March 11, 1941. W. F. HUCK 2,234,170

MEANS FOR PREPARING PRINTING PLATES FOR APPLICATION TO PRINTING CYLINDERS

Original Filed Sept. 2, 1936 3 Sheets-Sheet 1

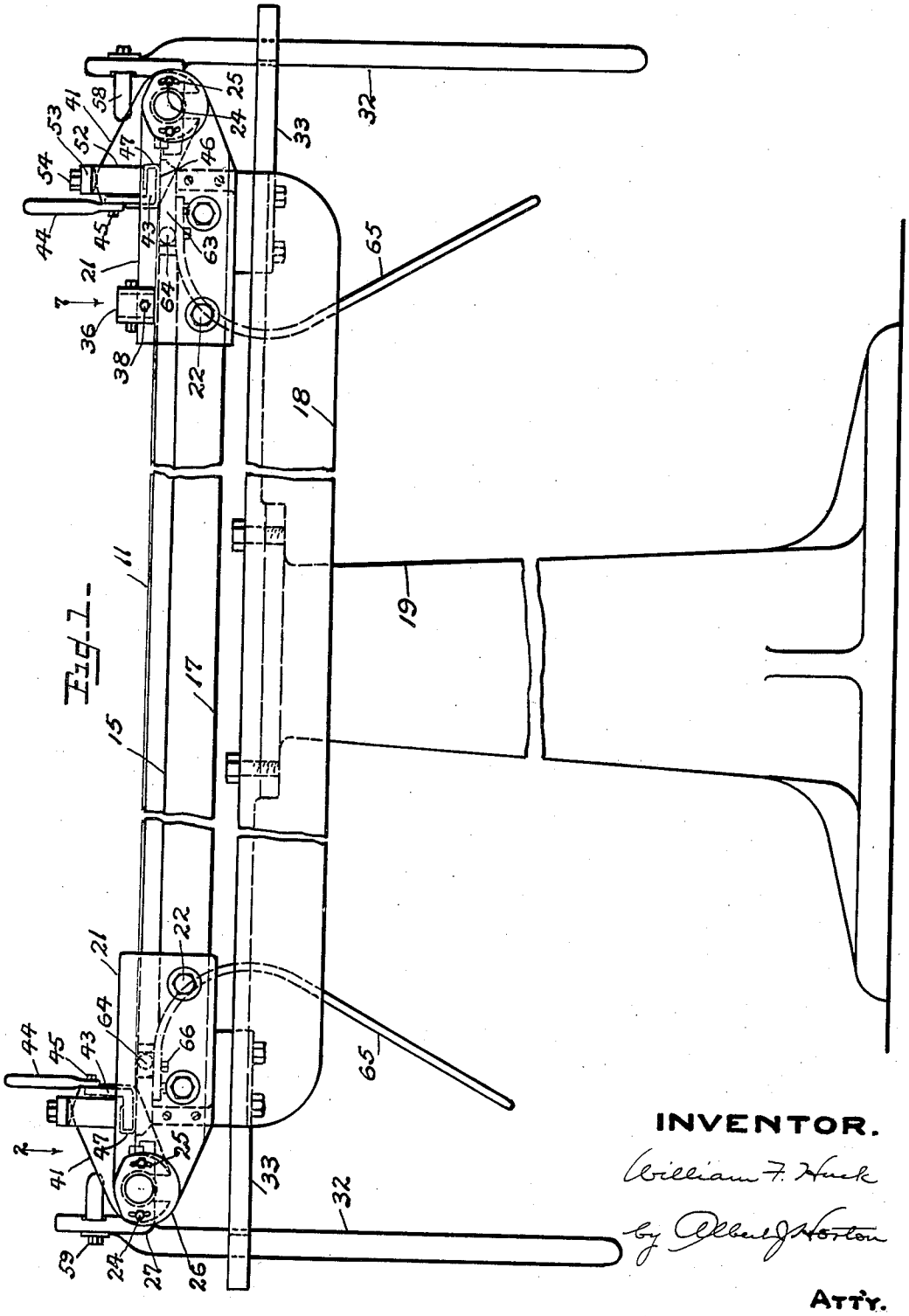


Fig. 1.

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Original Filed Sept. 2, 1936 3 Sheets-Sheet 2

Fig. 2.

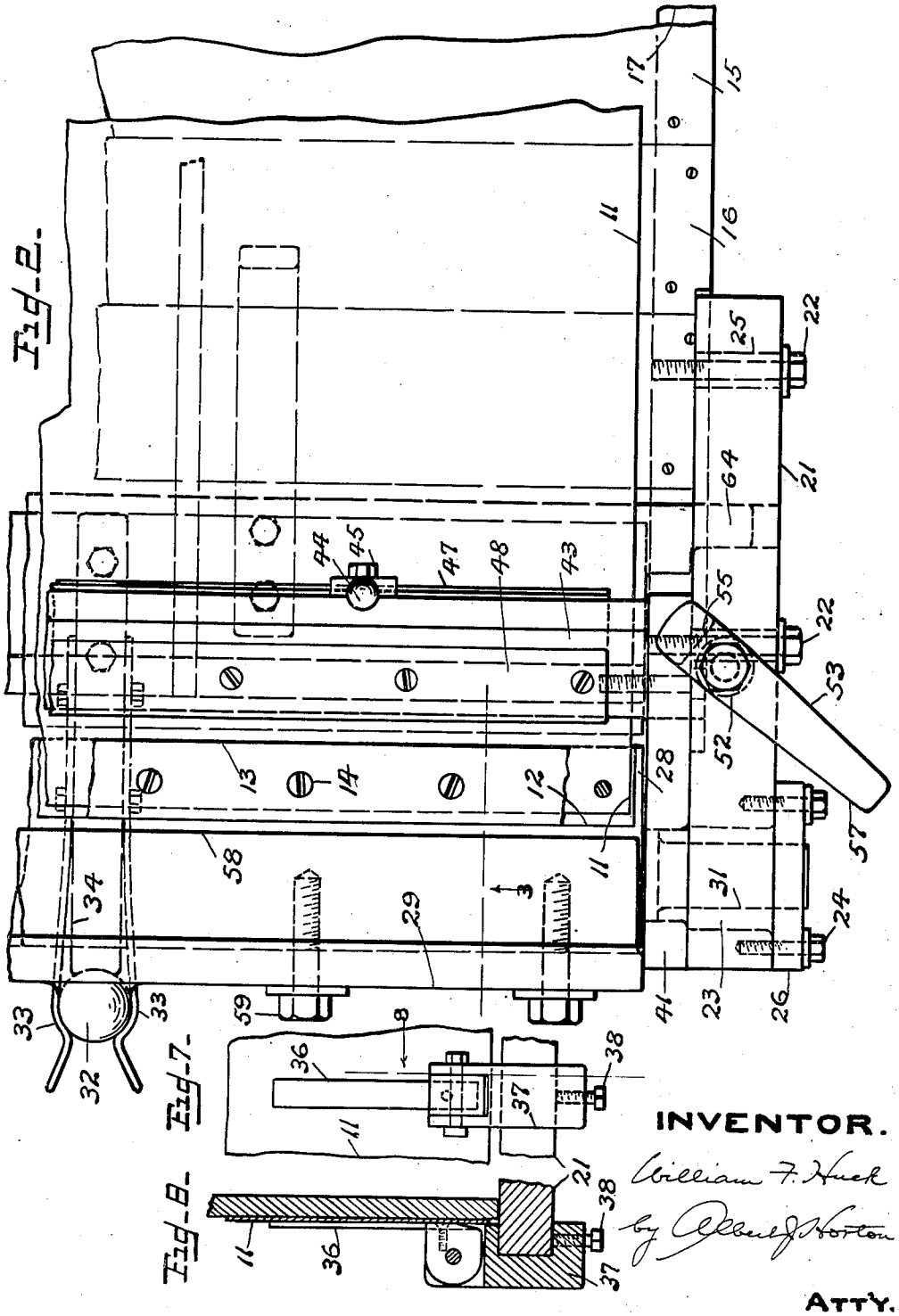


Fig. 7.

Fig. 8.

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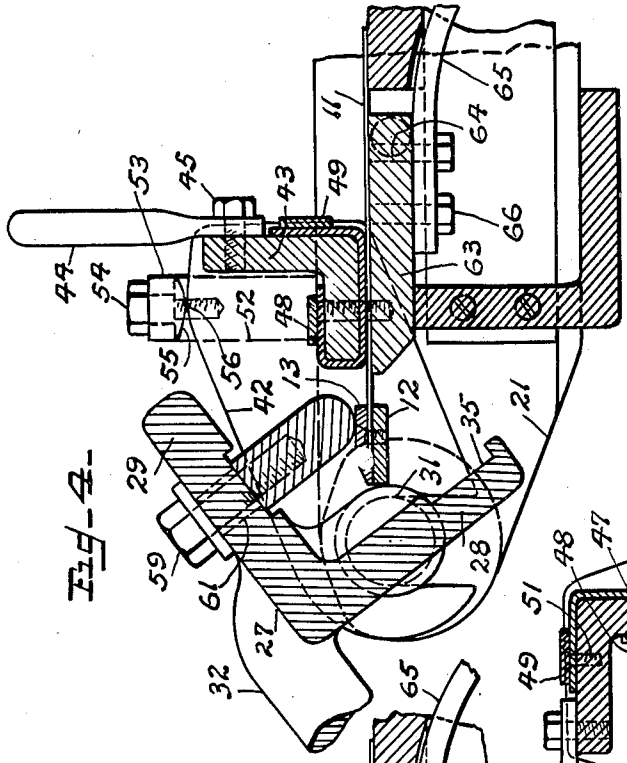


Fig. 4.

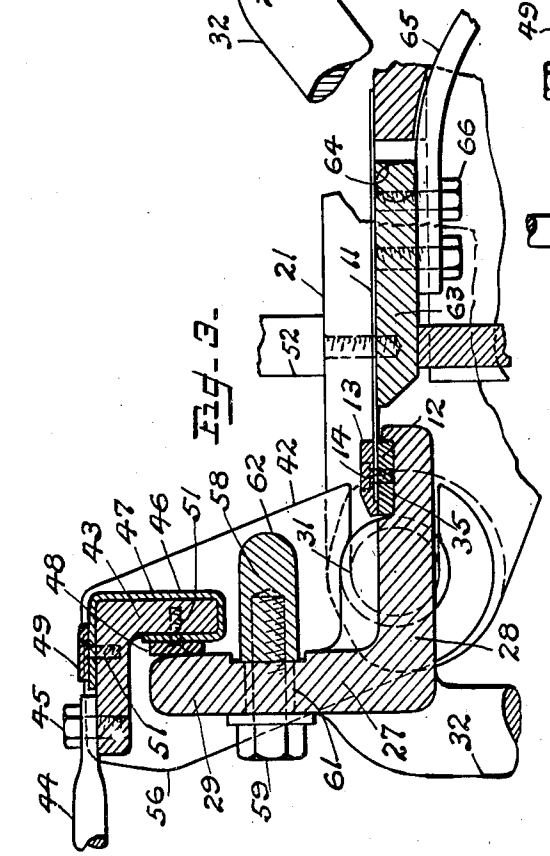


Fig. 3.

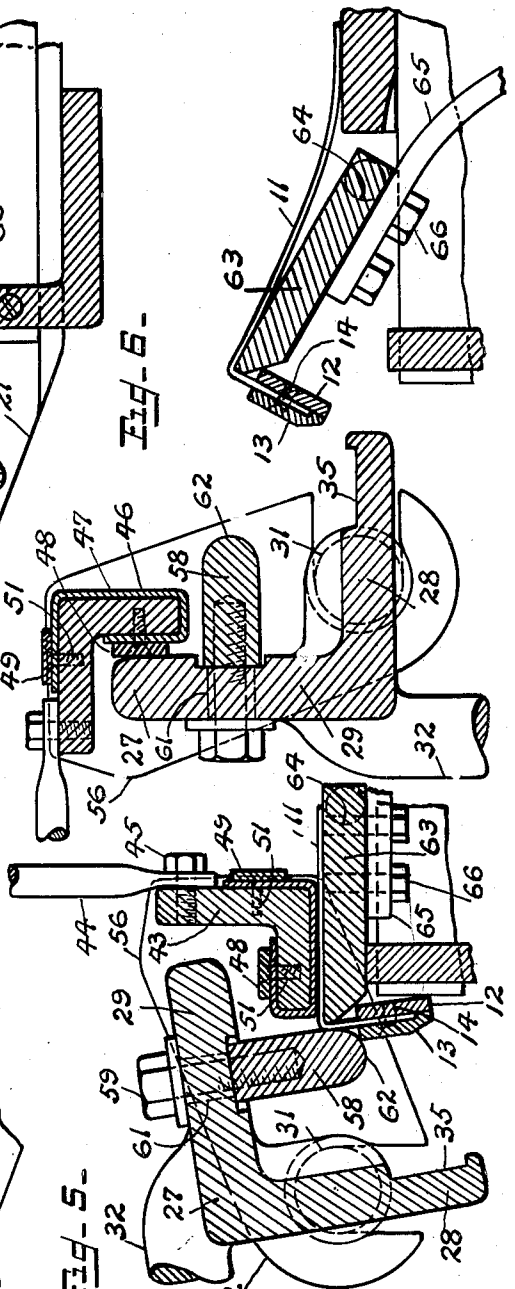


Fig. 5.

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UNITED STATES PATENT OFFICE

2,234,170

MEANS FOR PREPARING PRINTING PLATES FOR APPLICATION TO PRINTING CYLINDERS

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Application September 2, 1936, Serial No. 99,113
Renewed August 3, 1939

19 Claims. (Cl. 153—16)

This invention relates to means for preparing printing plates for application to printing cylinders and more particularly to preparing plates for use in rotary lithographic and photogravure web printing machines. The plates used in such types of printing machines are in many instances formed of flexible sheet metal upon a surface of which the design to be printed is produced by well known methods. These plates are wrapped about the printing cylinder, being secured in place by means of suitable devices whereby the adjacent plate ends are drawn closely together to prevent any appreciable gap between the ends thereof and are locked in such position.

A device whereby a flexible printing plate referred to above may be securely wrapped about a cylinder and locked in such position thereon is shown and described in Patent Number 2,051,858, granted August 25, 1936. In the use of this device, it is desired that each end of the plate be bent entirely across the plate, square with its edges, that the bend be located a predetermined distance from the printing form or design, and that plate clamping bars provided on each end of the plate be located a predetermined distance from the bend. The fixture shown in the accompanying drawings and as hereinafter described is particularly useful in the accomplishment of the above desideratum.

One of the objects of this invention is to provide a printing plate bending fixture having means to qualify the length of the plate plus its clamping bars before bending the plate.

Another object is to provide in such a fixture, means to positively locate the position of the bend relatively to the printing design on the plate.

Still another object is to provide in such a fixture, means to positively locate the position of the bend relatively to the plate clamping bars.

Still another object is to provide in such a fixture, means to bend a plate, which is adjustable to provide for differences in plate thickness, to insure squareness of the bend, and to insure correctness in the location of the bend.

It is also an object of this invention to provide a printing plate registering fixture of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevational view of a plate bending fixture embodying the features of this invention;

Figure 2 is a partial plan view of the fixture shown in Figure 1, looking in the direction of arrow 2;

Figure 3 is a section on line 3 of Figure 2, but showing the plate clamp in unclamped position;

Figure 4 is a view similar to Figure 3, but showing the parts in another position whereby the plate is clamped and the bending operation about to be started;

Figure 5 is another view similar to Figure 3, but showing the position of the parts directly after a plate end has been bent;

Figure 6 is still another view similar to Figure 3, and showing the position of the parts after bending and unclamping of the plate, and showing the stripping of the plate from the fixture;

Figure 7 is a partial plan view of a part of the fixture looking in the direction of arrow 7 in Figure 1; and

Figure 8 is a sectional view of the parts shown in Figure 7 looking in the direction of arrow 8 thereon.

The fixture selected to illustrate the features of this invention is particularly designed for the purpose of preparing and bending a printing plate 11 formed of flexible sheet metal and having a clamping bar secured to each of its ends, which bar comprises a lower member 12 and an upper member 13 which are secured together by screws 14 whereby the respective plate end is clamped therebetween. As referred to above, the plate 11 is intended to be wrapped about a printing cylinder and retained thereon by suitable devices which use the clamping bars at each end thereof to assist them in so doing. When applied on the cylinder the bends, one at each end of the plate, substantially abut each other, thereby preventing any appreciable gap being produced at this point. Inasmuch as the clamping bars are used by the aforesaid device, it is necessary to locate the bend relatively to the bar. It is also necessary to locate the bend relatively to the printing design on the plate in order that the printed matter therefrom will properly register with the printed matter produced by other plates and also be properly located upon the sheet being printed.

The fixture of this invention is provided with a

table-like plate support 15. The plate support 15 may be constructed of wooden strips 16 mounted upon a frame 17 of metal plates, which is supported above the floor by a frame 18 carried by a standard 19. The fixture is provided with a plate bending device at each end of the table 15. The fixtures are the same in structure and similarly operate to bend the plate in view of which only one will be described. For certain purposes, however, portions of each device cooperate, as will be pointed out hereinafter, to accomplish one or more of the above desirable results.

A bearing bracket 21 is secured at each side of each end of the table 15 by bolts 22 and supports a bearing bushing 23, which is eccentrically mounted therein and is secured thereto by screws 24 passing through elongated slots 25 formed in a flange 26 formed as a part of the bushing 23. An angle bar 27 having flanges 28 and 29, substantially at right angles to each other, is disposed between each pair of brackets 21 at each end of the table 15 with gudgeons 31 extending from each end of the bar 27 journaled in the respective bearing bushing 23. An operating handle 32 extends from the bar 27 and is provided for the purpose of rocking the bar upon its gudgeons 31. Cooperating spring fingers 33 secured to the underside of the table 15 cooperate to grip the handle 32 and retain it in inoperative position. In its inoperative position the flange 28 is disposed in a horizontal plane with its operable surface in alignment with the upper surface of the table 15, and the flange 29 is vertically disposed. A stop member 34 disposed between the fingers 33 is adapted to positively insure such position of the flanges 28 and 29 due to the engagement of the handle 32 therewith.

The flange 28 is provided with a groove 35 which extends the length of the flange and is of proper width and depth to receive the lower member 12 of the plate clamping bar. In cooperation with the groove 35 in the flange 28 at the other end of the table 15, the plate 11 with its clamping bars may be qualified as to length by the disposal of a clamping bar in each groove 35 and adjusting the clamped plate between the members 12 and 13 thereof. Adjustment of the eccentric bearing bushing 23 permits slight changes in the distance between the grooves 35 to obtain correct measurements and location of the plate 11.

A gauge blade 36 is pivotally mounted in a bracket 37, which is slidably mounted upon the frame 17 at one end of the table, and is provided for the purpose of gauging the distance between the printing design on the plate 11 and the plate clamping bar. A blade 36 is disposed at each side of the table 15 whereby the printing design may be squared with the edge of the frame 17 and disposed parallel with the plate clamping bar. Each of the brackets 37 may be secured in place on the frame 17 by means of a clamping set screw 38, thus permitting the operation of the fixture upon a plurality of similar plates and insuring the same dimensions in the location of the printing design relatively to the clamping bar on each.

A pair of arms 41 and 42 are swingably mounted upon each of the gudgeons of each of the angle bars 27. Extending between the arms 41 and 42 of each pair is a clamping member 43 which is secured to the arms and is swingable therewith by means of a handle 44 secured to the member 43 by screws 45. The member 43 has a plate engaging surface 46 which, in this instance, is preferably covered by a sheet of soft felt 47 clamped to the member 43 by securing bars 48 and 49 and screws 51. Posts 52, extending upwardly from each bracket 21, have upon their upper ends a swingable lever 53 pivoted to the respective post by a screw 54. One end of each of the levers 53 is provided with a camming surface 55 adapted to engage a camming surface 56 formed on the upper surface of each of the arms 41 and 42 when the member 43 is in engagement with a plate 11 on the table 15 to securely clamp the plate between the same. The other end of each of the levers 53 is extended to provide an operating handle 57 therefor.

A bar of metal forming a bending head 58 is disposed on edge against the surface of the flange 29 of the angle bar 27 and secured thereto by screws 59 which pass through elongated openings 61 in the flange 29 and thread into the edge of the head 58 abutting the flange. The other edge 62 of the head 58 is rounded over and cooperates with the edge of a swingable plate stripping bar 63 provided at and extending across the end of the table 15 to bend the plate 11. The head 58 extends along the flange 29 substantially its entire length. Alignment of the head 58 on the flange 29 permitted by the elongated openings 61 and of the eccentric bushing 23 in which the gudgeons 31 are journaled compensates for variations in thickness of the plate 11 and permits correct alignment of the rounded edge 62 of the head 58, with the plate stripping bar 63. While the angle bar 27 is being swung to bend a plate by means of the operating handle 32 the plate clamping bar 12, 13 is released from the groove 35 in the flange 28.

The plate stripping bar 63 is provided with gudgeons 64, one at each end, which is journaled in the adjacent bracket 21. An operating handle 65 is secured to the bar 63 by screws 66 and extends downwardly and outwardly into convenient reach of the operator. The bar 63 is operated after a plate 11 has been bent to raise the bent end of the plate to readily permit its removal from the fixture.

The provision in a plate bending fixture of the type above described, of means to clamp and bend both ends of a plate including means to locate the bend both in respect to the printing design on the plate and to the end of the plate or to plate clamping members secured thereon, results in accurate and efficient preparation of a printing plate for use on and securement to a printing cylinder. By the use of a fixture as described above, a plate 11 having a printing design thereon, may be located in respect to its end clamping bars 12, 13, due to the gauge blades 36 and the grooves 35 in the flange 28 of the angle bar 27 to be parallel therewith and with the bars 12, 13 square with the side edges of the plate. The eccentric bushing 23 permits the correct location of the grooves 35 in respect to the outer edge of the bar 63 over which the plate is bent. The distance between the bends is controlled by adjustment of the brackets 21 on the table 15. The provision of the adjustable angle bar 27, and in addition the adjustable bending head 58, permits compensation for variations in thickness of the plate and forms means whereby the bends may be located the desired dimension from the printed design and/or the end of the plate, or the plate end clamping bars. When once adjusted the fixture may be conveniently used for bending a number of similar plates. In addi-

tion to the above, provision of the stripping bar **63**, whereby the bent plate ends are raised, permits ready removal therefrom without affecting the bend or in any manner distorting the plate.

The operations performed during the use of this fixture may comprise the placement of clamping bars **12**, **13** in the grooves **35**, the placement of a plate **11** on the table **15**, (see Figure 3), the use of the gauge blades **36** to locate the printing design on the plate in respect to the plate end clamping bars **12**, **13** and then the clamping of the plate between the bars. The plate **11** is then securely clamped to the table **15** by the clamping members **43** by operation of the levers **53** (see Figure 4), and then bent about the edge of the stripping bar **63** by the swinging of the angle bar **27** and the cooperating head **58** (see Figure 5). After bending the plate **11**, the clamping member **43** is released and swung upwardly, the angle bar **27** is swung upwardly and away, and the stripping bar **63** rocked on its gudgeons to raise the bent end of the plate to remove it from the fixture (see Figure 6).

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, and it will be further understood that each and every novel feature and combination present in or possessed by the mechanism herein disclosed forms a part of the invention included in this application.

What I claim is:

1. In a bending fixture for a plate having an end clamping part thereon, a plate supporting table, a member disposed at one end of said table and having a recess to receive the plate end clamping part to locate the plate end relatively to the end of the table, a bending head adapted to engage the plate end and bend the plate about the end of the table, and means to substantially simultaneously actuate said head and said member to bend the plate and to release the plate end clamping part from the recess in said receiving member.

2. In a bending fixture for a plate having an end clamping member thereon, a plate supporting table having a swingable end portion, a member disposed at one end of said table to receive the plate end clamping member and to locate the plate end relatively to the end of the table, a bending head adapted to engage the plate end and bend the plate about the swingable end portion of said table, means to actuate said head to bend the plate, and means to swing the said table end portion.

3. In a bending fixture for a plate having an end clamping part thereon, a plate supporting table, a member disposed at one end of said table and having a recess to receive the plate end clamping part to locate the plate end relatively to the end of the table, means to clamp the plate upon the table, a bending head adapted to engage the plate end and bend the plate about the end of the table, means to actuate said head and said member to substantially simultaneously bend the plate and to release the plate end clamping part from the recess in said receiving member, and means to release said plate clamping means.

4. In a bending fixture for a plate having an end clamping member thereon, a plate supporting table having a swingable end portion, a member disposed at one end of said table to receive the plate end clamping member and to locate the plate end relatively to the end of the table, means to clamp the plate upon the table, a bending head adapted to engage the plate end and bend the plate about the swingable end portion of said table, means to actuate said head to bend the plate, means to swing the table end portion, and means to release said plate clamping means.

5. In a fixture for bending a plate having a printing design thereon, a table for supporting the plate, a swingable end edge on said table about which the plate is to be bent, means to insure that the printing design is parallel with the table end edge, means to clamp the plate on said table, means to bend the plate about the table end edge, and means to swing the table end edge.

6. In a fixture for bending a plate, a support for a plate, a plate bending head, a member having an edge about which the plate is to be bent, means to pivotally support said bending head for swinging movement past the edge of said member, and means to pivotally support said member for swinging movement to raise the plate after bending.

7. In a fixture for bending a plate, a plate support having an edge about which the plate is to be bent, a member having flanges substantially at right angles to each other, said member being mounted for swinging movement, a first one of said flanges being adapted to position the plate relatively to said edge, and a member on the second of said flanges extending parallel to the first flange to engage the plate and bend it about said edge when the flanges are swung in one direction.

8. In a fixture for bending a plate, a plate support having an edge about which the plate is to be bent, a member substantially in alignment with the support and being adapted to locate the plate on said support relatively to said edge, a bending head above and extending toward the support to engage the plate and bend it about said edge, common means to carry said head and said member and being operable to actuate said plate bending head and to simultaneously remove said plate locating member from its operative positon, and means to insure the replacement of said plate locating member in plate locating position.

9. In a fixture for bending a plate, a plate support having an edge about which the plate is to be bent, a member substantially in alignment with the support and being adapted to locate the plate on said support relatively to said edge, a bending head above and extending toward the support to engage the plate and bend it about said edge, common means to carry said head and said member and being operable to actuate said plate bending head and to simultaneously remove said plate locating member from its operative position, means to insure the replacement of said plate locating member in plate locating position, and means to adjust said carrying means to vary the position of said plate locating member relatively to said edge.

10. In a fixture for bending a plate having a printing design thereon and a clamping bar on its end edge, a rockably mounted member having flanges, one of said flanges being at an angle to the other, a plate support, a first one of said flanges having a recess adapted to receive the clamping bar on the plate and a second one of said flanges having a plate engaging and bend-

ing head thereon extending over and parallel to the first flange.

11. In a fixture for bending a plate having a printing design thereon and a clamping bar on its end edge, a rockably mounted member having flanges, one of said flanges being at an angle to the other, a plate support, a first one of said flanges being substantially in alignment with said support and having a recess adapted to receive the clamping bar on the plate and a second one of said flanges having a plate engaging and bending head thereon extending over and parallel to the first flange, and means to rock said member to remove the clamping bar from the plate receiving recess in the first flange and to engage the plate by said bending head.

12. In a fixture for bending a plate having a printing design thereon and a clamping bar on its end edge, a rockably mounted member having flanges, one of said flanges being at an angle to the other, a plate support, a first one of said flanges being substantially in alignment with said support and having a recess adapted to receive the clamping bar on the plate and a second one of said flanges having a plate engaging and bending head thereon extending over and parallel to the first flange, means to rock said member to remove the clamping bar from the plate receiving recess in the first flange and to engage the plate by said bending head, and means to engage said rocking means when said plate receiving flange is in position to receive a clamping bar.

13. In a fixture for bending a plate having a printing design thereon and a clamping bar on its end edge, a rockably mounted member having flanges, one of said flanges being at an angle to the other, a plate support, a first one of said flanges being substantially in alignment with said support and having a recess adapted to receive the clamping bar on the plate and a second one of said flanges having a plate engaging and bending head thereon extending over and parallel to the first flange, means to rock said member to remove the clamping bar from the plate receiving recess in the first flange and to engage the plate by said bending head, means to engage said rocking means when said plate receiving flange is in position to receive a clamping bar, and means associated with said last named means to insure the return of said clamping bar receiving flange into the same position at each operation.

14. In a fixture for bending a plate adjacent its end, a table for supporting the plate, a freely swingable plate stripping bar extending across an end of said table and about an edge of which the plate is to be bent, means to engage and bend the plate in one direction about the edge of the said bar, and means to swing the bar in an opposite direction to the direction the plate is bent.

15. In a fixture for bending a plate adjacent its end, a table for supporting the plate and having a swingable end edge portion about which the plate is to be bent, a rockable bar extending across the table in front of the table end edge portion, a plate end edge locating member attached to and extending from said bar toward the table end edge portion, a bending head attached to said bar, spaced above and extending over said locating member, to engage the plate end and bend it over the table end edge portion, and means to rock said bar.

16. In a fixture for locating a clamping bar upon an end of, and for bending, a plate having a printing design thereon, a table for supporting the plate and having an end edge about which the plate is to be bent, means to locate the printing design on the plate relatively to the table end edge, means to releasably hold a clamping bar to be secured to the end of said plate and to locate said bar with respect to the printing design on the plate, means to bend the plate about the table end edge, and means to actuate said bar holding means and said plate bending means to release the bar and bend the plate.

17. In a fixture for bending a plate having a printing design thereon and for locating a clamping bar upon an end of the plate, a table for supporting the plate and having an end edge about which the plate is to be bent, means to locate the printing design on the plate relatively to the table end edge, means to receive and releasably hold a clamping bar to be secured to the plate end and to locate said bar with respect to the printing design on the plate, means to clamp the plate on said table, means to bend the plate about the table end edge, and common means to actuate the bar holding means to release the bar, and the bending means to bend the plate.

18. In a fixture for bending a plate, means to support a plate, a member adapted to engage and to bend a plate on said support about an edge thereof, a member to locate the bend in a predetermined position relatively to the end of the plate, said members extending toward the end edge of said support about which the plate is to be bent and being parallel to and spaced from each other, common pivoting means for said members, means to adjust said pivoting means to vary the position of the bend, and means to swing said members upon the pivoting means, to move the bending member past the edge of said support, and said locating member away therefrom.

19. In a fixture for bending a plate, a plate support having an edge about which the plate is to be bent, a member having a flange extending substantially at right angles thereto from one edge thereof, said flange being in substantial alignment with said support, said member being pivotally mounted to swing its other edge toward said support edge while the flange is swung away therefrom, and a bending head mounted on said member and extending parallel to said flange to engage the plate and bend it about the support edge as the edge of the member upon which it is mounted is swung toward the support edge.

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