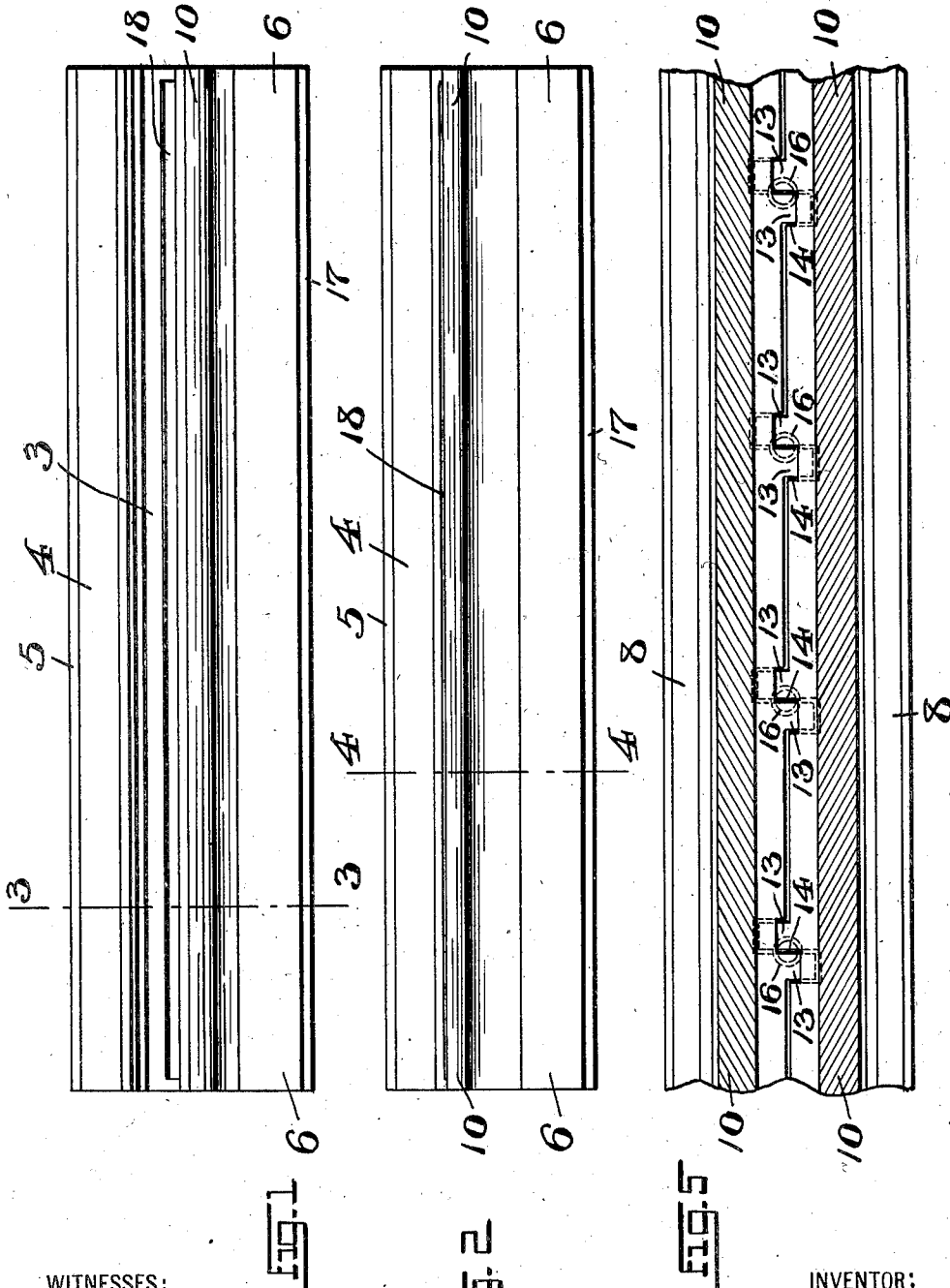


G. A. OHL, JR.
METAL BENDING OR FORMING DIES.
APPLICATION FILED MAR. 11, 1911.

1,003,197.

Patented Sept. 12, 1911.

2 SHEETS—SHEET 1.



WITNESSES:
Harry C. Pfeiffer
Frederick W. W. Brauntzel

FIG. 2

FIG. 5

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

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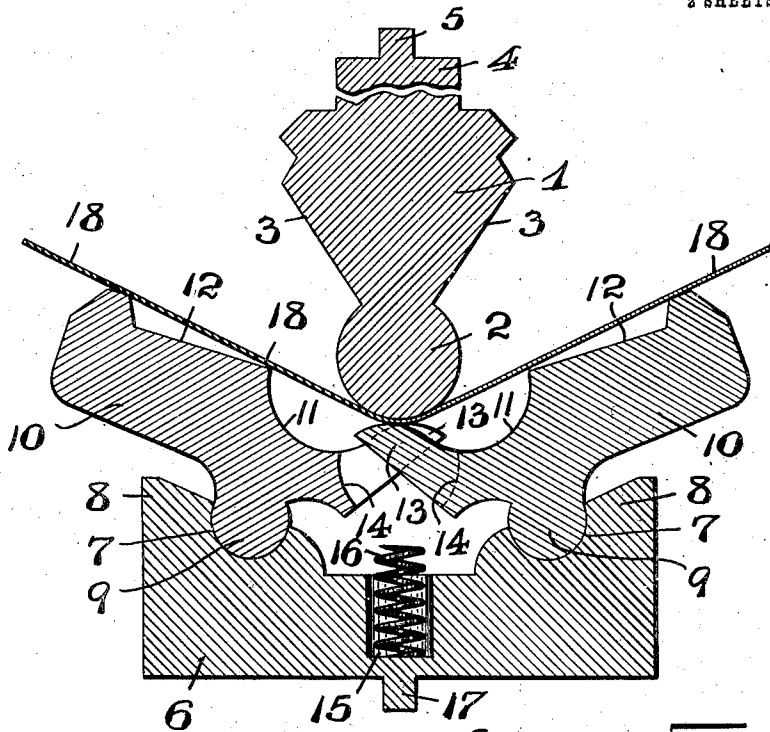


FIG. 3

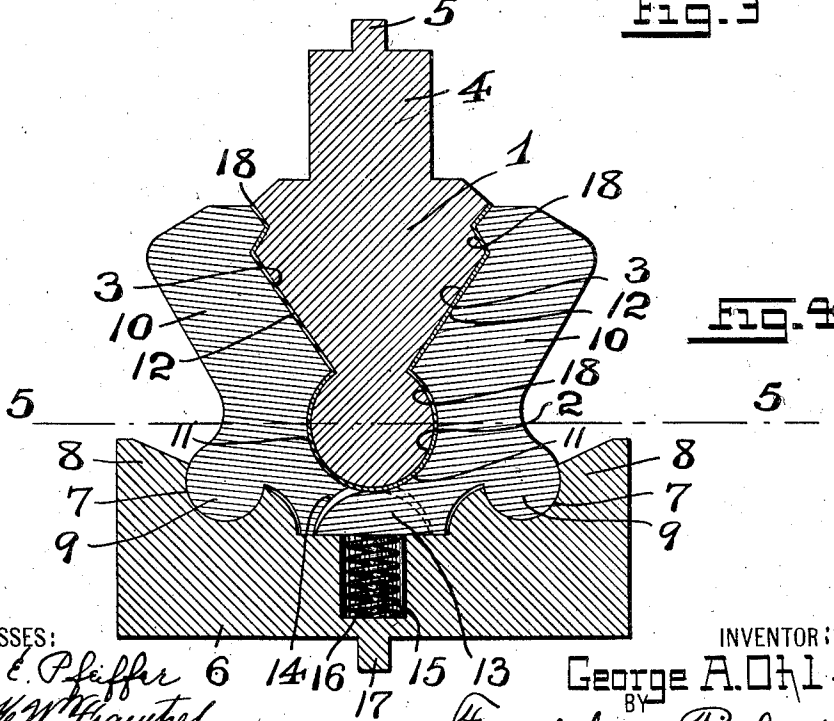


FIG. 4

WITNESSES:

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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 OR FORMING DIES.

1,003,197.

Specification of Letters Patent. Patented Sept. 12, 1911.

Application filed March 11, 1911. Serial No. 613,708.

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 or Forming 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 or forming sheet metal into desired conformations, such for example, as bending and forming the sheet-metal into the forms of ridge-rolls for roof-trees, and the like.

The invention has for its principal object to provide a novel arrangement and construction of dies by means of which complete ridge-rolls, and the like, can be formed or shaped in a single operation.

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 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 side elevation of the novel construction of dies in their opened positions ready to be operated. Fig. 2 is another side elevation of said dies after the same have been operated to form the sheet-metal into the desired shape. Fig. 3 is a transverse

vertical section, taken on line 3—3 in said Fig. 1; and Fig. 4 is a similar section, taken on line 4—4 in said Fig. 2, both of said views being made on a considerably enlarged scale. Fig. 5 is a horizontal section, on a smaller scale, said section being taken on line 5—5 in said Fig. 4, looking in a downward direction, and showing the female die-members, with the male die-members removed.

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

Referring now to the several figures of the drawings, the reference-character 1 indicates a male die-member, the same being provided at its free end with a roll-forming portion 2 and flange-forming portions 3 extending upwardly from the said roll-forming portion 2. Said male die-member 1 is further provided with the tail-piece or stock 4, the same having an upwardly and longitudinally extending rib 5. Said tail-piece or stock 4 and its rib 5 form the means by which the said male-die member 1 is secured to the hammer of a power press for operating said dies.

The reference-character 6 indicates the bed-plate of a female die-member, said bed-plate 6 being provided with a pair of longitudinally extending grooves 7, formed in the upper surface of suitable fulcrum beds 8 lying at each side of the said bed-plate 6. Pivottally supported in the grooves 7 of said fulcrum-beds 8, by means of the fulcrum-ribs 9 formed on their outer sides, are a pair of female-die members 10. Said female die-members 10 are provided adjacent to their lower marginal edges with longitudinally extending roll-forming surfaces 11 which conform to the conformation of the said roll-forming portion 2 of the male die-member 1, said female die-members 10 being further provided with flange-forming portions 12, which conform to the said flange-forming portions 3 of the said male die-member 1. The lower marginal edges of said female die-members are provided with a plurality of cam-members 13 and cut-away portions 14, the cam-members 13 of one of said female die-members being adapted to dove-tail into the cut-away portions 14 of the opposite female die-member. The bed-plate 6 of the said female die-members is provided with suitably disposed receiving sockets 15 in which are seated suitable coiled springs 16, the latter being adapted-

ed to exert the force of their compression upon the under side of the cam-members 13 of said female die-members 10, so as to throw the latter open and into their normal initial positions when the operating pressure of said male die-member 1 is released from said female-die-members. The bed-plate 6 is further provided upon its under side with a longitudinally extending rib 17 adapted to be received in the corresponding groove in the bed of a power press with which said dies are used.

The operation of said novel construction of forming dies is as follows: A sheet of metal, as 18, of proper width, is placed above the opened female die-members 10, so as to lie across the respective roll-forming surfaces 11 and the flange-forming portions 12, in the manner shown more particularly in Fig. 3 of the drawings. When in this position, which is the normal or opened position of the female die-members 10, the cam-members 13 are raised from said bed-plate 6 and project upwardly in the path of the descending male-die-member 1. After the sheet of metal 18 has been placed in the manner hereinabove set forth, the male die-member 1 is allowed to descend, so that its roll-forming portion 2 is brought in contact with said sheet-metal 18, thus subsequently causing the latter to be forcibly pressed upon the upwardly projecting cam-members 13 of the female die-members 10. The pressure of the descending male die-member 1 upon said cam-members 13, causes the said female die-members 10 to be rocked or moved upon their respective fulcrum-ribs 9 which, as has been stated, are seated in said grooves 7 of said fulcrum-beds 8 of the bed-plate 6. This rocking movement tends to close or force the female die-members 10 into contact with said male die-member 1, squeezing the sheet-metal 18 between the roll-forming portion 2 and the flange-forming portions 3 of said male die-member 1 and the roll-forming surfaces 11 and the flange-forming portions 12 of the respective female die-members 10, in the manner clearly illustrated in Fig. 4 of the accompanying drawings, and as will be clearly understood from an inspection of said figure. The leverage exerted by the said cam-members 13 upon their respective female die-members 10, causes the latter to operate upon the sheet-metal with great pressure, so as to force the same to conform to the shape of said male die-member 1, as will be clearly evident. After this operation has taken place, the pressure of the power press is released and its hammer raised, so as to remove the male die-member from its forming contact with the said female die-members. As soon as the pressure of the male die-member is released from said cam-members 13, the said springs 16,

which are at that time under compression, exert their pressure against the under side of said cam-members 13, whereby the same are pressed upwardly, such movement tending to rock the said female die-members 10 in the opposite directions, so as to thereby remove the same from the path of the ascending male die-member and again opening the same to their normal initial positions. The ascending male die-member 1 carries with it the sheet metal, bent to correspond to the conformation of said die-member, and to form the desired ridge-roll, or the like. After the several die-members have resumed their normal initial positions, the said sheet-metal which has been bent to form the desired ridge-roll may be withdrawn from said male die-member 1 by sliding the same lengthwise of the male die-member 1, until the finished metal product is removed therefrom.

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 confine 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, the combination of a male die-member of desirable conformation and a female-die comprising a bed-plate, fulcrum-beds at each side of said bed-plate provided with grooves in the upper surface thereof, a pair of female die-members, fulcrum-ribs connected with each female die-member and operatively seated, respectively, in the grooves of said fulcrum-beds, each female die-member being provided with die-faces or surfaces corresponding to the conformation of said male-die member, and cam-members projecting from the lower marginal portion of each female die-member and adapted to be operated by the pressure of the descending male die-member so as to oscillate said female die-members upon their fulcrum-ribs and cause the same to coöperate with said male die-member to bend sheet-metal, the lower marginal edges of each female die-member being provided with cut-out portions adapted to receive the said cam-members of the respectively opposite female die-member, substantially as and for the purposes set forth.

2. In metal bending dies, the combination of a male die-member of desirable conformation and a female die comprising a bed-

plate, fulcrum-beds at each side of said bed-plate provided with grooves in the upper surface thereof, a pair of female die-members, fulcrum-ribs connected with each female die-member and operatively seated, respectively, in the grooves of said fulcrum-beds, each female die-member being provided with die-faces or surfaces corresponding to the conformation of said male-die member, cam-members projecting from the lower marginal portion of each female die-member and adapted to be operated by the pressure of the descending male die-member so as to oscillate said female die-members upon their fulcrum-ribs and cause the same to cooperate with said male-die member to bend sheet-metal, the lower marginal edges of each female die-member being provided with cut-out portions adapted to receive the said cam-members of the respectively opposite female die-member, and means for returning said female-die members to their normal initial position, substantially as and for the purposes set forth.

3. In metal bending dies, the combination of a male die-member of desirable conformation and a female die comprising a bed-plate, fulcrum-beds at each side of said bed-plate provided with grooves in the upper

surface thereof, a pair of female die-members, fulcrum-ribs connected with each female die-member and operatively seated, respectively, in the grooves of said fulcrum-beds, each female die-member being provided with die-faces or surfaces corresponding to the conformation of said male-die member, cam-members connected with each female die-member and adapted to be operated by the pressure of the descending male die-member so as to oscillate said female die-members upon their fulcrum-ribs and cause the same to cooperate with said male-die member to bend sheet-metal, and means for returning said female die members to their normal initial position, comprising the provision in said bed-plate of receiving sockets, and a coiled spring arranged in each receiving socket, said springs engaging the under sides of said cam-members, substantially as and for the purposes set forth.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 9th day of March, 1911.

GEORGE A. OHL, Jr.

Witnesses:

FREDK. C. FRAENTZEL,
FREDK. H. W. FRAENTZEL.