

G. A. OHL, JR.

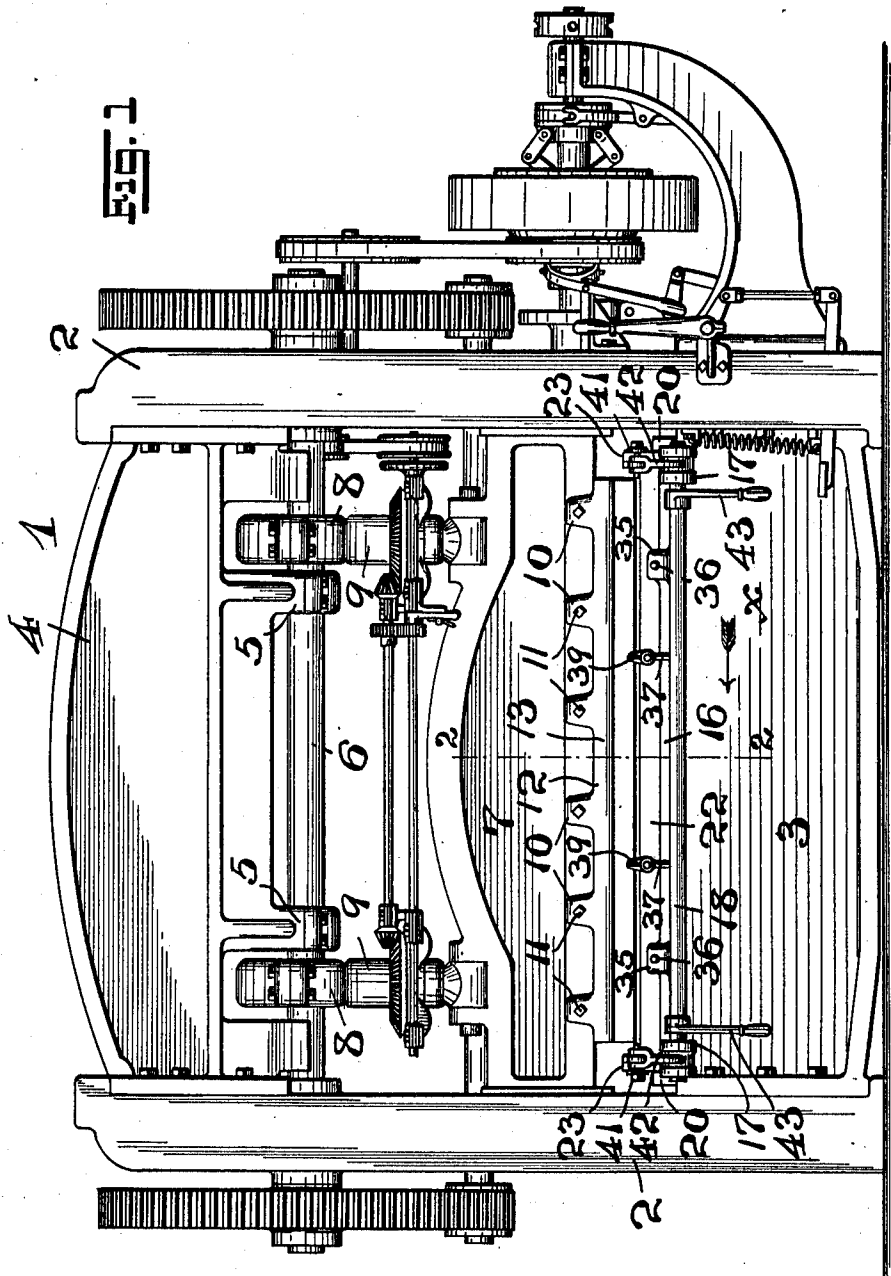
POWER PRESS.

APPLICATION FILED APR. 29, 1911.

1,004,066.

Patented Sept. 26, 1911.

3 SHEETS—SHEET 1.



WITNESSES:  
*Harry E. Pfeiffer*  
*Anna H. Alter.*

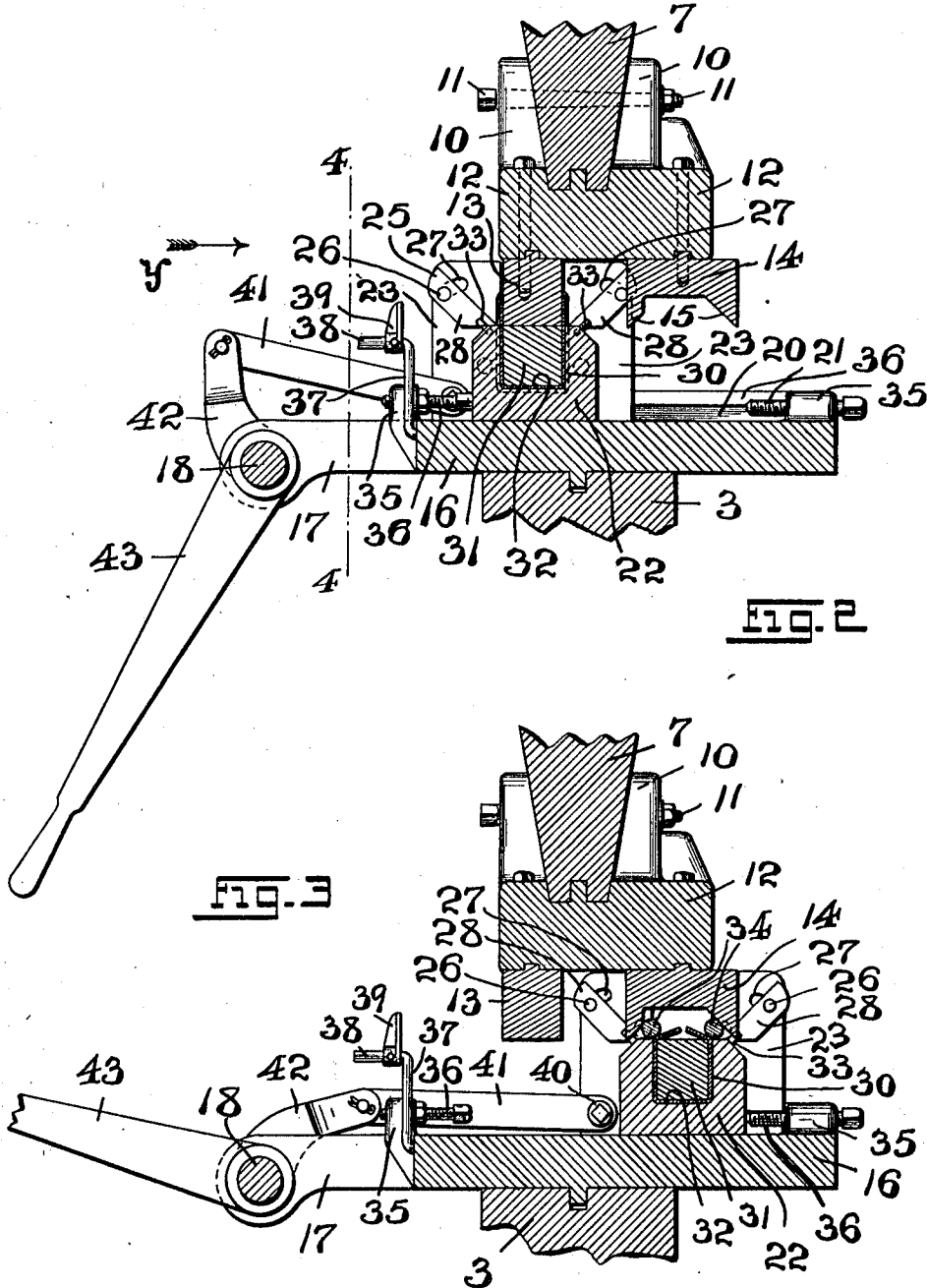
INVENTOR:  
**George H. Ohl, Jr.,**  
BY  
*Fraentzel and Richards,*  
ATTORNEYS

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3 SHEETS—SHEET 2.



WITNESSES:  
*Harry C. Pfeiffer*  
*Anna H. Acter.*

INVENTOR;  
*George A. Ohl, Jr.,*  
BY *Fraentzel and Richards,*  
ATTORNEYS

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3 SHEETS—SHEET 3.

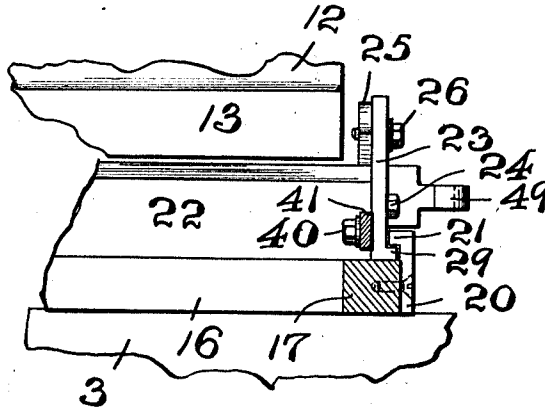


Fig. 4

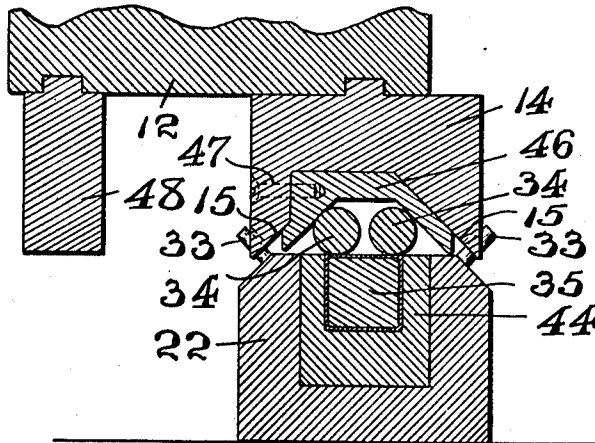


Fig. 5

WITNESSES:  
*Harry E. Pfeiffer*  
*Anna H. Otter*

INVENTOR:  
*George F. Ohl, Jr.*  
BY  
*Fraentzel and Richards,*  
ATTORNEYS

# UNITED STATES PATENT OFFICE.

GEORGE A. OHL, JR., OF NEWARK, NEW JERSEY, ASSIGNOR TO GEORGE A. OHL & CO., A CORPORATION OF NEW JERSEY.

## POWER-PRESS.

1,004,066.

Specification of Letters Patent.

Patented Sept. 26, 1911.

Application filed April 29, 1911. Serial No. 624,057.

*To all whom it may concern:*

Be it known that I, GEORGE A. OHL, Jr., a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Power-Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention has reference, generally, to improvements in that class of power presses which are employed for the purposes of bending metal, and more particularly for operating upon sheet-metal to form the same into square and rectangular tubing.

The present invention, therefore, has for its principal object to provide improvements in power-presses, whereby square and rectangular tubes, such as have been heretofore drawn on draw-benches, may be easily, quickly, and perfectly produced from sheet-metal by the operation of a novel arrangement and construction of forming dies.

The invention has for a further object to provide a novel construction and arrangement of forming dies to be operated by a power-press hammer whereby said square and rectangular tubes may be formed out of sheet-metal, or similar materials.

Other objects of the present invention not at this time more particularly enumerated will be clearly understood from the following detailed description of the present invention.

With the various objects of the present invention in view, the said invention consists, primarily, in the novel constructions of the improvements in power-presses herein-after set forth; and, furthermore, this invention consists in the several novel arrangements and combinations of the various devices and parts, as well as in the details of the construction thereof, all of which will hereinafter be more fully described in the following specification, and then finally embodied in the clauses of the claim which are appended to and which form an essential part of this specification.

The invention is clearly illustrated in the accompanying drawings, in which:—

Figure 1 is a front elevation of a power press provided with the improvements made according to and embodying the principles of the present invention. Fig. 2 is a detail cross-section of the same taken on line 2—2 in said Fig. 1 looking in the direction of the arrow *x*, the same being drawn upon an enlarged scale; and Fig. 3 is a view similar to that shown in Fig. 2, except that the forming dies are shown in their shifted position, as arranged to perform a second bending operation in the course of bending sheet-metal to produce square and rectangular tubes. Fig. 4 is a detail longitudinal section taken one line 4—4 in said Fig. 2, looking in the direction of the arrow *y*. Fig. 5 is a detail cross-section similar to that shown in Fig. 3, except that the forming dies are provided with inlays so as to adapt the same to the formation of a smaller size of square or rectangular tube.

Similar characters of reference are employed in all of the hereinabove described views, to indicate corresponding parts.

Referring now to the several figures of the drawings, the reference-character 1 indicates a complete power press, comprising a pair of end-frames or housings 2, between which is secured a bed or supporting-table 3, the same extending between the lower ends of said end-frames or housings, and a top-frame 4 secured between the upper end-ports of said end-frames or housings. Said top-frame 4 is provided with suitably disposed shaft-supporting hangers 5 in which is rotatably mounted a suitably driven shaft 6, the ends of which are journaled in said end-frames or housings 2. Slidably arranged, so as to be capable of a reciprocatory movement in a vertical plane between said end-frames or housings 2, is a hammer or slide 7. The reciprocatory movement of said hammer or slide 7 is produced by means of a pair of eccentrics 8 which are arranged upon and are operated by said driven shaft 6, said hammer or slide 7 being operatively connected with said eccentrics 8 by means of adjustable suspension-arms 9. Secured to the lower end of said hammer or slide 7, by means of its plurality of pairs of oppositely disposed lugs 10 and the cross-pins or bolts

11 extending through said lugs and the body of said hammer or slide 7, is a die-carrier 12, the same extending substantially the length of said hammer or slide 7. Secured to the forward portion of said die-carrier 12, in any suitable manner, is a male die-member 13. Secured to the rear portion of said die-carrier 12, in any suitable manner, is a bending die-member 14. The said bending die-member 14 is grooved or channeled on its under side, the sides of said groove or channel being inclined inwardly from the bottom edges upward, so as to form inclined or chamfered portions 15.

Supported and secured, in any suitable manner, upon said bed or supporting table 3 of said power-press 1, is a base-plate 16. Said base-plate 16 is provided, preferably at its ends, with forwardly extending arms 17, in the free ends of which is journaled a shaft 18. Secured to each end of said base-plate 16, by means of screws 19, or in any other desirable manner, are laterally extending guide-plates 20 formed at their top marginal edges with a longitudinally extending rib or projection 21. Slidably arranged upon said base-plate 16 is a female-die member 22, the same being provided at each end with an end-plate 23, secured thereto by means of bolts 24, or in any other suitable manner. Said end-plates 23 are further provided with latch-pieces 25 adjustably connected therewith by means of bolts 26, or the like, the latter passing through suitably disposed adjusting slots 27 with which each of said end-plates 23 is provided. The foot 28 of each latch-piece 25 is caused to bear upon the upper surface of said female die-member 22 and thus serves to prevent the same from "springing" or shearing upon the bolts 24. Each of said end-plates 23 is further provided at their outer bottom-edges with a longitudinally extending rib or projection 29 which slides underneath said rib or projection 21 of the adjacent guide-plate 20, thus maintaining said female die-member 22 in its proper laterally sliding relation to said base-plate 16 and to the said male die-member 13 and said bending die-member 14. The said female die-member 22 is provided in its upper portion with a suitably sized rectangular trough or groove 30, the same corresponding to the desired cross-section shape of the rectangular tubing it is desired to produce. The reference-character 31 indicates a rectangular mandrel about which a sheet of metal, such as 32, is to be bent by the operation of the respective die-members.

The said female die-member 22 is further provided with rest-pins 33 adapted to support upon the upper surface of said female die-member a pair of bending rollers 34 which are placed thereon so as to cooperate with the action of said bending die-member 14, as will be subsequently set forth. Said base-plate 16 is provided along its respective longitudinal edges with suitably disposed upwardly extending lugs 35, the same being provided with screw-threaded perforations in which are adjustably supported screw-threaded stop-pins 36 adapted to limit the respective lateral sliding movements of said female die-member 22 upon said base-plate 16, and, furthermore, to properly aline or register said female die-member 22 in respectively proper positions beneath said male die-member 13 and said bending die-member 14. Secured to the forward longitudinal edge of said base-plate 16 are bracket-arms 37, upon the horizontal shanks 38 of which are adjustably mounted and supported gage-pieces 39, by means of which said sheet of metal 32 is registered above said female die-member 22 preparatory to the operation of the respective die-members thereon. The lateral sliding movements of said female die-member 22 upon said base-plate 16 are accomplished by the following mechanism. Pivotally secured to a portion of said end-plates 23 of said female die-member 22, by means of bolts 40, are connecting links 41, the opposite ends of which are pivotally connected with the respective lever-arms 42 which are secured to and are operated by the rotation or rocking movement of said shaft 18. Secured to said shaft 18, in convenient locations, are hand-levers 43, whereby said shaft 18 is rotated or rocked to operate said lever-arms 42 to push or pull said female die-member across said base-plate 16, according to the direction of the rotation of said shaft 18 and the consequent movement of said lever-arms 42.

Referring now more particularly to Fig. 5 of the drawings, the said female die-member 22 is there shown equipped with a female inlay member 44 which reduces the groove or trough of said female die-member, so as to permit the same to operate with a smaller sized mandrel, as 45. In like manner, the bending die-member 14 is also provided with a bending inlay-member 46, secured thereto by means of the screws 47, or other suitable fastening means, so as to correspondingly reduce the chamfered or inclined portion of said bending die-member. Also, the male die-member 13 is replaced by a male die-member 48 of reduced size, so as to correspond with the smaller mandrel. It will, of course, be readily understood, that by fitting in variously sized inlay members and male die-members, that several different sizes and rectangular shapes of tubing may be produced with but little expenditure of labor.

The operations of bending square or rectangular tubes upon said novel construction of power-press are performed as follows:—The said female die-member 22 is first

brought to its forward position registering beneath said male die-member 13; and, a sheet of metal, as 32, is laid across the trough or groove 30 and registered by contacting the edge thereof with said gage-pieces 39. The mandrel 31, above which said sheet of metal 32 is to be formed, is now laid upon the top of said sheet and in alinement with said trough or groove 30 of said female die-member 22 and consequently in alinement with said male die-member 13 and beneath the same. The power is now applied to rotate said driven shaft 6, to cause the downward movement of said hammer or slide 7, thus carrying downwardly said male die-member 13 with considerable pressure, until the latter contacts with said mandrel 31, forcing the same downwardly into the trough or groove 30 of said female die-member 22 and carrying therewith said sheet of metal 32, until the parts assume the positions illustrated in Fig. 2 of the accompanying drawings, with the marginal edges of said sheet of metal 32 projecting in a vertical plane above the upper surface of said female die-member 22. The hammer or slide 7 is now returned to its normal initial position, again carrying upwardly said male die-member 13. The said female die-member 22 is now moved laterally across said base-plate 16 to register the same beneath said bending die-member 14. A pair of bending rollers 34 are now placed upon the upper surface of said female die-member 22 between said rest-pins 33 and the upwardly projecting marginal edges of said sheet of metal 32. The driven shaft 6 is again rotated to reciprocate said hammer or slide 7, again carrying downwardly said bending die-member 14, thereby causing the inclined or chamfered portions 15 thereof to engage said bending rollers 34, and to roll the same against said upwardly projecting marginal edges of said sheet of metal 32, bending the same over and downwardly, in the manner illustrated more particularly in Fig. 3 of the accompanying drawings. While it is preferable to use the said bending rollers in the manner just described, it will, of course, be evident, that such use is not absolutely necessary since the chamfered or inclined walls of said bending die-member may be caused to directly engage the marginal edges of said sheet-metal, so as to bend the same over sufficiently to enable the final completion of the tube in the manner about to be described. The hammer or slide 7 is again raised to carry away said bending die-member 14. The said bending rollers are removed, and said female die-member 22 is moved upon said base-plate 16 to cause the same to resume its normal initial position registering beneath said male die-member 13. The hammer or slide 7 is again moved downwardly, carrying said male die-

member 13 downwardly and in contact with said bent-over portions of said sheet of metal 32, and exerting a considerable pressure thereon to press the same firmly down upon the surface of said mandrel 31. It will be understood, however, that either a lap-joint or a butt-joint may be formed by the juncture of the marginal edges of said sheet of metal, as may be desired. Furthermore, said tube may be provided with a soldered joint or seam when desired. The mandrel 31 is provided with a perforated tongue or lug 49 by means of which said mandrel may be connected with the running gear of a draw-bench or other similar means whereby the same may be withdrawn from the finished tube.

The present invention provides a means whereby rectangular tubing may be easily and quickly manufactured, the mechanism being of a simple character, little subject to disarrangement, but highly efficient in the performance of its functions.

Of course, it will be clearly understood, that various changes may be made in the several arrangements and combinations of the various mechanisms and devices, as well as in the details of the construction of the same, without departing from the scope of the present invention, as described in the foregoing specification, and as defined in the claims appended to the said specification. Hence, I do not limit my invention to the exact arrangements and combinations of the various mechanism and devices as described in the said specification, nor do I confine myself to the exact details of the construction of the various parts of the same as illustrated in the accompanying drawings.

I claim:—

1. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a slidably supported female die-member, a mandrel coöperating with said female die-member, and means for moving said female die-member laterally to register the same alternately beneath said male die-member and said bending die-member.

2. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel coöperating with said female die-member, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member.

3. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a base-

plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, comprising a pair of outwardly extending arms connected with said base-plate, a shaft journaled in the free ends of said arms, lever-arms secured upon said shafts, link-members connecting said lever-arms with said female die-member, and hand-levers connected with said shaft for operating the same.

4. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a slidably supported female die-member, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, means for supporting said bending rollers upon said female die-member, and means for moving said female die-member laterally to register the same alternately beneath said male die-member and said bending die-member.

5. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member.

6. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, comprising a pair of outwardly extending arms connected with said base-plate, a shaft journaled in the free ends of said arms, lever-arms secured upon said shafts, link-members connecting said lever-arms with said female die-member, and hand-levers connected with said shaft for operating the same.

ber, and hand-levers connected with said shaft for operating the same.

7. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, said bending die-member being provided in its under side with a channel or groove having inwardly inclined or chamfered portions or walls, a slidably supported female die-member, a mandrel cooperating with said female die-member, and means for moving said female die-member laterally to register the same alternately beneath said male die-member and said bending die-member.

8. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, said bending die-member being provided on its under side with a channel or groove having inwardly inclined or chamfered portions or walls, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member.

9. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, said bending die-member being provided on its under side with a channel or groove having inwardly inclined or chamfered portions or walls, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, comprising a pair of outwardly extending arms connected with said base-plate, a shaft journaled in the free ends of said arms, lever-arms secured upon said shaft, link-members connecting said lever-arms with said female die-member, and hand-levers connected with said shaft for operating the same.

10. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, said

bending die-member being provided on its under side with a channel or groove having inwardly inclined or chamfered portions or walls, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, comprising a pair of outwardly extending arms connected with said base-plate, a shaft journaled in the free ends of said arms, lever-arms secured upon said shafts, link-members connecting said lever-arms with said female die-member, and hand-levers connected with said shaft for operating the same, and adjustable stop devices connected with said base-plate for limiting the lateral movements of said female die-member.

11. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, said bending die-member being provided on its under side with a channel or groove having inwardly inclined or chamfered portions or walls, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, comprising a pair of outwardly extending arms connected with said base-plate, a shaft journaled in the free ends of said arms, lever-arms secured upon said shaft, link-members connecting said lever-arms with said female die-member, and hand-levers connected with said shaft for operating the same, adjustable stop-devices connected with said base-plate for limiting the lateral movements of said female die-member, and adjustable sheet-gage devices connected with said base-plate for registering sheet-metal in proper relation to said female die-member.

12. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member,

and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, and adjustable stop-devices connected with said base-plate for limiting the lateral movements of said female die-member.

13. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, adjustable stop-devices connected with said base-plate for limiting the lateral movements of said female die-member, and adjustable sheet-gage devices connected with said base-plate for registering sheet metal in proper relation to said female die-member.

14. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, and adjustable stop-devices connected with said base-plate for limiting the lateral movements of said female die-member.

15. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, adjustable stop-devices connected with said base-plate for limiting the lateral movements of said female die-member and adjustable sheet-gage devices connected with said base-plate for registering sheet metal in proper relation to said female die-member.

16. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending die-member carried by said die-carrier, a  
5 base-plate, a female die-member slidably supported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member,  
10 rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and  
15 said bending die-member, comprising a pair of outwardly extending arms connected with said base-plate, a shaft journaled in the free ends of said arms, lever-arms secured upon said shaft, link-members connecting  
20 said lever-arms with said female die-member, and hand-levers connected with said shaft for operating the same, and adjustable stop-devices connected with said base-plate for limiting the lateral movements of said  
25 female die-member.

17. In a power press, a reciprocating hammer, a die-carrier connected with said hammer, a male die-member and a bending  
30 die-member carried by said die-carrier, a base-plate, a female die-member slidably sup-

ported upon said base-plate, a mandrel cooperating with said female die-member, bending rollers cooperating with said female die-member and said bending die-member, rest-pins connected with said female die-member for supporting said bending rollers in proper relation thereto, and means for moving said female die-member laterally upon said base-plate to register the same alternately beneath said male die-member and said bending die-member, comprising a pair of outwardly extending arms connected with said base-plate, a shaft journaled in the free ends of said arms, lever-arms secured upon said shaft, link-members connecting said lever-arms with said female die-member, and hand-levers connected with said shaft for operating the same, adjustable stop-devices connected with said base-plate for limiting the lateral movements of said female die-member, and adjustable sheet-gage devices connected with said base-plate for registering sheet metal in proper relation to said female die-member.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 25th day of April, 1911.

GEORGE A. OHL, JR.

Witnesses:

FREDK. C. FRAENTZEL,

FREDK. H. W. FRAENTZEL.