

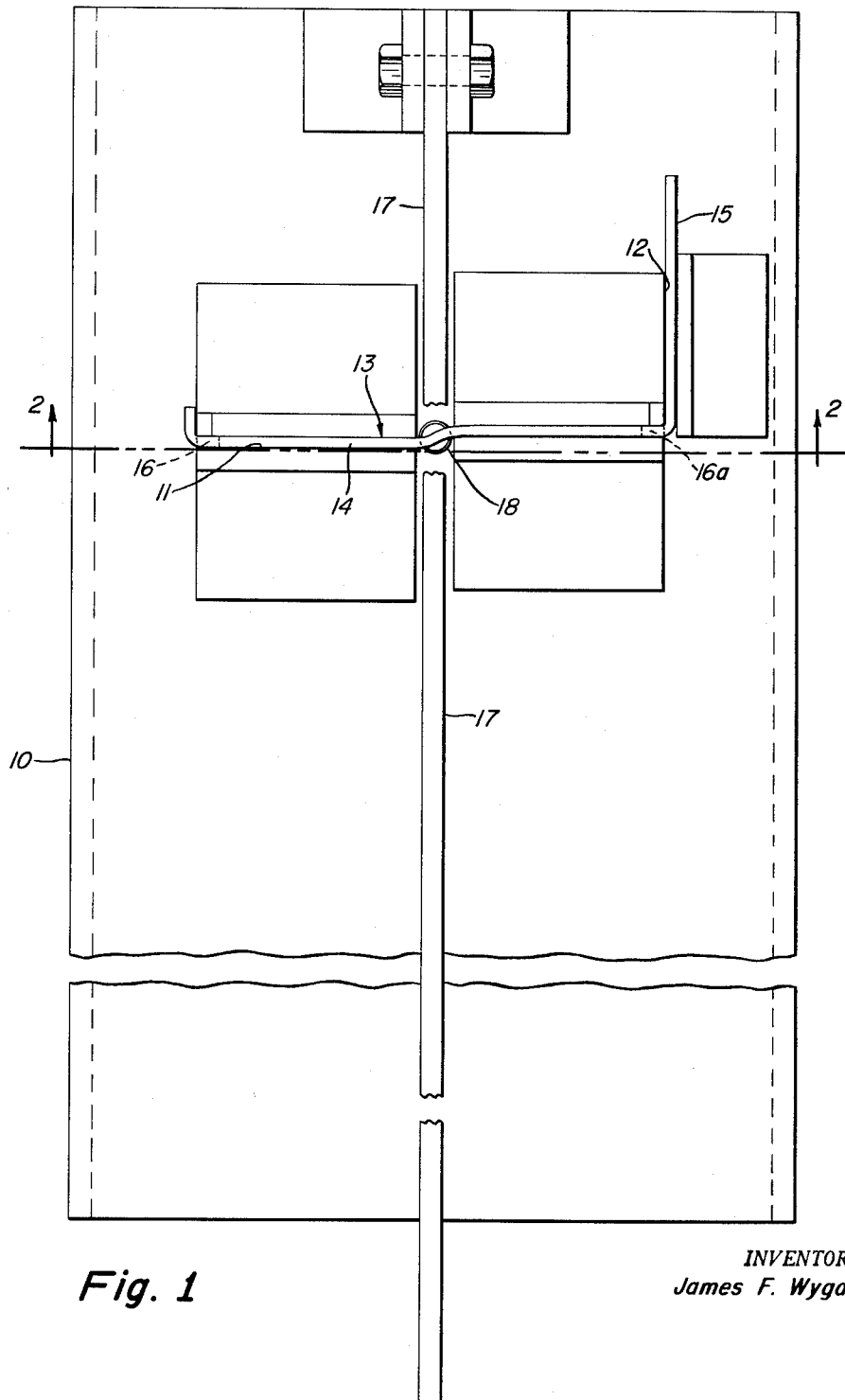
Nov. 19, 1963

J. F. WYGANT
BENDING APPARATUS

3,111,158

Filed April 22, 1960

2 Sheets-Sheet 1



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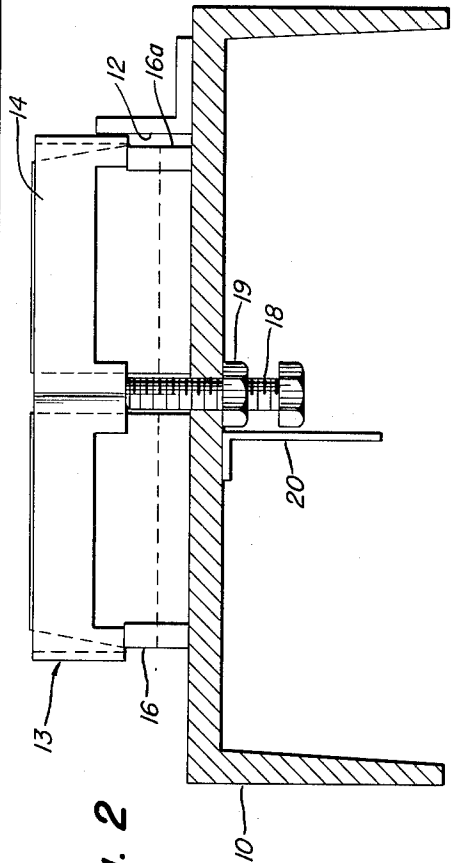
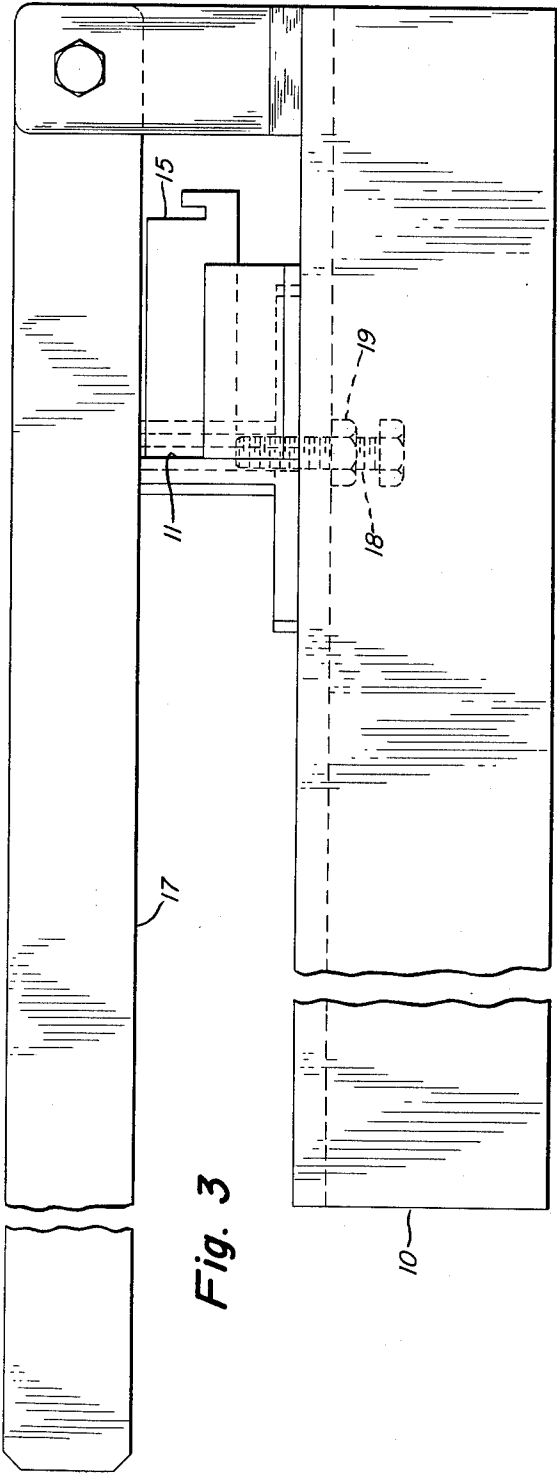
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BENDING APPARATUS

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4 Claims. (Cl. 153-16)

This invention relates to a device for bending an L-shaped article. More particularly it relates to apparatus for bending a unit employed in anchoring a concrete lining, whereby the unit anchor is made to conform to the curvature of the surface to which the concrete lining is applied.

In my co-pending application, S.N. 823,961, now U.S. Patent No. 3,076,481, issued February 5, 1963, I have disclosed a novel unit anchor employed in anchoring monolithic concrete linings to the wall of a conduit, pressure vessel or the like. This anchoring device is an L-shaped article adapted to interlock with other similar anchors to form an interlocking network, attached to a surface to which a concrete lining is to be applied. When applied to a curved surface, each anchor should be bent to approximate the curvature of the surface, without distorting the shape of the anchor other than the bend purposely made.

The unit anchors are adapted for field installation in a piece of equipment, and, consequently require a portable, rugged device to bend the anchors to conform to the particular surface.

An object of this invention is to provide apparatus for bending articles having substantially an L-shape. Another object of this invention is to provide such apparatus to bend one leg of an L-shaped article to a preselected angle of bend while preserving approximately the 90° bend at the junction of the two arms of the shape. A further object of this invention is to provide an apparatus which results in accurately controllable and reproducible degrees of bending. Still another object of this invention is to provide a bending apparatus in which the degree of bending may be varied, but which permits a setting to be maintained indefinitely. A further object is to provide bending apparatus which is portable, physically rugged and inexpensive. Still a further object is to provide bending apparatus having a high production rate, but requiring a minimum of skill and experience by the operator.

Further objects of the invention will become apparent and a fuller understanding of the invention will be had by referring to the following description and the accompanying drawings wherein:

FIGURE 1 is a top view of the apparatus of the invention,

FIGURE 2 is a cross-section of the apparatus taken at line A-A of FIGURE 1, and

FIGURE 3 is a side view of the invention.

Referring to the figures, the bending apparatus includes a base plate 10 provided with two sets of guides 11 and 12. The base plate 10 may consist of any type plate or table having the necessary strength and rigidity, but conveniently a 6" channel iron may be used. The guides 11 and 12 may be set in the base plate 10, however, it has been found convenient to employ lengths of angle irons, mounted on the base, back to back to form these guides. In the preferred embodiment of the invention, the angle irons which form the side walls of the guides are spaced so as to receive the edge of the right angle shape and to position the right angle shape firmly in the apparatus. The purpose of the guides 11 and 12 is to prevent buckling, or transverse bending, of the arm being bent.

In the preferred embodiment of the invention the bending apparatus is provided with a long guide 11 and a short guide 12 placed substantially perpendicular to it for bending the L-shaped anchor 13 having a long arm 14 and a

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short arm 15. The short guide 12 serves to restrain the short arm 15 of the anchor during bending and automatically positions the inserted shape with the long arm resting on the end supports 16 and 16a and the center positioned under the bending lever 17 and over the adjustable stop screw 18. The anchor 13 to be bent may be inserted into the bending apparatus in one motion by merely dropping the shape edgewise into the openings of the guides 11 and 12.

The stop screw 18 may be mounted in the base plate 10 so as to extend upwardly into the guide 11 to a preselected height, depending upon the angle of the bend which is to be made. The precise angle which results will be determined by the relative heights of the end supports 16 and 16a and the extension of the stop screw 18 into the guide 11. When a large quantity of anchors are to be bent to the same angle the stop screw 18 may be fixed in position permanently, or in the preferred embodiment locked in place by means of a lock nut 19. Conveniently, a set of stop screws may be employed to obtain different curvatures, each screw having its own lock nut 19 permanently positioned on the screw by tack-welding, so that the extension of the stop screw 18 into the guide 11 is determined by the position of the lock nut 19.

In order that the extension of the stop screw 18 into the guide 11 is known at all times a gauge 20 may be mounted on the underside of the base plate 10 adjacent the head of the stop screw 18. The gauge 20 may be of any appropriate material provided with scaled lines indicative of the position of the stop screw 18. Preferably, the height of the gauge 20 is the same as the length of the stop screw 18, and the gauge 20 is marked so that the extension of the stop screw 18 is indicated by the position of the screw head relative to the gauge markings. The gauge may be graduated directly in radii of curvature.

Preferably, the bending lever 17 is mounted on the base 10 and aligned substantially perpendicular to the long guide 11. However, the bending lever 17 may intersect the long guide 11 at an angle if desired. Also, the bending lever 17 may be mounted on the base plate 10, so as to be adapted for bending the short arm 15 of the anchor 13.

In the operation of the bending apparatus described above, an L-shaped unit anchor is inserted edgewise into the guides, with the long arm of the anchor in the long guide and the short arm of the anchor in the short guide. The bottom edge of the long arm of the anchor is supported at either end by the end supports and the sidewalls of the guides provide transverse support along substantial portions of each of the arms. The height of the stop screw is set at some point lower than the height of the end supports, the extension of the stop screw from the base being such as to provide the desired angle of bend. The bending lever is brought down to contact the upper edge of the anchor and sufficient force applied to permanently deform the anchor by bending the center portion thereof downwardly until its bottom edge strikes the stop screw. The bending lever is then released and the bent anchor removed from the apparatus.

Various modifications and changes in the construction of the bending device of my invention will be apparent to those skilled in the art, however, these are considered within the scope of the invention.

Having described my invention, what I claim is:

1. A device adapted for bending an L-shaped article which apparatus comprises a base plate; a first guide supported by said base plate, said first guide having side walls spaced to receive an edge of a first arm of said article and to provide transverse support along a substantial length of said first arm; a second guide supported by said base plate, said second guide being adapted to receive the second arm of said article, said second guide being substantially perpendicular to said first guide and adapted to position

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said article when inserted in said device; a pivoted bending lever mounted on said base plate, the pivotal arc thereof intersecting said first guide when said lever is pivoted toward said base plate, said lever thereby contacting said article inserted in said device at the point of said intersection; a stop mounted beneath said first guide at the intersection thereof with said lever and extending upwardly from said base to a height lower than the height of the said walls of said first guide; end supports at either end of said first guide to support said article therein at a height greater than the height of said stop.

2. The device of claim 1 wherein said pivoted bending lever is aligned substantially perpendicular to said first guide.

3. The device of claim 1 wherein said stop is a screw mounted in said base plate and extending into said first guide and wherein a gauge strip is mounted on the underneath side of said base plate, said gauge strip being

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adapted to indicate the extension of said stop screw into said first guide.

4. The device of claim 1 wherein said first guide is grooved at the point of intersection of said lever therewith to accommodate said lever when pivoted toward said base plate.

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