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KICK-UP BACK STOP FOR PRESS BRAKE

Filed Sept. 16, 1966

Fig. 1

Fig. 2

Fig. 3

Fig. 4

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Filed Sept. 16, 1966, Ser. No. 579,952
U.S. C. 72-46
Int. Cl. B21d 11/22
P. H. A. P. 1 Claim

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. But when the bar 20 is relieved by raising it clear, the leaf spring 26 is supported by the rear end of the saddle, as illustrated in FIGURE 3. The spring can also be swung to an inactive 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 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:
a 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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