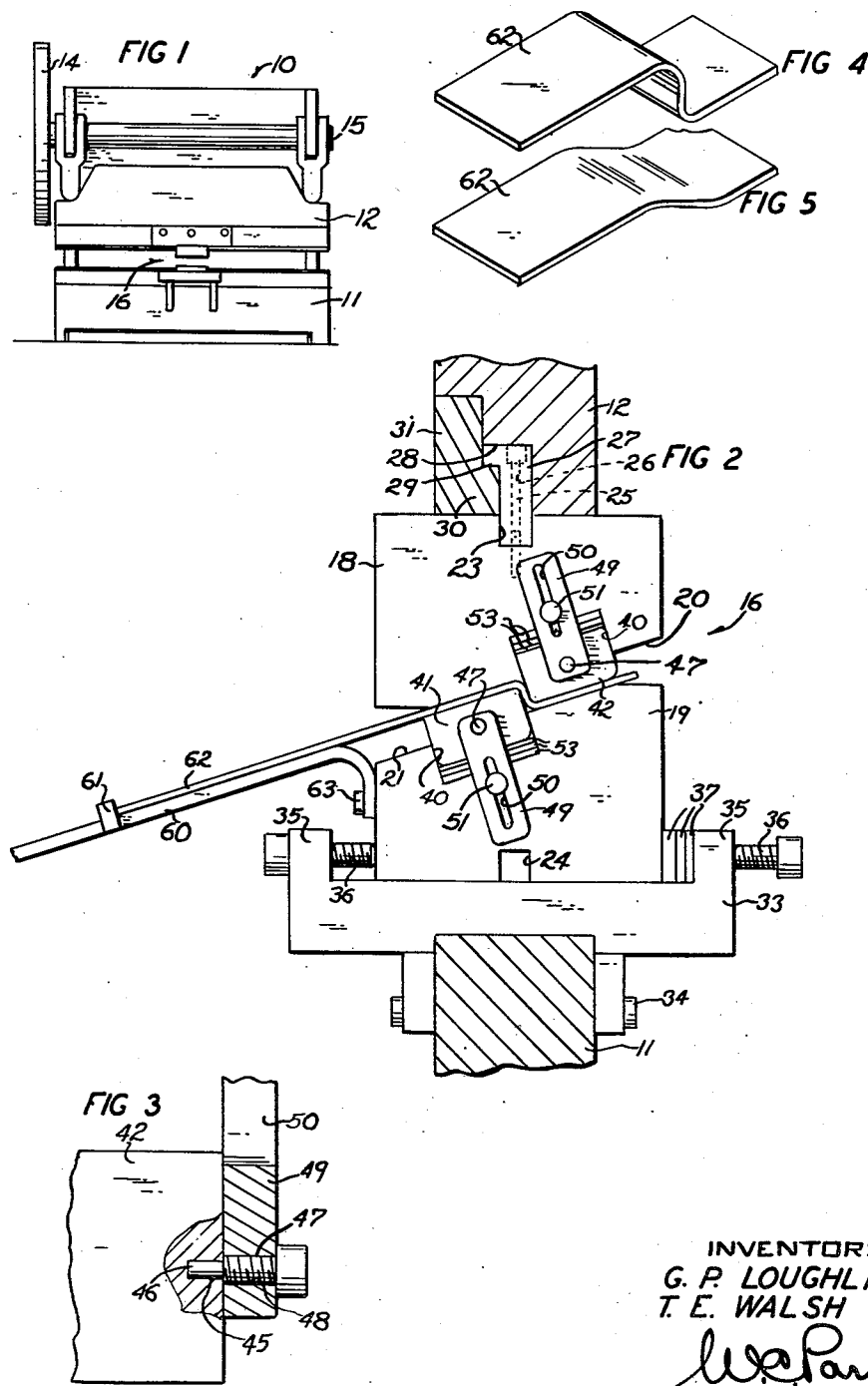


Oct. 1, 1957

G. P. LOUGHLIN ET AL
RECIPROCATING BENDER WITH SELECTIVELY
POSITIONABLE DIE FACES
Filed Dec. 16, 1954

2,808,095



INVENTORS
G. P. LOUGHLIN
T. E. WALSH

W. Parnell
ATTORNEY

1

2,808,095

RECIPROCATING BENDER WITH SELECTIVELY POSITIONABLE DIE FACES

George P. Loughlin, Jersey City, and Thomas E. Walsh, Bayonne, N. J., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application December 16, 1954, Serial No. 475,794

2 Claims. (Cl. 153—21)

This invention relates to bending tools for strip or sheet material and the object of the invention is a tool of this type which is well adapted to making right angle or offset bends of varied radii in such material.

With this and other objects in view, the invention comprises a universal tool for a press having a fixed bed and a reciprocable ram, the tool including members secured respectively to the bed and the ram and having out of line grooves therein to receive elements rectangular in general contour with rounded corner edges of known different radii selectively positioned in the grooves to cooperate with the members to form bends in materials with predetermined radii.

In the present embodiment of the invention, the elements are rotatably supported by arms adjustably secured in any desired position to the ends of the members to permit rapid adjusting and setting of the elements in their respective grooves. Furthermore, spacing members of varied thicknesses may be disposed in the grooves back of the elements to produce varied formations in the material. Also, one of the members is movable relative to the other any desired distance to produce offset bends of varied contours.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawing, wherein:

Fig. 1 is a front elevational view of a press embodying the invention;

Fig. 2 is an enlarged vertical sectional view of portions of the ram and bed of the press illustrating an end elevational view of the tool;

Fig. 3 is a fragmentary detailed view, portions thereof being shown in section, illustrating how the elements are supported rotatably by the arms, and

Figs. 4 and 5 are isometric views of metal members formed by the tool.

In the present embodiment of the invention, the press 10 selected to illustrate the invention includes a fixed bed 11 and a reciprocable ram 12. The ram 12 is reciprocated through single operating cycles in the conventional manner by the operation of a clutch (not shown) connecting the ram driving means, including a flywheel 14, to a crank shaft 15.

The tool, indicated generally at 16, includes members 18 and 19 which are identical in structure including diagonal forming surfaces 20 and 21 which are parallel with each other when the members are mounted in the press. The lengths of the members 18 and 19 may be of any suitable dimensions desired depending upon the maximum width of materials to be bent by the tool. Grooves 23 and 24 extend the full length of the members 18 and 19 and are provided with suitably spaced threaded apertures for screws 25. The screws 25 extend through apertures 26 of a mounting strip 27 and secure the strip in the groove 23 of the upper member. The mounting strip is receivable in a recess 28 of the ram 12 where a laterally extending tongue 29 thereof is interengaged by an enlarged portion 30 of a clamping plate 31 and firmly held

2

in the recess of the ram to thereby secure the upper member 18 to the ram.

The lower member 19 is adjustably located on a support 33 mounted at 34 on the bed 11. The support 33 has upwardly extending flanges 35 with threaded apertures through which adjusting or locating screws 36 extend to engage the adjacent surfaces of the lower member 19 or spacing members 37 interposed between the back surface of the member 19 and the adjacent vertical portion 35. Through this means, the lower member 19 may be moved relative to the upper member to produce right-angle or offset bends of various contours in materials.

Out of line grooves 40 are formed in the members 18 and 19 intersecting the forming surfaces 20 and 21 thereof to receive elements 41 and 42. In the present embodiment of the invention, the elements 41 and 42 are parts of a complete set of elements through the aid of which bends of any desired radii may be produced. It is preferred that the elements 41 and 42 be in like pairs so that bends of like radii may be formed simultaneously. The elements 41 and 42 being rectangular in general contour are provided with four bending edges of different known radii. As an example, one pair of forming elements may have one forming edge with one $\frac{1}{32}$ inch radii, another $\frac{1}{16}$ inch radii, another $\frac{3}{32}$ inch radii and the fourth, $\frac{1}{8}$ inch radii. Other pairs of forming elements may include radii of larger and smaller dimensions than those specified or with radii of finer dimensions in-between those suggested. In this manner, it will require only a few pairs of forming elements to produce bends in materials of all possible radial dimensions with the assurance that the members 18 and 19 and their surfaces 20 and 21 will cooperate with all of the elements regardless of the radii desired for the bends. The pair of forming elements 41 and 42 then are representative of any of the single elements or pairs to be selected, it being observed that these elements have forming edges with radii of different dimensions.

The forming elements 41 and 42 have aligned apertures 45 in the ends thereof to receive pin-like projections 46 of screws 47 disposed in threaded apertures 48 in like ends of supporting arms 49. The arms 49 have elongate apertures 50 therein to receive mounting screws 51 disposed in threaded apertures in the ends of the members 18 and 19. The pair of arms for each element serves various functions, one, to firmly hold the elements in their grooves 40, two, to permit location of the elements at varied positions in the grooves determined by a series of spacing members 53 of various thicknesses any one or group of which may be disposed in either or both grooves or removed entirely therefrom depending upon the required positions of the elements. Another purpose for the arms 49 is one wherein the setting up operation for the tool may be done rapidly if the same elements 41 and 42 are to be employed but different bending edges are to be moved into forming positions. This may be accomplished by loosening the mounting screws 51, moving the elements 41 and 42 free of their grooves 40 where they may be rocked or rotated on the pin-like portions 46 of the screws 47 until the desired forming edges are in position after which the elements with the arms may be moved to locate the elements in the grooves where they are locked in place by tightening the screws 51. A supporting platform 60, including any suitable means 61 to locate material 62 in position when the press is open, is mounted at 63 on the lower member 19, or if desired on the bed 11.

During operation of the press through single cycles, the materials 62 may be positioned in the press during each open portion of the operating cycle after which the conventional means may be operated to cause the press to move through a complete cycle including the closed position of the press illustrated in Fig. 2. These operations

3

may continue forming like bends in successive strips of material until it is desirable to reset the tool which is accomplished while the press is in its open position (as shown in Fig. 1). In this position, the set of elements 41 and 42 may be adjusted to other positions to locate bending edges of different radii in the operating positions. This is accomplished without removing the elements from the tool, it being required that the screws 51 at each end of the members 18 and 19 be loosened to permit movement of the elements free of their grooves for the removal of any or all of the spacing members 53 or the insertion of other spacing members to produce the desired relative positions of the elements when in closed position to produce the bends of the desired dimensions as illustrated (for example) in Fig. 4. If one or both elements 41—42 are to be removed and replaced by another single or pair of elements, the screw or screws 47 may be moved to free one end of each element and the free arm moved to one side. The reverse process may be followed in mounting one or more different elements in place. To produce offset bends of varied dimensions (as illustrated in Fig. 5), the lower member 19 is adjusted relative to the upper member 18 through combined actuation of the screws 36 and the inclusion of spacing members 37, to produce the desired variable positions not only of the members 18 and 19 but particularly of the elements 41 and 42.

From the disclosure of the tool, it will be apparent that numerous bending formations may be produced in materials, these variations not only existing in the radii of the bends and in the distances the bends are from each other but in the adaptability of the tool to offset the bends varied distances.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A universal bending tool for a press having a fixed bed and a reciprocable ram, upper and lower members having parallel forming surfaces disposed at like angles with respect to the path of the ram and parallel out of line element receiving and locating grooves intersecting said surfaces, means to secure the upper member to the ram, a support for the lower member mounted on the bed, elements rectangular in general contour with rounded corner edges positioned in the grooves to locate any corner

4

edge of each element in its respective bending position to cooperate with each other and the forming surfaces of the members to form bends in materials, the corner edges of each element being curved with known different radii to form bends of different predetermined radii in materials when disposed in their bending positions, the elements having aligned apertures in ends thereof, arms adjustably secured to the members, and pivotal supports carried by the arms and receivable in the apertures of their respective elements on which the elements may be rotated to selectively vary the positions of the corner edges of the elements in the bending positions and secure them in their grooves.

2. A universal bending tool for a press having a fixed bed and a reciprocable ram, upper and lower members having parallel forming surfaces disposed at like angles with respect to the path of the ram and parallel out of line element receiving and locating grooves intersecting said surfaces, means to secure the upper member to the ram, a support for the lower member mounted on the bed, elements rectangular in general contour with rounded corner edges positioned in the grooves to locate any corner edge of each element in its respective bending position to cooperate with each other and the forming surfaces of the members to form bends in materials, the corner edges of each element being curved with known different radii to form bends of different predetermined radii in materials when disposed in their bending positions, the elements having aligned apertures in ends thereof, arms adjustably secured to the members, pivotal supports carried by the arms and receivable in the apertures of their respective elements on which the elements may be rotated to selectively vary the positions of the corner edges of the elements in the bending positions and secure them in their grooves, and spacing members of varied thicknesses receivable in the grooves to position the elements relative to the forming surfaces of their members to vary the spacing between the bends in the material.

References Cited in the file of this patent

UNITED STATES PATENTS

338,100	Ohl	Mar. 16, 1886
2,141,736	Castle et al.	Dec. 27, 1938
2,310,498	Turton	Feb. 9, 1943
2,433,226	Lebanc	Dec. 23, 1947

FOREIGN PATENTS

456,493	Germany	Feb. 23, 1928
---------	---------	---------------