Dec. 23, 1947. R. A. LEBLANC 2,433,226

FORMING OR BENDING DIE ASSEMBLY FOR PRESSES

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Fig. 1.

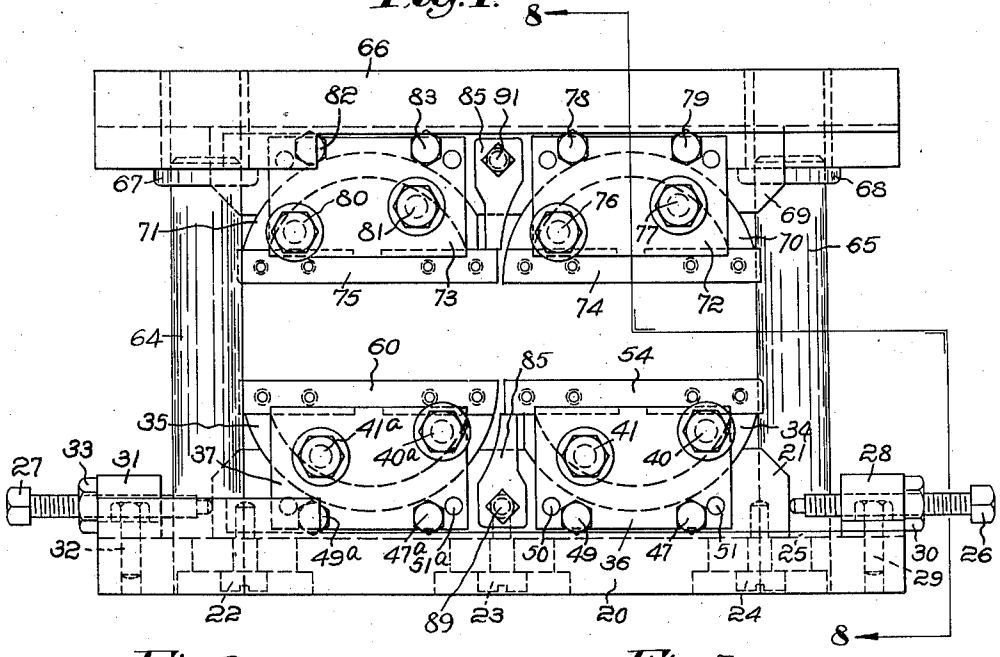


Fig. 2.

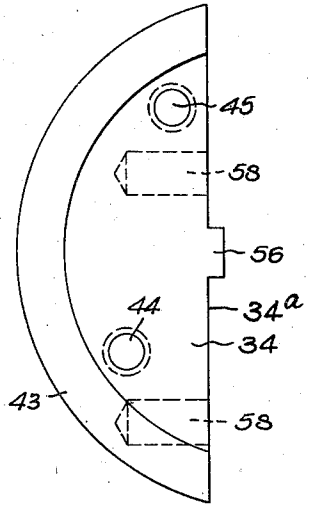
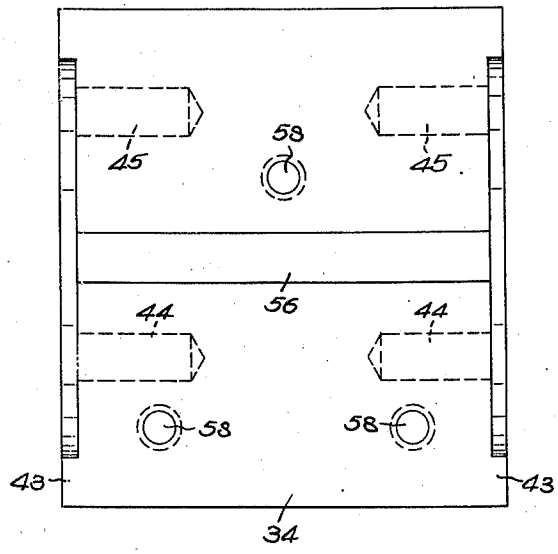


Fig. 3.



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FORMING OR BENDING DIE ASSEMBLY FOR PRESSES

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Fig. 4.

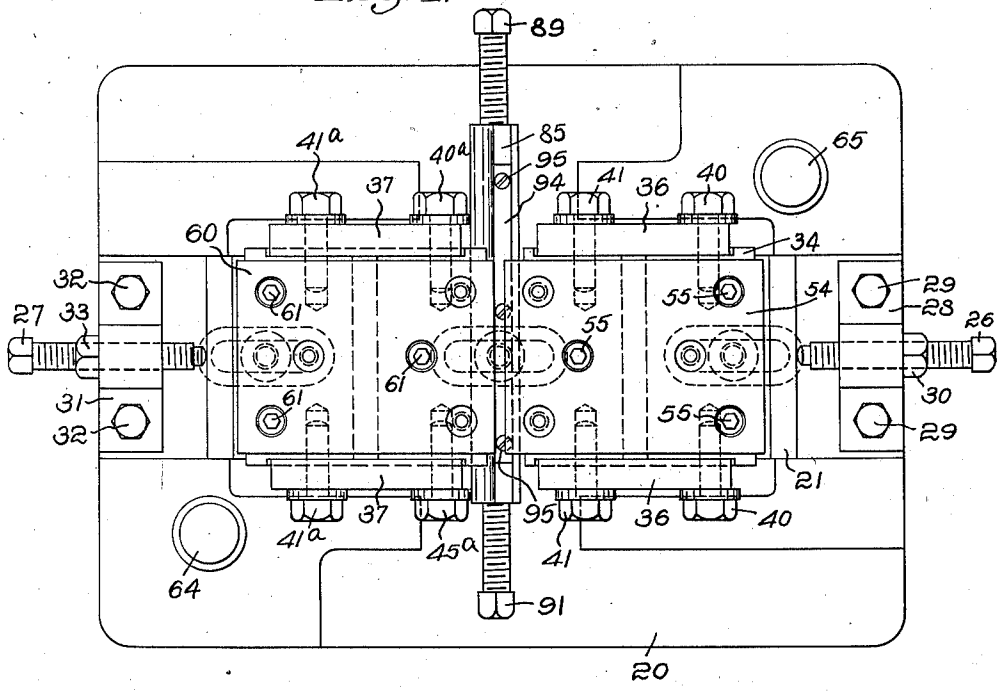


Fig. 6.

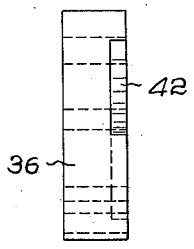


Fig. 5.

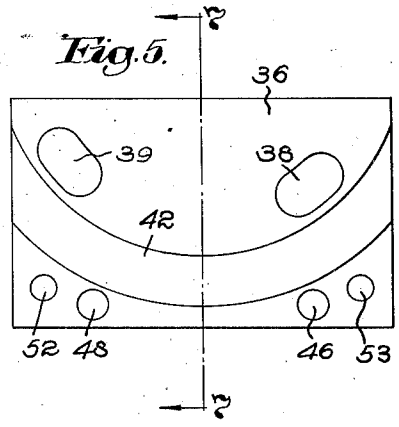
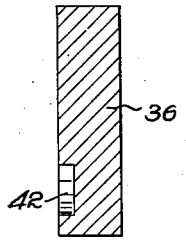


Fig. 7.



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FORMING OR BENDING DIE ASSEMBLY FOR PRESSES

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Fig. 8.

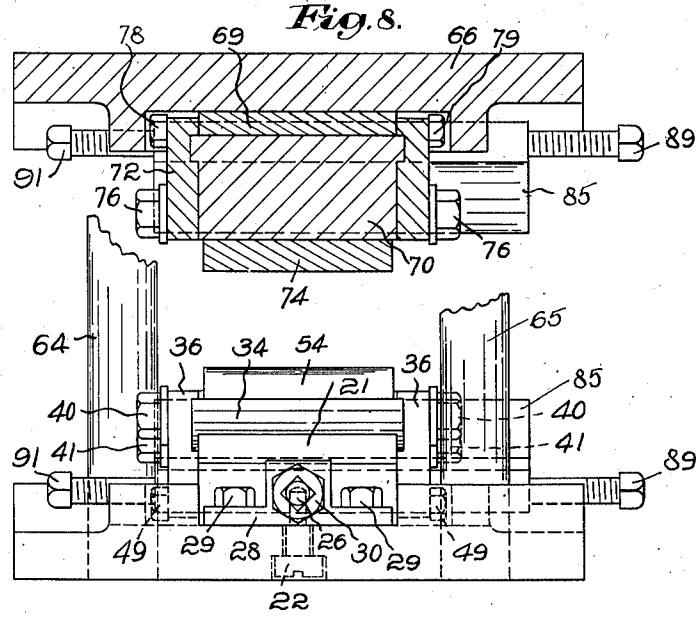


Fig. 9.

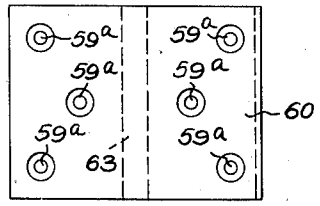


Fig. 10.

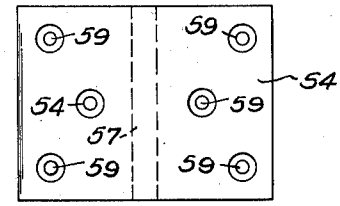


Fig. 11.

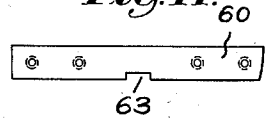
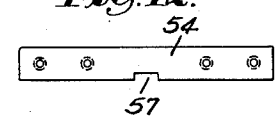


Fig. 12.



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Dec. 23, 1947. R. A. LEBLANC 2,433,226

FORMING OR BENDING DIE ASSEMBLY FOR PRESSES

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Fig. 13

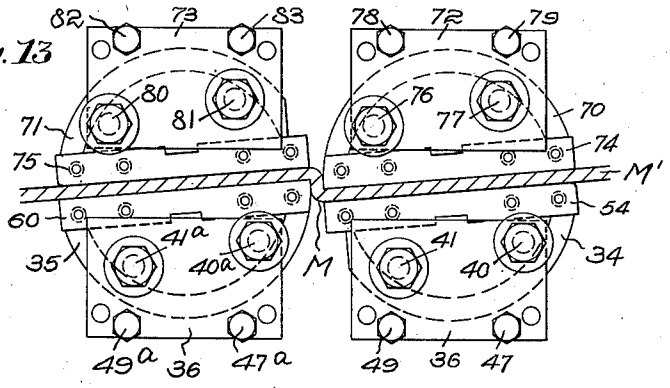


Fig. 14.

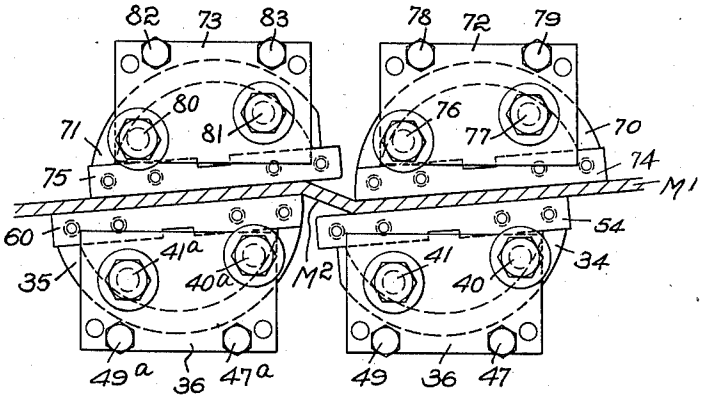
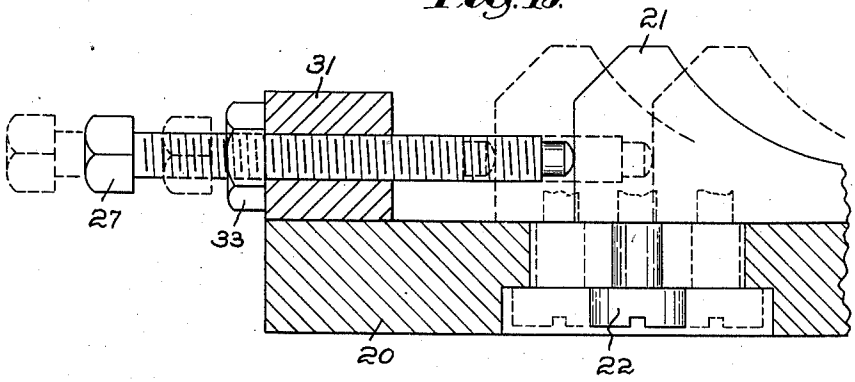


Fig. 15.



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FORMING OR BENDING DIE ASSEMBLY FOR PRESSES

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Fig. 17.

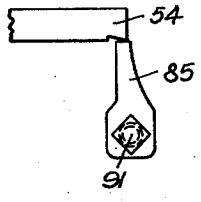


Fig. 16.

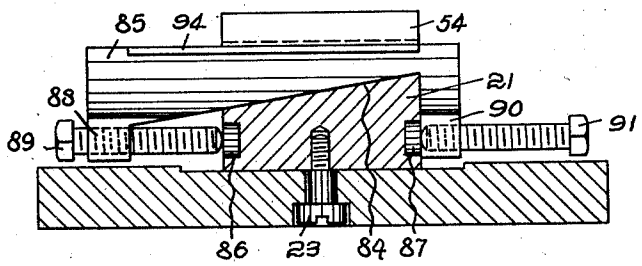


Fig. 19.

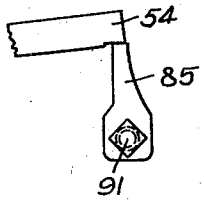


Fig. 18.

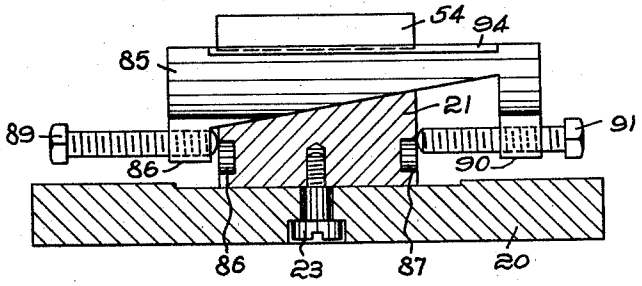


Fig. 20.

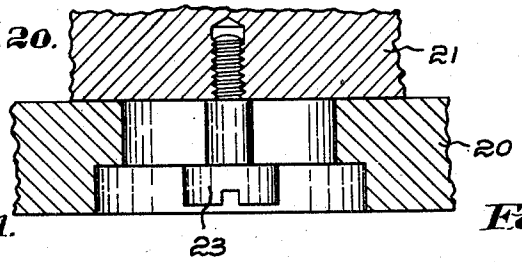


Fig. 21.

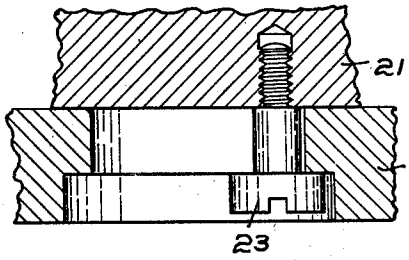
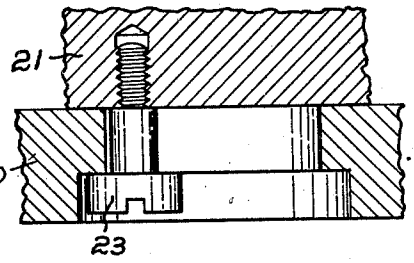


Fig. 22.



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UNITED STATES PATENT OFFICE

2,433,226

FORMING OR BENDING DIE ASSEMBLY FOR PRESSES

Rolland A. Leblanc, Rochester, N. Y.

Application June 5, 1945, Serial No. 597,690

12 Claims. (Cl. 153—21)

1

This invention relates to a new and improved forming or bending die assembly for presses of various types and sizes.

In order that the principle of the invention may be readily understood, I have disclosed one embodiment thereof in the accompanying drawings, wherein

Fig. 1 is a front elevation of the forming die assembly shown with the die adjusted to a flat condition;

Fig. 2 is an enlarged detail showing the left-hand end, as viewed in Fig. 3, of one of the rocker members;

Fig. 3 is a top plan view of Fig. 2;

Fig. 4 is an elevation of the forming die with the top forming member removed so as clearly to show the construction thereof;

Fig. 5 is an elevation of one of the rocker member guide plates;

Fig. 6 is a left-hand end view of Fig. 5;

Fig. 7 is a section through Fig. 5 on the line 7—7 thereof;

Fig. 8 is a section through Fig. 1 on the irregular line 8—8 thereof, parts being broken away;

Fig. 9 is a top elevation of one of the rocker member hardened-surface plates or shoes, being the plate or shoe used on the upper right-hand rocker member and the lower left-hand rocker member, as viewed in Fig. 1;

Fig. 10 is a rocker member plate or shoe similar to Fig. 9 but used on the upper left-hand rocker member and the lower right-hand rocker member, viewing Fig. 1;

Fig. 11 is an end view of Fig. 9;

Fig. 12 is an end view of Fig. 10;

Fig. 13 is a diagrammatical representation of the position of the several rocker members when set to form a compound right angle bend;

Fig. 14 is a view similar to Fig. 13 but shows the rocker members adjusted to make a so-called modified S bend;

Fig. 15 is a fragmentary section of Fig. 1 to show clearly the adjusting means for the rocker member support plate;

Fig. 16 is a section through Fig. 4 taken on a vertical center line clearly to show the forming shoe back-up member and the means for adjusting such member;

Fig. 17 is a left-hand side view of Fig. 16 showing the relation between one of the forming shoes and the back-up member;

Fig. 18 is a view similar to Fig. 16, but showing the forming shoe adjusted to a different position;

Fig. 19 is a fragmentary left-hand end view of Fig. 18;

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Fig. 20 is a fragmentary section taken on a horizontal center line through Fig. 4, and showing the center adjustable hold-down screw when adjusted to a central position;

Fig. 21 is a view similar to Fig. 20, but showing the assembly adjusted to a right-hand position viewing Fig. 4; and

Fig. 22 is a view similar to Fig. 20, but showing the assembly adjusted to a left-hand position.

In short run production or in experimental work, it is often necessary to form a number of pieces, but the quantity is not large enough to warrant the manufacture of individual forming dies for these jobs. There has long been a desire for an adjustable forming means that could be quickly and accurately set up to form a relatively small number of pieces, all having substantially the same dimensions, as contrasted with mass production.

My invention provides a forming or bending die assembly that adequately meets this need. Objects of the invention are: to provide an adjustable forming die that can readily be set to any one of a great number of different forming dimensions; to provide an adjustable forming die which, when once adjusted to a given dimension, will securely maintain that adjustment through a large number of forming operations as contrasted with mass production; to provide an adjustable forming die that will accept a great variety of different thicknesses of metal; to provide an adjustable forming die that can readily be used in a standard punch press or other presses, such as hydraulic or foot presses, with no change in that equipment to adapt it to receive my invention; and to provide an adjustable forming die assembly that is self-contained and can be preadjusted before mounting in the press. Other important objects of the invention will be apparent from the following specification.

I provide by my invention a new tool or die assembly for use in job shops, experimental shops, and for production of short runs. Such tool or die assembly provides ready means of forming metal into a great variety of different offset bends and, when once adjusted to a particular style or type of bend, any number of pieces can be formed and there can be maintained very accurate dimensional tolerances. In the past, when forming a number of pieces, even though the number was relatively small, it has been necessary to make up temporary tools, thus consuming valuable time and adding to the cost of the piece produced. By the use of my invention, it has been found to require only a very short time to adjust the tool

or die assembly to a new dimension and then to reproduce any number of pieces.

The invention can be used in many types of presses, such as arbor presses, hydraulic presses, punch presses, screw presses, etc. and in many sizes of such presses. The tool or die assembly can be so quickly set up for use that it is possible to save time on the manufacture of even one piece over the usual hand forming methods.

Referring first to Figs. 1 and 4, wherein is shown a single embodiment of the die assembly constituting my invention, there is provided a lower base plate 20, which is suitably received and supported in a press that may be of any suitable type and size. Opposed to the said lower base plate 20 is an upper base plate, to be subsequently referred to. Said two base plates are, for descriptive purposes, referred to as the lower and upper base plates. My invention may be practiced in a press wherein the two base plates may be arranged at right angles to the arrangement indicated in Figs. 1 and 4, or at some intermediate angle, according to the type or style of press.

The base plate 20 has attached thereto, as best indicated in Figs. 1 and 4, a rocker member support or cradle member 21, any suitable means being provided for this purpose, such as screws 22, 23 and 24, shown in dotted lines in Fig. 1. Desirably also the rocker member support 21 is so shaped as to be fitted or received in a suitable groove 25 of the base plate 20, as indicated in Fig. 1. The said rocker member support 21 is provided with means for adjusting it manually either to the right or to the left along the bed plate 20, viewing Figs. 1 and 4. While for this purpose, any suitable means may be provided, I have in the disclosed embodiment of the invention shown adjusting screws 26, 27 at the opposite ends of the said rocker member support 21. The adjusting screw 26 is carried by a boss member 28 and is held to the base plate 20 by bolts 29, 29. The said screw 26 is locked in its adjusted position by a lock nut 30. Similarly the adjusting screw 27 is provided with a boss-like member 31 attached to the base plate 20 by bolts 32, 32, the said screw 27 being locked in position by means of a lock nut 33.

Cradled in the rocker member support 21 are two identical rocker members 34, 35, one being shown in detail in Figs. 2 and 3, wherein they are represented as arcuate in shape, being preferably semicylindrical or substantially so, with a straight or flat top surface indicated at 34*a*. Similar rocker members are also supported upon the opposing bed plate, as will be subsequently set forth more specifically. The two rocker members in each support are so placed and arranged as to turn upon axes parallel to each other, as will be evident from an inspection of Figs. 1, 13 and 14. While any suitable means may be employed to hold the rocker members 34, 35 in the rocker member support 21 in such a way as to permit them to be adjusted angularly or arcuately turned or tilted in position in the said rocker member support 21 with respect to the plane of the face of the bed plate 20. In the selected embodiment of the invention the change in position of each rocker member may be correctly defined as a bodily, arcuate adjustment in the direction of its periphery or circumference, or, otherwise stated, as a bodily arcuate adjustment. I preferably provide for each rocker member two laterally positioned clamp plates to engage the lateral faces thereof, those for the rocker member 34 being indicated at 36, 36 and those for the rocker member 35 being indicated at 37, 37 in Fig. 4. The structure of the two pairs of clamp plates 36, 37 for the two rocker members 34, 35 is preferably the same for both rocker members, and it is shown in Figs. 5, 6 and 7, wherein one of the clamp plates 36 is shown.

Such clamp plate 36 is provided with an elongated, slightly arcuate opening 38 and a second elongated, slightly arcuate opening 39 to receive clamp bolts 40, 41 respectively. The rocker members and the clamp plates are provided, the one with an arcuate groove and the other with a like-shaped boss for reception in said groove. While the groove may be provided in either one of said parts and the boss in the other, I preferably provide each clamp plate with such a groove, and I have shown the clamp plate 36 as provided with the arcuate groove 42, and in such case I provide the corresponding rocker member with a complementarily shaped formation 43 which, in the disclosed embodiment of the invention, is nearly semicircular. As best shown in Fig. 4, there is provided a clamp plate 36 at each side of the rocker member 34, and through the elongated openings 38 and 39 pass clamp bolts 40, 41 respectively. The bolt 41 is tapped into a threaded opening 44 of the rocker member 34 and the bolt 41 is threaded into a similar opening 45 of said rocker member 34. The clamp plate 36, as shown in Fig. 5, is provided with an opening 46 through which passes a clamp bolt 47, and with a second opening 48 through which passes a clamp bolt 49, both said clamp bolts 47 and 49 being threaded into the rocker member support or cradle 21, thus securely holding the rocker member 34 into position.

In order accurately to locate each clamp plate 36 before positioning the bolts 47 and 49, I provide suitable means which are preferably dowel pins 50, 51, shown in Fig. 1, as fitted into holes 52 and 53 respectively of the said clamp plate 36. The said dowel pins are also fitted into the rocker member support or cradle 21.

The rocker member 34 can be angularly shifted or arcuately turned in the direction of its circumference in the said rocker member support 21 by loosening the bolts 40, 41, and when the said rocker member is properly positioned it is then securely locked in place by tightening the said bolts 40, 41. The rocker member 35 is mounted in a manner entirely similar to the mounting of the rocker member 34, and it has similar bolts and nuts as the rocker member 34 and the same reference numerals are applied with a suffix "*a*" in each case.

Fastened to the top, flat, work surface 34*a* of the rocker member 34 is a hardened-surface plate or shoe 54, by means of screws 55, 55, as indicated in Fig. 4, the said plate or shoe 54 being shown separately in Figs. 10 and 12. As best shown in Figs. 2 and 3, the rocker member 34 is provided with a key formation or ridge 56 and the plate or shoe 54 is provided with a keyway 57 or, if desired, these formations may be reversed, in which case the plate or shoe 54 will be provided with the key formation and the rocker member 34 with the keyway. Such rocker member 34 is also provided with tapped holes 58, 58 and the said plate or shoe 54 is provided with counterbored holes 59 in alignment with the tapped holes 58, 58 of the rocker member 34, thus providing suitable means for attaching the hardened-surface plate or shoe 54 to the rocker member 34.

Similarly the rocker member 35, which occupies a side-by-side relation to and in close proximity

to the rocker member 34, is provided with a hardened-surface plate or shoe 60, shown separately in Figs. 9 and 11, it being attached to the said rocker member 35 by screws 61, 61. Similarly the rocker member 35 and the plate or shoe 56 are provided, the one with a key formation or ridge and the other with a keyway for aligning such plate or shoe 56 with the rocker member 35. Herein I have represented the rocker member 35 as provided with the key formation or ridge 62 (best shown in Figs. 13 and 14) and the plate or shoe 56 as provided with a keyway 63.

I have stated that the die assembly is provided with two base plates opposed to each other, being in this embodiment of my invention shown as horizontal, and I have described the lower base plate 20 as carrying a rocker member support in which are received side-by-side and in close proximity the two rocker members 34, 35. In order to support the upper or opposing rocker member in a support member upon a suitable base plate, I have, as shown in Figs. 1 and 8, provided two cylindrical uprights or columns 64, 65, to which is fitted an upper movable plate 66 parallel and opposed to the base plate 20 and having bushings 67 and 68.

It is unnecessary to show or describe the mounting of the said base plates 20 and 66 in a press for movement toward each other in the operation of the press. Obviously any suitable means may be provided for this purpose.

Carried by the said upper base plate 66 is an upper rocker member support 69, which is not represented as mounted for adjusting movement along the face of said base plate 66, as is the case with the rocker member support 21 upon the lower base plate 20, as a lengthwise adjustment of one of said rocker member supports is sufficient, but within the scope of my invention either or both of said rocker member supports may be similarly adjustable upon its base plate.

The said rocker member support 69 is provided as shown in Fig. 1 with rocker members 70, 71, being secured in position by means of clamp plates 72, 73 at both sides of the said rocker members 70, 71, and being of exactly the same construction as the clamp plates 36, 37 upon the lower rocker member support. Similarly the upper rocker member 70 is provided with a hardened-surface plate or shoe 74 of the same construction as the lower hardened-surface plate or shoe 60, and the upper rocker member 71 is provided with a hardened-surface plate or shoe 75 that is of the same construction as the lower hardened-surface plate or shoe 54. Similarly the upper rocker member 70 is provided with clamp screws 76, 77, and clamp plate retaining screws 78, 79. The upper rocker member 71 is similarly provided with clamp screws 80, 81 and with clamp plate retaining screws 82, 83.

Even though the hardened-surface plates 54 and 75 are mounted upon the rocker members, I provide supplemental supporting means for effectively supporting them when they have been adjusted to the proper position. For this purpose, and referring particularly to Figs. 1, 4 and 16 to 19, there is represented in Fig. 16 in section the lower half of the forming or bending die, viewed from the left-hand end of Fig. 1. As shown particularly in Fig. 16, the rocker member support 21, there shown in vertical section, is provided with a tapered slot-like opening or groove indicated at 84, and into which is fitted an adjusting wedge member 85 for longitudinal or axial adjustment in said opening 84. The rocker member

support 21 is also provided with hardened steel inserts 86, 87. The adjusting wedge member 85 is provided on its left-hand end, viewing Fig. 16, with a boss 88 into which is threaded an adjusting screw 89, and at the right-hand end of the adjusting wedge member 85 is provided integrally or otherwise a second boss 90 into which is threaded an adjusting screw 91.

As shown in Fig. 1, there are provided two adjusting members 85, one pertaining to the base plate 20 and the other pertaining to the opposing base plate 66. They are provided to support the two hardened-surface plates 54 and 75 once said plates are adjusted to the proper position. Each wedge member 85 is moved in an axial direction by first loosening the screw 89 and then tightening the screw 91. As clearly shown in Figs. 1 and 8, both the upper plate assembly and the lower plate assembly are provided with similar wedge-adjusting means and corresponding numerals have been applied to the corresponding parts. In Fig. 18 one of the wedge members 85 is represented as moved all the way to the right and the hardened-surface plate member 54 as raised to the fullest possible extent, as indicated in Fig. 19.

It will be understood that the metal to be bent or formed is placed between the two pairs of rocking members when separated as in Fig. 1, after the latter have been angularly adjusted or tilted with respect to the planes of the surfaces of the two base plates 20 and 66, that is, arcuately turned in the direction of their circumferences, as required by the character of the work to be done. By adjusting the lower rocker members 34 and 35 in a contraclockwise direction viewing Fig. 13, and making a corresponding adjustment of the upper rocker members 70 and 71, a double right-angled bend is formed, as indicated at M, in the piece of metal which is indicated at M'. In order to form such a right-angled bend, the rocker member 70 must be spaced a definite distance from the rocker member 35 depending upon the thickness of the metal strip M'. The means provided in the present embodiment of the invention for varying that distance in accordance with the thickness of the metal strip M' consists of the adjusting screws 26, 27.

In order to accommodate a thicker metal than is shown in Fig. 13, it is necessary to shift the rocker member support 21 to the right viewing Figs. 1 and 4, and this is done by first loosening the adjusting screw 26 and then tightening the adjusting screw 27. In order to accommodate a thinner metal than is represented in Fig. 13, the adjusting screw 27 is first loosened and then the adjusting screw 26 is tightened, thus shifting the rocker member support to the left.

It will be noted that by adjusting the several rocker members in an angular or tilting direction with respect to the plane of the face of each base plate, that is, by arcuately turning each rocker member in the direction of the circumference thereof, and by longitudinally adjusting the rocker member support 21, almost any type of bend or form may be imparted to the metal. For example, a modified S-bend, such as indicated in Fig. 14 at M2, is attained by adjusting the rocker member support 21 to the left viewing Figs. 1 and 4, and it will be observed that in such case the hardened-surface plate or shoe 54 of the rocker member 34 will underlie the hardened-surface plate or shoe 75 of the said rocker member 71. Any desired offset within quite substantial limits can be had by properly adjusting

lengthwise the rocker member support 21 either to the right or to the left viewing Figs. 1 and 4.

I have in practice found that with the thinner metal strips the clamp screws 40 and 41 and 80 and 81 are sufficient to hold the lower and upper rocker members respectively in position, but as already stated I may provide supplemental supporting means particularly when unusually heavy metal or unusually stiff or hard metal is used. In such cases I provide the wedge members 85, above shown and described, and I may attach to each wedge member 85 a hardened-metal strip, indicated in Figs. 16 and 18, but best shown in Fig. 4 at 94, to prevent wear of the said support member 85. Such hardened strips, when employed, are attached to the working faces of said wedge members by suitable screws 95, Fig. 4.

Other forms or types of securing and adjusting means may be provided for the main elements of the die assembly than those shown and specifically described. The characteristic features of my invention include particularly the following: the two rocker member supports mounted upon the two bed plates, at least one of said rocker member supports being longitudinally adjustable; two opposing pairs of rocker members supported for adjusted angular or tilting positioning in the said rocker member supports respectively, that is, each rocker member being capable of being arcuately turned in the direction of the circumference thereof, said rocker members in each support being positioned side-by-side in relatively close proximity, for the reception between said pairs of rocker members of the metal that is to be formed or bent; and manual means for relatively slightly turning or tilting said rocker members in their said supports with respect to each other from the planes of the faces of said bed plates, so as to change the plane of their adjacent side-by-side work-receiving faces, and means to secure said rocker members in their adjusted positions.

Having thus described one illustrative embodiment of my invention, it is to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

I claim:

1. An adjustable die assembly for use in presses of various types and sizes, to impart to a metal sheet a single bend of variable form extending transversely straight across the sheet, including, in combination, two opposing bed plates adapted to be mounted in a press, a rocker member support mounted upon each of the two opposing faces of said bed plates, two opposing pairs only of rocker members, each rocker member being supported for bodily arcuate adjustment in a circumferential direction in said rocker member supports respectively, the arrangement being such that the said rocker members turn upon axes parallel to each other, so as to change the relation of the adjacent ends of the work edges of the corresponding members of the two pairs of said rocker members, said two rocker members in each such support being thereby supported in relatively close proximity for the reception, between said two pairs of rocker members, of the sheet of metal that is to be transversely bent straight across by the action of the adjacent ends of the work edges of the said rocker members, manual means for relatively so arcuately adjusting, from the planes of the faces of their said bed plates, said two pairs only of rocker members in their said supports with respect to each other, as to change the shape of the straight transverse bend to be imparted to the metal sheet received between said two opposing pairs of rocker members, by changing the plane of the adjacent work-receiving edges, and means to secure said rocker members in their arcuately adjusted position.

2. An adjustable forming or bending die assembly for use in presses of various types and sizes including, in combination, two opposing bed plates adapted to be mounted in a press, a rocker member support mounted upon each of the two opposing faces of said bed plates, two opposing pairs of rocker members each supported for bodily arcuate adjustment in a circumferential direction is said rocker member supports respectively, said rocker members in each such support being side-by-side in relatively close proximity for the reception between said pairs of rocker members of the metal to be formed or bent, manual means for relatively so adjusting said rocker members in their said supports with respect to each other, from the planes of the faces of said bed plates, so as to change the plane of their adjacent, side-by-side, work-receiving faces, and means to secure said rocker members in their adjusted position, one of said rocker member supports being provided at its opposite ends with adjusting screws 26, 27 by means of which such rocker member support may be longitudinally adjusted along the face of its bed plate.

3. An adjustable forming or bending die assembly for use in presses of various types and sizes including, in combination, two opposing bed plates adapted to be mounted in a press, a rocker member support mounted upon each of the two opposing faces of said bed plates, two opposing pairs of rocker members each supported for bodily arcuate adjustment in a circumferential direction in said rocker member supports respectively, said rocker members in each such support being side-by-side in relatively close proximity for the reception between said pairs of rocker members of the metal to be formed or bent, manual means for relatively so adjusting said rocker members in their said supports with respect to each other, from the planes of the faces of said bed plates, so as to change the plane of their adjacent, side-by-side, work-receiving faces, and means to secure said rocker members in their adjusted position, one of the said bed plates being provided at opposite ends of its rocker member support with boss members 23 and 31, and adjusting screws 26 and 27 threaded into the said boss members for engagement with opposite ends of the rocker member support for the purpose of manually adjusting the same in a lengthwise direction along the said bed plate.

4. An adjustable forming or bending die assembly in accordance with claim 1, but wherein for the purpose of holding the rocker members to their adjusted position, there is provided to clamp each rocker member to its rocker member support at least one clamp plate in clamping engagement with such rocker member, and wherein there are provided means to secure said clamp plate or plates to the rocker members respectively and also to the rocker member support, thereby clamping such rocker members in adjusted position with relation to the rocker member support.

5. An adjustable forming or bending die as-

sembly in accordance with claim 1, but wherein for the purpose of holding the rocker members in their adjusted position, there are provided clamp plates at opposite sides of and in engagement with said rocker members for the purpose of clamping said rocker members to the respective rocker member support, and wherein there are provided means to secure said clamp plates to the rocker members respectively and also to the rocker member support for the purpose of clamping said rocker members to the respective rocker member support, and wherein the rocker members each having an arcuate face, and the clamp plates are respectively provided, the one with an arcuate groove and the other with a like-shaped boss for reception in said groove.

6. An adjustable forming or bending die assembly for use in presses of various types and sizes including, in combination, two opposing bed plates adapted to be mounted in a press, a rocker member support mounted upon each of the two opposing faces of said bed plates, two opposing pairs of rocker members each supported for bodily arcuate adjustment in a circumferential direction in said rocker member supports respectively, said rocker members in each such support being side-by-side in relatively close proximity for the reception between said pairs of rocker members of the metal to be formed or bent, manual means for relatively so adjusting said rocker members in their said supports with respect to each other, from the planes of the faces of said bed plates, so as to change the plane of their adjacent, side-by-side, work-receiving faces, and means to secure said rocker members in their adjusted position, each of the said rocker members being provided with a flat work face, and a hardened-surface plate or shoe secured to such work face, and supplemental supporting means for cooperatingly supporting the hardened-surface plates or shoes of one or more of the rocker members.

7. An adjustable forming or bending die assembly for use in presses of various types and sizes including, in combination, two opposing bed plates adapted to be mounted in a press, a rocker member support mounted upon each of the two opposing faces of said bed plates, two opposing pairs of rocker members each supported for bodily arcuate adjustment in a circumferential direction in said rocker member supports respectively, said rocker members in each such support being side-by-side in relatively close proximity for the reception between said pairs of rocker members of the metal to be formed or bent, manual means for relatively so adjusting said rocker members in their said supports with respect to each other, from the planes of the faces of said bed plates, so as to change the plane of their adjacent, side-by-side, work-receiving faces, and means to secure said rocker members in their adjusted position, each of the said rocker members being provided with a flat work face, and a hardened-surface plate or shoe secured to such work face, and supplemental supporting means for cooperatingly supporting the hardened-surface plates or shoes of one or more of the rocker members, such means comprising adjusting wedge members received in groove-like openings in the rocker member support.

8. An adjustable die assembly for use in presses of various types and sizes, to impart to a metal sheet a single bend of variable form, extending

transversely straight across the sheet, including, in combination, two opposing bed plates adapted to be mounted in a press, a rocker member support mounted upon each of the two opposing faces of said bed plates, two opposing pairs only of rocker members, one member of each pair being received in each of said rocker member supports respectively upon said two opposing bed plates, each of said rocker members having for that purpose an arcuate edge received in the corresponding rocker member support and having an opposite work-receiving edge constituting substantially a chord of said arcuate edge, the two rocker members in each rocker member support being so arranged therein as to turn upon axes parallel to each other and being positioned in relatively close proximity for the reception between said two pairs of rocker members of the sheet of metal that is to be transversely bent straight across, in a direction normal to the lateral faces of the rocker members, by the action of the adjacent ends of the work edges of said rocker members, each of said rocker members being adjustable in its rocker member support in a circumferential direction upon its arcuate edge so as to change the planes of the work-receiving edges of the said rocker members according to the character of the intended bend to be imparted to the metal sheet.

9. An adjustable forming or bending die assembly in accordance with claim 8, but wherein each of said rocker members has two opposite lateral faces normal to the work-receiving edge thereof, and wherein two clamp plates secured to the corresponding rocker member support are provided for clamping each of said rocker members, in its adjusted position in the corresponding rocker member support, positioned to engage said lateral faces respectively, each of said lateral faces and the corresponding clamp plates having interengaging formations.

10. An adjustable forming or bending die assembly in accordance with claim 8, but wherein the rocker member support upon each bed plate is a unitary piece that receives its two rocker members in their said relatively close proximity to each other.

11. An adjustable forming or bending die assembly in accordance with claim 8, but wherein each of said rocker members has at least one lateral face normal to the working edge thereof, and wherein there is provided a clamp plate secured to the corresponding rocker member support, to engage such lateral face of such rocker member, with capacity of such rocker member to be adjusted in its rocker member support upon its own arcuate edge and to be clamped by such clamp plate in adjusted position.

12. An adjustable forming or bending die assembly for use in presses of various types and sizes including, in combination, two opposing bed plates adapted to be mounted in a press, a rocker member support mounted upon each of the two opposing faces of said bed plates, two opposing pairs of rocker members, one member of each pair being received in each of said rocker member supports respectively upon said two opposing bed plates, each of said rocker members having for that purpose an arcuate edge received in the corresponding rocker member support and having an opposite work-receiving edge constituting substantially a chord of the said arcuate edge, the two rocker members in each rocker member support being positioned side-by-side in relatively close proximity,

for the reception between said two opposing pairs of rocker members of the metal to be formed or bent, each of said rocker members being adjustable in its rocker member support in a circumferential direction upon its arcuate edge, so as to change the planes of the work-receiving edge of the said rocker members according to the character of the intended bend of the metal, a hardened-surface plate secured flatwise to the work-receiving edge of each rocker member, and supplemental supporting means for cooperatively supporting the hardened-surface plate of at least one of said rocker members.

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