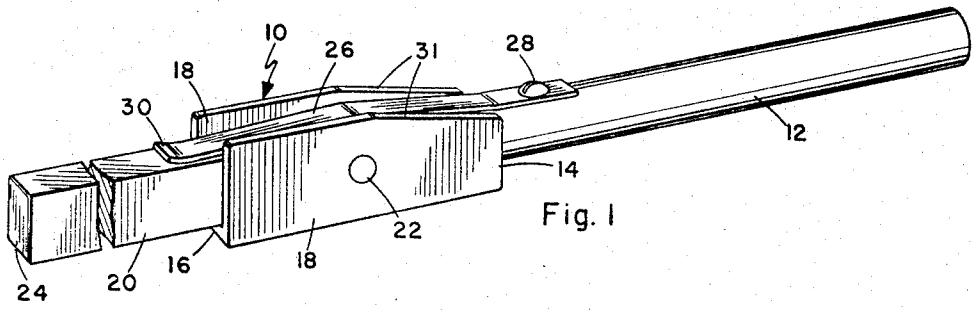


Fig. 1

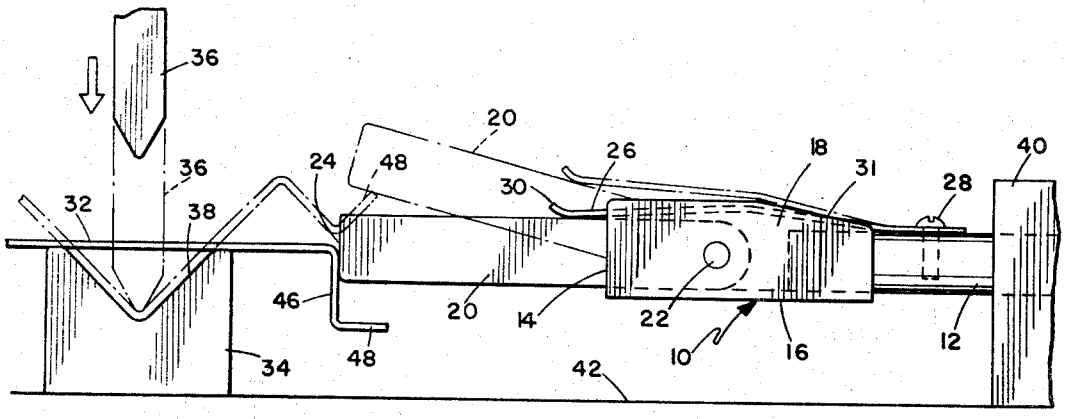


Fig. 2

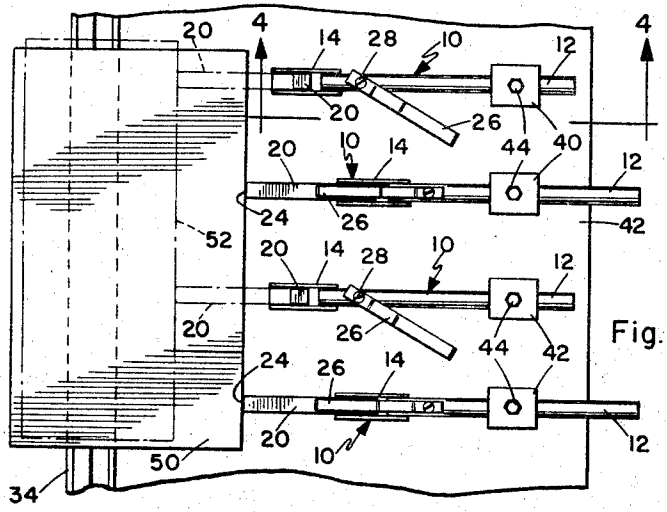


Fig. 3

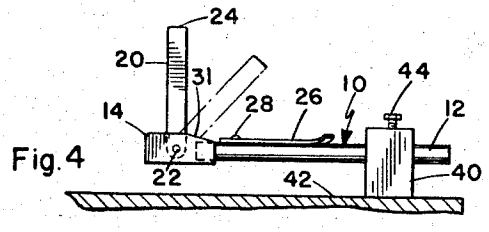


Fig. 4

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KICK-UP BACK STOP FOR PRESS BRAKE

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Int. Cl. B21d *11/22*

ABSTRACT OF THE DISCLOSURE

A back stop for a press brake with the stop bar pivoted in a U-shaped saddle fixed to the end of a support bar designed to be fixed horizontally, the saddle holding the stop bar against side sway and receiving a leaf spring pivoted on the support bar when the leaf spring, along with the stop bar are in operative position.

The present invention relates to metal working tools and specifically to a kick-up back stop for a press brake.

In bending metal parts on a press brake it is common to use some type of stops, locating pins, jigs, or the like to align the metal so that the bend will occur at the correct place. For simple bends, as when making a flange, fixed stops are adequate since the edge of the metal engaging the stops will be pulled clear as the metal is bent. For complex bends, however, fixed stops may obstruct the movement of the metal part as the bending occurs and can cause distortion or damage to the part. In some instances minor dents or distortion of the metal edge is tolerated and is corrected after bending, but the technique is not satisfactory for precision work or quantity production.

The back stop described herein has a stop portion which is hinged to be kicked up by the motion of the metal part during bending, without damaging the part in any way. The hinged stop portion is resiliently held in place by a simple spring which can be displaced when required to allow the stop portion to be raised or hinged back clear of the work area. This facilitates set up and permits the use of more than one set of back stops to be installed at different locations for multiple bending operations at different settings, without having to adjust the stops each time.

The back stop and its use are illustrated in the drawing, in which:

FIGURE 1 is a perspective view of the back stop;

FIGURE 2 is a side elevation view showing the back stop in use on a press brake;

FIGURE 3 is a top plan view, on a reduced scale, of a multiple stop arrangement; and

FIGURE 4 is a view taken on line 4—4 of FIGURE 3.

Similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawing.

The back stop **10** has a rigid support bar **12**, which may be of any convenient length, with a saddle **14** of generally U-shaped cross section fixed to and extending beyond one end thereof. Saddle **14** has a bottom plate **16** and vertical parallel side plates **18**, the top being open. In the extended portion of the saddle **14** is a stop bar **20** one end of which is pivotally mounted on a hinge pin **22** through side plates **18** perpendicular to support bar **12**, so that the stop bar can swing vertically. The stop bar **20** rests on bottom plate **16** and projects from the saddle horizontally, the outer end of the stop bar having a stop face **24**. As illustrated the stop face is a plain vertical surface, but could be made in any configuration to suit specific parts or bending operations. Stop bar **20** is held down in the saddle by a leaf spring **26** secured at one end to the support bar **12** by a pivot screw **28**, the other end of the leaf spring resting on top of the stop bar and having an upwardly turned lip **30** for finger engagement.

The top edge portions of the side plates **18** define a channel above the depressed stop bar and normally restrain the leaf spring **26** from lateral swinging movement out of contact with the stop bar **20** but relieved portions **31** of the side plates adjacent the pivot screw **28** permit such lateral swinging of the leaf spring, as indicated in FIGURE 3. The leaf spring can also be swung to an inoperative position parallel to the support bar.

The back stop is used on a press brake in which a metal part **32** is placed over a die **34** and pressed into the die by a descending head or punch **36**. As illustrated in FIGURE 2 the die **34** has a V-shaped channel **38** to form a right angled bend in the part. The back stop **10** is mounted in a conventional type holder **40** on the bed or frame **42** of the press brake, the support bar **12** extending horizontally through the holder generally perpendicular to the length of the die. A lock screw **44**, or similar retaining means, is used to hold the back stop at any required setting. Several back stops can be spaced along the length of the machine and are adjusted so that when the edge of the metal part is held against the stop faces **24**, the bend line will occur at the correct location.

In making a simple or initial bend, the thin edge of the metal part will be against the stop faces and will probably slide upwardly as bending occurs, without lifting the stop bars. However, if a depending or flanged edge of the part engages the stops, the kick-up action of the stop bars becomes essential. In FIGURE 2, the part **32** is shown as having a downwardly turned wall **46** with an outwardly turned flange **48** along the lower edge thereof. Flange **48** extends beneath the stop bar **20** and the part could certainly not be bent when using fixed stops without damaging the flange. As shown in the broken line position, however, the descending punch **36** presses the part into channel **38** and causes the flanged edge to rise, the flange **48** lifting the stop bar **20**. Spring **26** is merely for holding the stop bar in place and is not strong enough to cause distortion of the part. When the bent metal part is removed the stop bar **20** will drop back into place for the next operation.

By using back stops at different settings it is possible to perform consecutive bending operations without readjusting the stops. As shown in FIGURE 3, the metal part **50** is held against one pair of back stops for a first bending operation. Another pair of back stops secured at a different setting, with their stop faces closer to the die, have their springs **26** swung aside and the stop bars **20** raised clear of the part **50**. The stop bars can be swung back to rest on the support bars **12** if desired, as indicated in the broken line position in FIGURE 4. After the initial bend is made, the part is removed and the raised stop bars are dropped into place, the partially formed part **52** then being inserted to rest against the second set of stop bars, as in the broken line position in FIGURE 3. The springs are replaced to hold the stop bars down, the use of a single screw to hold each spring and the curved lip **30** making it a simple matter to move the spring as necessary.

It will be evident that any reasonable number of back stops may be used in appropriate sets for consecutive bending operations, each set being brought into place only as needed.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawing are to be considered as merely illustrative rather than limiting.

I claim:

1. A kick-up back stop, comprising:

an elongated support bar for attachment to a support;

a saddle fixed to and extending from one end of said support bar;

a stop bar having one end pivotally attached to said saddle to swing about an axis substantially perpendicular to said support bar;

said stop bar extending from said saddle and having a stop face on the other end thereof;

said saddle having a bottom plate including a portion on the side of said axis remote from said support bar, and said stop resting, in its operative position, on said portion;

a leaf spring having one end bearing on said stop bar, the other end of said spring having a pivotal attachment to said support bar, to swing into inoperative positions in a plane substantially perpendicular to the plane of motion of the stop bar and out of contact with said stop bar, said saddle having side plates with portions thereof extending above said stop bar, in the depressed position of the stop bar, and defining a channel for said leaf spring and normally restraining the leaf spring from lateral swinging movement out of contact with said stop bar.

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