G. A. OHL, JR.

METAL BENDING DIE.

APPLICATION FILED APR. 8, 1914.

1,111,403. Patented Sept. 22, 1914.

Fig. 1

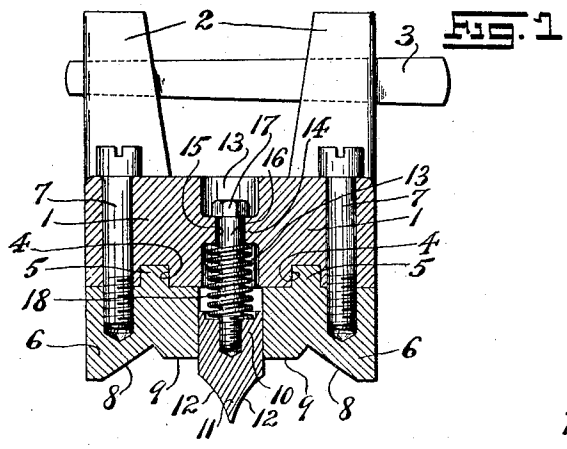
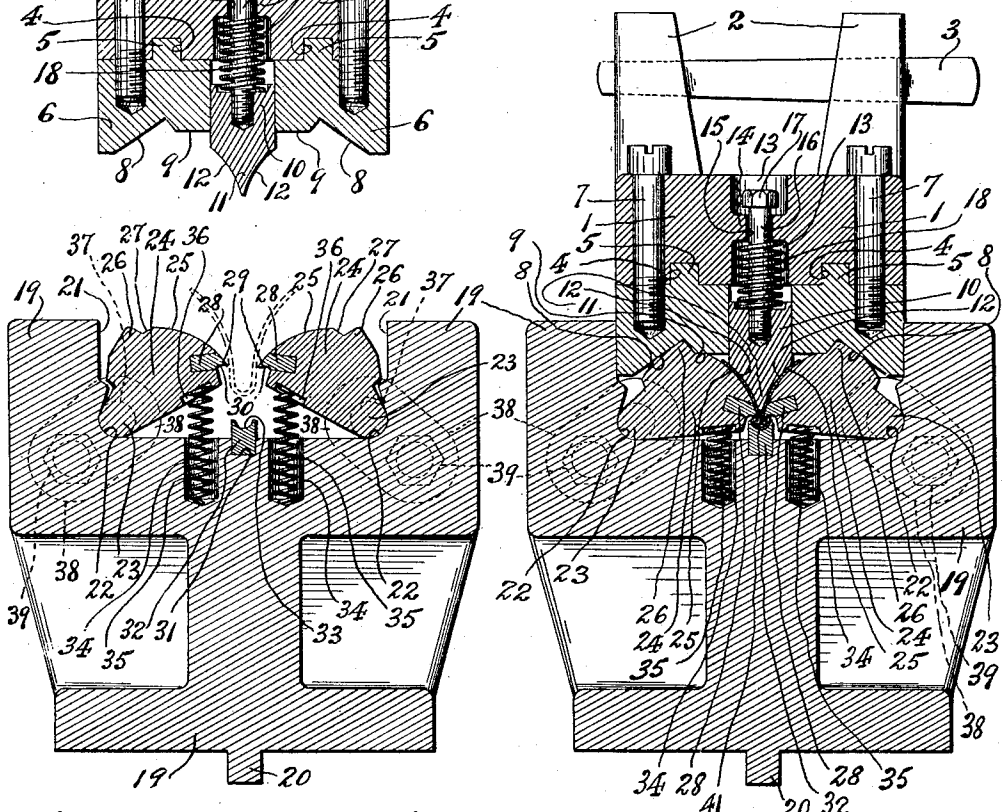


Fig. 2



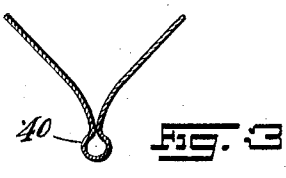


Fig. 3

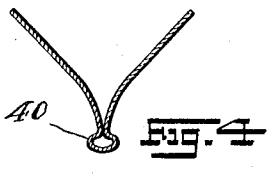


Fig. 4

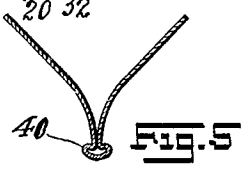
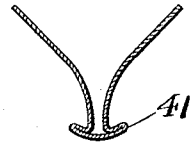


Fig. 5

Fig. 6



WITNESSES:

Wilhelmina B. Frauntzel.

Mabel Peterson

INVENTOR

George A. Ohl, Jr.,

BY

Frauntzel & Richards,

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

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

METAL-BENDING DIE.

1,111,403. Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed April 8, 1914. Serial No. 830,411.

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 Metal-Bending Dies; 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.

The present invention has reference, generally, to improvements in dies for forming sheet-metal; and, this invention relates, more particularly, to a novel arrangement and construction of dies adapted to be used in that class of power presses which are employed for bending and forming sheet-metal into desired conformations, such for example, as bending and forming the sheet metal into various forms of corner-pieces, angle plates and the like.

The invention has for its principal object to provide a novel arrangement and construction of dies by means of which may be formed or shaped small nose or bull nose corner-pieces, such as are connected with the angles of plastered walls to reinforce the wall plaster at such points, and thereby prevent chipping and breaking of the wall plaster at such corners or angles.

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 objects of the present invention in view, the said invention consists, primarily, in the novel construction of dies hereinafter set forth; and, the invention consists, furthermore, in the novel arrangements and combinations of the various parts of the dies, as well as in the details of the construction thereof, all of which will be hereinafter more fully described, and then finally embodied in the claims 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 transverse vertical section of the novel bending dies made according to and embodying the principles of the present invention, the same being shown in their normal initial positions; Fig. 2 is a similar view showing the novel bending dies in their operated positions upon the completion of their bending operations; and Figs. 3, 4 and 5 are respectively cross-sections of small nose and Fig. 6 of bull nose corner-pieces of the character possible to be formed by the operation of said novel bending dies.

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

Referring now to said Figs. 1 and 2 of the drawings, the reference character 1 indicates the bolster or main-body of the upper die-member from the upper surface of which project the pairs of lugs or ears 2 adapted to embrace the hammer of a power press for operating said dies, and which are detachably secured to said hammer by means of the transverse dowel-pins 3. Said bolster or main-body 1 of the upper die member corresponds in length to the length of corner-pieces desired to be formed, such length being usually in sizes from eight to twelve feet, although of course the invention is not to be limited in this respect. Formed in the under side of said bolster or main-body 1 are a pair of longitudinally extending channels or grooves 4, in which are received the longitudinally extending stocks or tail-pieces 5 of cam-members 6 which are secured to the under side of said bolster or main-body 1 by means of bolts or screws 7. The said cam-members 6 parallel each other, and are maintained by the engagement of their stocks or tail-pieces 5 with said channels or grooves 4 from any lateral movement of displacement with relation to said bolster or main-body 1. Each cam-member 6 is provided with a properly inclined cam-surface 8, and adjacent to the inner marginal edge portion of each cam-member 6 is a flattened hammer-portion 9. Connected with said bolster or main-body 1 so as to extend longitudinally between said pair of cam-members 6 is a plunger die-member 10, the lower or free end of which is wedge-shaped to provide a male die-portion, 11, having upwardly diverging side surfaces 12 which may be curved to any desired degree, or which may be flat surfaces, or which may be a combination of curved and flat surface according to the desired form to be given to

the flaring walls of the corner-piece to be bent or shaped. Said plunger-die member 10 is so associated with said bolster or main body 1 as to be capable of a yieldable vertical movement with relation thereto, and to accomplish this end there are provided openings or sockets 13 extending vertically through said bolster or main-body 1, and formed within said openings or sockets 13 is an annular shoulder 14 which provides a restricted opening 15 of reduced diameter. Extending through said openings 15 are bolts 16, which screw into said plunger die-member 10, and by which the latter is suspended from said bolster or main-body 1. The heads 17 of said bolts 16 are thus arranged within the upper ends of said openings or sockets 13, and by engaging with said shoulders 14 limit the projected position of said plunger die-member. The plunger die-member is yieldably maintained in its projected position by springs 18 surrounding said bolts 16 between the upper surface of said plunger die-member 10 and said shoulders 14, so that the same are arranged within the lower ends of said openings or sockets 13.

The reference character 19 indicates the bed-plate of the lower die-member, the same being provided upon its under side with a longitudinally extending rib 20 adapted to be received in a corresponding groove in the anvil of a power-press to thus affix said lower die-member to the latter, and in proper registration with the upper die-member as carried by the hammer of said power-press. The upper surface of said bed-plate 19 is provided with a longitudinally extending channel 21 corresponding in width to the width of said cam-members 6 as attached to the bolster or main-body 1 of said upper die-member, and which are adapted to enter said channel 21 when said upper die-member is carried into coöperative relation with said lower die-member. Formed at each side of said channel 21, and preferably in the plane of the bottom of said channel, are longitudinally extending grooves forming fulcrum bearings 22. Pivotally supported in the said fulcrum-bearings 22, by means of their fulcrum-ribs 23 formed at their lower ends, are a pair of oscillatable die-members 24, the same being provided with die-surfaces 25 corresponding to the side surfaces 12 of the male die-portion 11 formed upon said plunger die-member 10. Said oscillatable die-members 24 are each provided upon their upper surfaces with projections or ribs 26 adapted to receive the operative engagement of the cam-surfaces 8 of said cam-members 6 of the upper die-member. The said upper surfaces of said oscillatable die-members 24 are also provided with longitudinally extending receiving-surfaces 27 adapted to receive the contact and pressure of said hammer-portion 9 of said die-members 6 connected with said upper die-member. Inserted in the oppositely facing inner edges of said oscillatable die-members 24 are longitudinally extending pinching dies 28, the same having downwardly projected die-portions 29, the rear or under sides of which are undercut as at 30. Said pinching-dies 28 are made, preferably, of hardened tool steel. Extending centrally and longitudinally through said channel 21, the same being seated in a groove 31 whereby it is retained against lateral displacement, is a female-die 32, having a concave die-portion 33 in its upper surface. Said female-die 32 is also preferably made of hardened tool-steel. In order to return and maintain said oscillatable die-members 24 in their normal initial or raised positions there are provided compression springs 34 which are seated in receiving recesses or sockets 35 formed in the bed-plate 19, the upper ends of said springs 34 being seated in depressions or sockets 36 formed on the under side of said oscillatable die-members 24. In order to retain said fulcrum-ribs 23 of said oscillatable die-members 24 seated in their respective fulcrum bearings 22, said oscillatable die-members 24 are provided at their respective outer ends with outwardly projected studs 37 which are journaled in retaining links 38 which are secured by bolts 39 to the respective ends of said bed-plate 19.

The operation of the above described construction of forming or bending dies is as follows:—The sheet-metal strip which is to be bent into a small-nosed or bull nosed corner-piece is first bent longitudinally in angular form having a rounded apex (as illustrated in dotted representation in Fig. 1) by means of preliminary or first operation dies, and when so bent the same is laid between said oscillatable die-members 24 with the rounded apex registered above said female-die 32. The upper die member is now allowed to descend, and the male die-portion 11 of the plunger die-member 10 centers the metal strip and tends to carry the same downward to seat its rounded apex in the female-die 32. As the upper die-member descends the cam-surfaces 8 of the cam-members 6 thereof engage the projections or ribs 26 of the oscillatable die-members 24, thereby causing the same to swing downwardly on their fulcrum, simultaneously causing the die-surfaces 25 to engage the metal strip and force the same in contact with the die-surfaces 12 of the plunger die-member 10, and causing the die-portions 29 of the pinching dies 28 to move into contact with the apex of the metal strip.

As the downward movement of the upper die continues the hammer-portions 9 of the cam-members 6 engage the receiving sur-

faces 27 of the oscillatable die-members 24, and thereby a downward pressure is exerted upon the die-members 24 which causes the pinching-dies 28 to pinch the metal strip together just above the apex of the same as seated in the female-die 32, and during this pinching operation the plunger die-member 10, being yieldingly mounted holds the metal strip in contact with the die-surfaces 25 of the die-members 24 without preventing the further downward movement of the upper die-member which is necessary to secure the operation of the pinching dies 28 as just described. It will be apparent that various degrees of the pinching operation may be secured by regulating the degree of the downward stroke or movement of the upper die-member. By shortening the stroke of the upper die-member, various sizes of small-nosed corner-pieces 40 may be formed, such as are illustrated more particularly in Figs. 3 and 4 and 5 of the drawings, and by completing the full stroke of the upper die-member bull-nosed corner-pieces 41, may be formed, such as illustrated in Fig. 6 of the drawings.

I am aware that some changes may be made in the arrangements and combinations of the various devices and parts, 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 which are appended hereto. Hence, I do not limit my invention to the exact arrangements and combinations of the devices and parts as set forth in the said specification, nor do I limit myself to the exact details of the construction of the said parts, as illustrated in the accompanying drawings.

I claim:—

1. In metal bending dies, a pair of oppositely facing oscillatable die-portions, supporting means upon which said die-portions are fulcrumed, a female die-member centrally disposed on said supporting means between said die-portions and toward which the latter swing, pinching-dies fixed in the free ends of said die-portions and alined below the die-surfaces thereof, said pinching-dies coöperating with said female die-member during the bending operations, a vertically movable upper die-member provided with means for operating said oscillatable die-portions when contacting therewith, and a male-die connected with said upper die-member with which the die-surfaces of said oscillatable die-portions cooperate during the bending operations.

2. In metal bending dies, a lower die-member consisting of a bed-plate, oppositely facing oscillatable die-portions fulcrumed on said bed-plate, each oscillatable die-portion having a projection on its upper side, each oscillatable die-portion having die-surfaces at its outer end, pinching-dies secured in the lower marginal edges of the outer end of said oscillatable die-portions, spring-means connected with said bed-plate and engaging said oscillatable die-portions, to maintain the latter in normal initial position, and a female-die having a concave die depression secured to said bed-plate so as to extend longitudinally between said oscillatable die-portions; a vertically movable upper die-member consisting of a bolster, cam-members connected with said bolster having cam-surfaces adapted to engage said projections of said oscillatable die-portions to operate the latter, a hammer-portion connected with each cam-member adapted to engage said hammer-receiving surfaces of said oscillatable die-portions, and a vertically yieldable plunger die mounted on said bolster, said plunger-die having a male-die-portion provided with die-surfaces adapted to coöperate with the die-surfaces of said oscillatable die-portions.

3. In metal-bending dies, a lower die-member consisting of a bed-plate, oppositely facing oscillatable die-portions fulcrumed on said bed-plate having die-surfaces at their outer ends, pinching-dies secured to the lower marginal edges of the outer ends of said oscillatable die-portions, spring-means mounted in said bed-plate and engaging said oscillatable die-portions to maintain the latter in normal initial positions, a stationary female-die secured to said bed-plate and extending longitudinally between said oscillatable die-portions; a vertically movable upper die-member consisting of a bolster, cam means connected with said bolster for engaging and operating said oscillatable die-portions of said lower die-member, and a vertically yieldable plunger die mounted on said bolster, said plunger-die having a male die-portion provided with die-surfaces adapted to cooperate with the die-surfaces of said oscillatable die-portions.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 30 day of March, 1914.

GEORGE A. OHL, Jr.

Witnesses:
August A. Berghof,
Fredk. C. Fraentzel.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."