

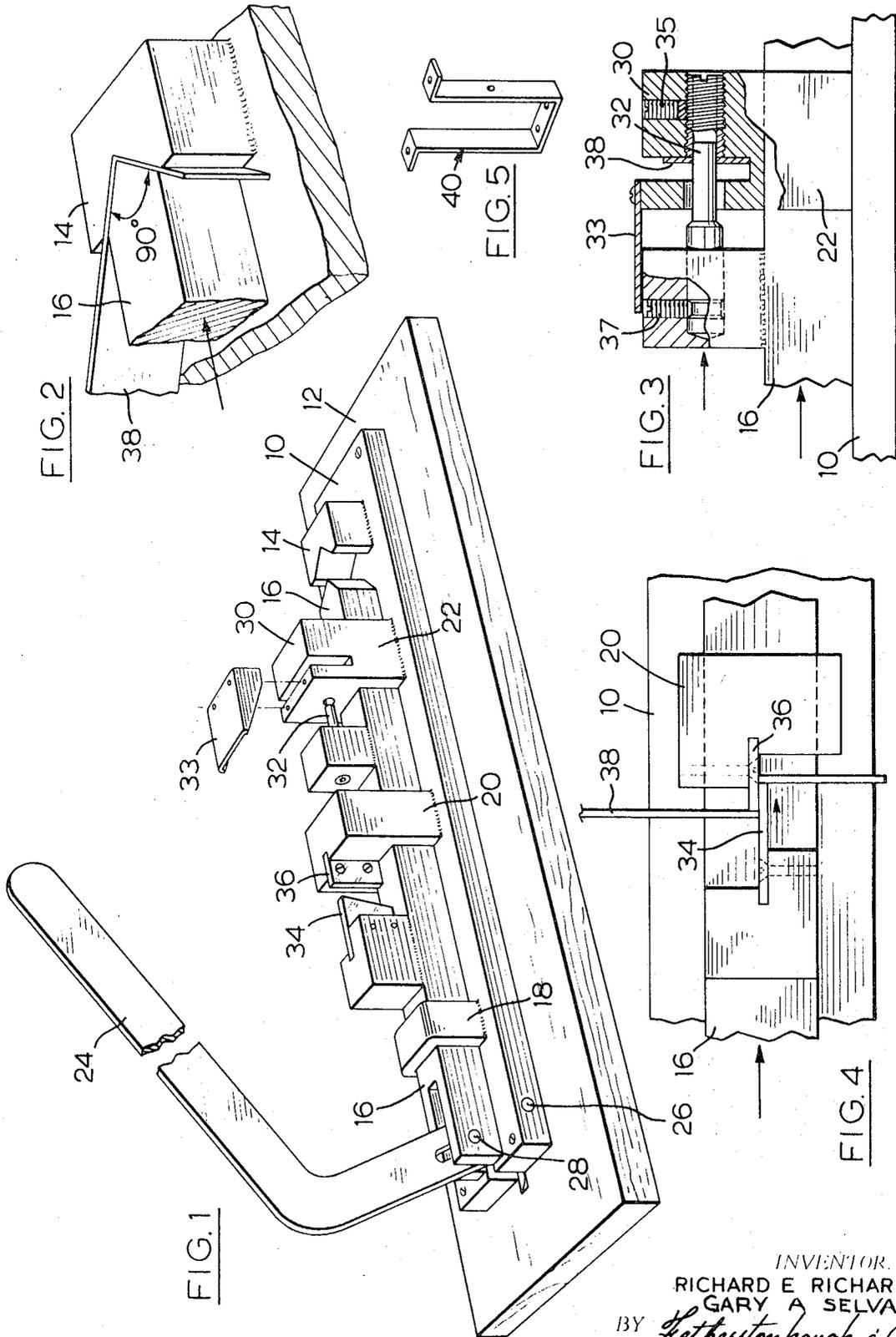
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R. E. RICHARDS ET AL

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COMBINED CUTTING, PUNCHING AND BENDING TOOL

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INVENTOR.  
RICHARD E RICHARDS  
GARY A SELVA  
BY *Hetherington & Co*  
ATTORNEYS

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**COMBINED CUTTING, PUNCHING  
AND BENDING TOOL**

Richard E. Richards, Bramalea, Ontario, and Gary A. Selva, Toronto, Ontario, Canada, assignors to E. Selva & Sons Limited, Toronto, Ontario, Canada

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1 Claim

**ABSTRACT OF THE DISCLOSURE**

This invention relates to a combined tool that can, in turn, cut, punch and bend a strip of metal to form a metal hanger. The punch and one of the cutting shears are mounted on the ram of the break that performs the bending operation so that a common operating handle can be provided for all operations.

This invention relates to a combined cutting, punching and bending tool.

In the sheet metal and related trades, it is practice to secure components, such as ducts, pipes and the like, into position by means of metal hangers. These hangers are formed from strip steel, which the workman cuts as required from a roll or a flat strip of steel and then forms it with his required bends and holes. The cutting and forming cannot, as a general rule, be factory done because every job has a different requirement and the workman must custom make his hangers for every situation that he encounters. The time-honoured practice in the trade has been for the workman to snip off a piece of metal from a roll with a pair of metal cutting snips, drill or punch the necessary holes with a separate drill or punching device, and then bend the strip as required with a pair of pliers, vice or other separate bending tool. These operations are relatively time-consuming and, therefore, costly. There are, of course, in practically every instance better tools for doing the particular job than the workman has used, but these tools are shop tools and the workman cannot transport them to each particular job nor can he attend at a shop to do the necessary operations. He has, therefore, over the years, put up with the inconvenience and inefficiency of the tools that he has had available to him.

It is, therefore, a principal object of this invention to provide a simple, compact, easily transportable tool that is capable of efficiently cutting, punching and bending a strip of metal for the purpose of making a metal hanger or the like.

With this and other objects in view, a machine tool according to this invention, comprises a base, a break bed on said base, a ram for said break bed, means for reciprocating said ram into and out of operative engagement with said break bed, a die, a punch for said die, one of said punch or said die being mounted on said base, the other of said punch or said die being carried by said ram whereby they are carried into and out of operative relationship with each other as said ram is operated by said means for reciprocating said ram, a first shear blade, a second shear blade, one of said first or second shear blades being mounted on said base, the other of said first and second shear blades being carried by said ram whereby they are carried into and out of operative relationship with each other as said ram is operated by said means for reciprocating said ram. The invention will be clearly understood after reference to the following detailed specification read in conjunction with the drawings.

In the drawings:

FIG. 1 is a perspective view of a machine tool according to this invention;

FIG. 2 is a partial view of the break section of the machine showing the break bending a piece of metal;

FIG. 3 is a partial section of the punch section of the machine showing the punch through a piece of metal;

FIG. 4 is a partial section of the cutters showing the cutters cutting through a piece of metal; and

FIG. 5 is a view of a hanger bent by the tool.

Referring to the drawings, the machine tool there shown comprises a steel base 10 mounted on a wooden stand 12. As indicated above, the tool is adapted to bend a strip of metal, to punch a strip of metal and to cut a strip of metal.

The bending operation is achieved by means of a break that consists of a break bed 14 welded to the base 10 and formed with a break surface that is adapted to bend a strip of metal to 90°. The ram 16 for the break 14 is reciprocated within the ram mounting that consists essentially of guide channels formed by strap 18, 20 and 22 by means of a manually operated handle 24. The manually operated handle 24 is pivoted to swing about the base 10 as at 26 and connects with the ram 16 by means of pin 28. A slotted opening at pin 28 in the handle 24 permits the reciprocating movement of the ram 16 as the handle 24 is pivoted about the pivot point 26.

In use, if one wants to bend a piece of metal 38 in the break, one places it at the location where the bend is desired in the break bed 14 and depresses the handle 24 to cause the cooperating end of the ram 16 to press against the metal and form it into the shape of the bed 14, as illustrated in FIG. 2. Bed 14 has a 90° bend, which is the bend commonly required in a hanger assembly.

The tool, however, is designed to achieve the cutting and punching operations that are commonly required in the making of hangers by manipulation of the handle 24 and through the cooperation of appropriate elements mounted on the ram 16 and the base 10.

The punching operation commonly required in the manufacture of hangers is achieved by means of the die 30, which is rigidly mounted on the base 10 at the location of the guide 22 and a cooperating punch 32 that is rigidly mounted on the ram 16. The mounting for the die is formed with an appropriate slot adapted to receive a strip of hanger material and, in use, the handle 24 is actuated to cause the punch to enter the strip of material 38 and the die to punch an appropriate sized hole, as illustrated in FIG. 3 of the drawings. It will be apparent that the punch and die must be arranged so that the punching operation is completed before the ram reaches the full extent of its travel as determined by its cooperation with the break bed 14.

Numeral 33 is a cover that is screwed into place over the punch to prevent improper access to the punch.

The cutting operation is similarly performed. In this case, there is a pair of cooperating blades 34 and 36. The blade 34 is rigidly mounted on the ram 16, while the cooperating blade 36 is rigidly mounted on the base at the location of the guide channel 20. Blades 34 and 36 move past each other in shearing relation and are adapted to cut a strip of metal hanger material 38 as they do so, as shown in FIG. 4 of the drawings. Here again, it will be apparent that the relative movement of the blades, to achieve a cutting operation, must be achieved before the ram achieves its full extent of movement as determined by its mating with the break bed.

It will be noted the punch 32 is set into a hole in the upwardly extending post on the ram. It is maintained in position by means of a set screw 37 that engages in a circumferentially extend groove in the end of the punch. The die 30 is screw-threaded into a through hole in the projection on the base and it is secured into position by

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means of a set screw 35 that bears against a piece of nylon that overlays the threaded die.

In order to align the die and punch mountings, one first drills a hole of small size through the projection on the base that houses the die and into the portion of the ram that houses the punch. The hole is then reamed out in the portion that is to house the punch to a size to accommodate the base of the punch. The portion of the hole that extends through the die retaining post 30 is then reamed out to a larger size to a diameter to house the die. The enlarged die hole is then threaded to receive the die. The punch is first mounted in position and secured by means of the thread screw and then the die is mounted in position and set in position by means of its set screw.

In use, one first determines the hanger requirements and then cuts a strip of metal from a larger piece by manipulating the handle 24 to operate the cutting blades. The strip so cut is then punched as required by manipulating the handle 24 to operate the punch and die 30 and 32. The strip so cut and punched is then formed with the required number of 90° bends by manipulating the handle to operate the ram and break. FIG. 5 shows a hanger 40 that was cut, punched and bent from a strip of metal with the machine.

The invention is very simple and very materially reduces the time that is required to form a hanger. The tool is portable and can be practically used by workmen on the job. The job once completed, is neat and accurate.

We claim:

1. A machine tool comprising a base, a break bed on said base, a ram slidable in guide means fixed to said base and having its free end formed for and disposed in coopera-

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tive relationship with said break bed, means for reciprocating said ram in said guide means to carry the free end thereof into and out of cooperative engagement with said break bed, a die, a punch for said die, one of said die or said punch being mounted on said guide means to overlie the upper surface of said ram, the other being carried by the upper surface of said ram, and both the die and punch being disposed so that they are carried into and out of operative relationship with each other as said ram is operated by said means for reciprocating said ram, a first shear blade, a second shear blade, both blades being oriented normal to the base and one of said first or second shear blades being mounted on said guide means to extend above the upper surface of said ram, and the other being carried by the upper surface of said ram, and both blades being disposed so that they are carried into and out of operative relationship with each other as said ram is operated by said means for reciprocating said ram.

References Cited

UNITED STATES PATENTS

484,369	10/1892	Horner	83—620
1,272,068	7/1918	McClure et al.	83—620
2,023,638	12/1935	Lawson	29—155
3,468,206	9/1969	Bakula	83—599

CHARLS W. LANHAM, Primary Examiner

E. M. COMBS, Assistant Examiner

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