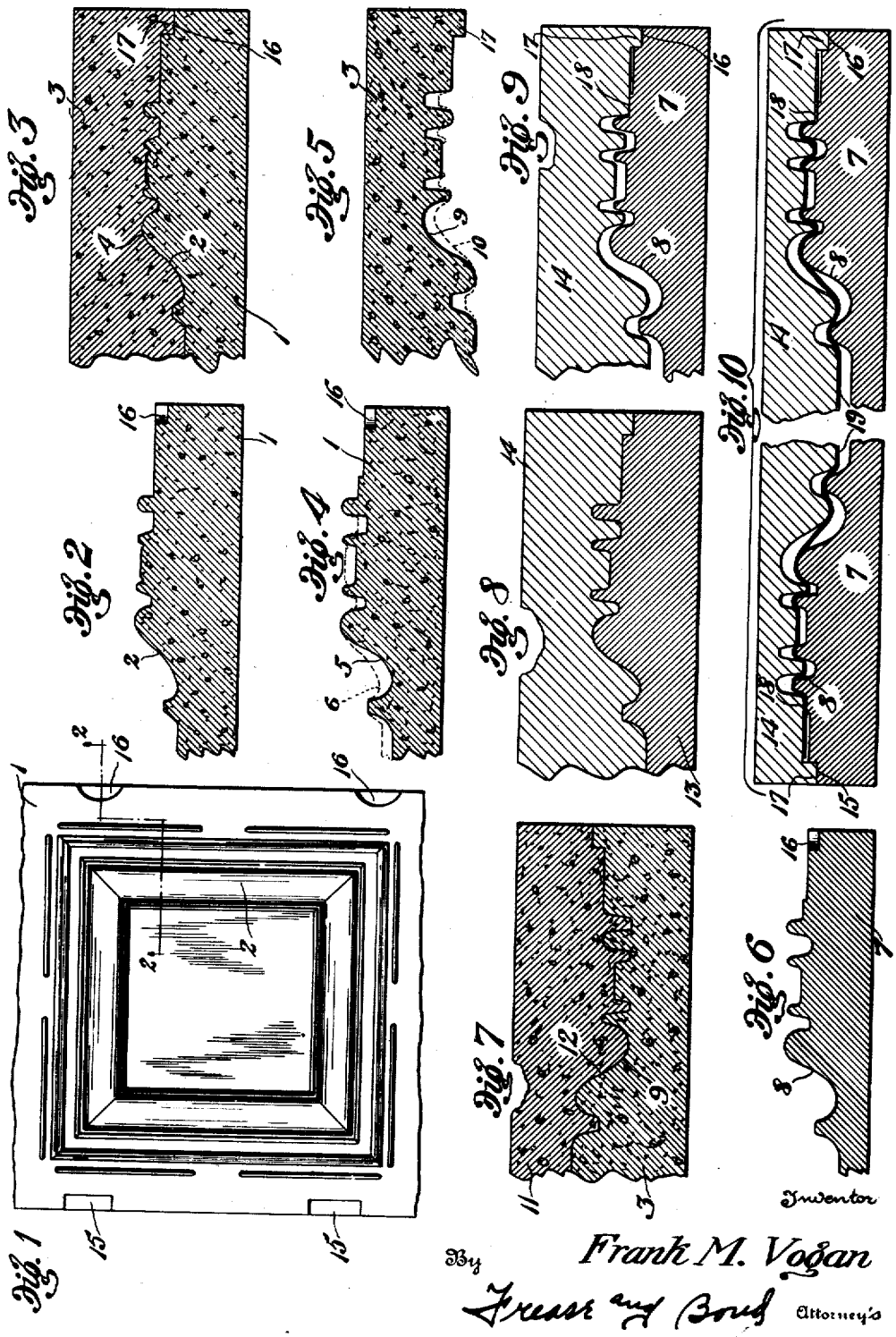
Jan. 15, 1924. 1,480,644

F. M. VOGAN

DIE AND METHOD OF MAKING THE SAME

Filed July 3, 1922



Inventor

By Frank M. Vogan

Fraser and Bond Attorneys

Patented Jan. 15, 1924. 1,480,644

UNITED STATES PATENT OFFICE.

FRANK M. VOGAN, OF CANTON, OHIO.

DIE AND METHOD OF MAKING THE SAME.

Application filed July 3, 1922. Serial No. 572,433.

To all whom it may concern:

Be it known that I, FRANK M. VOGAN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Die and Method of Making the Same, of which the following is a specification.

This invention relates to dies for forming sheet metal and the method of making the same, and has for its objects to provide a novel method of making dies for forming sheet metal ceilings and the like, by means of which a true upper die is produced in lead, whereby a perfect impression may be obtained; and in which the high points of one die preferably do not contact with the low points of the other die, the dies meeting upon the sheet metal only around the border or edge of the metal, thus permitting the metal to be bent or formed to the desired shape rather than stretching the metal into the required form, as is done in the usual dies now in general use.

The above and other objects may be attained by producing the dies in the manner illustrated in the accompanying drawing, in which—

Figure 1 is a plain view of the original plaster or wood mold;

Fig. 2, a section on the line 2—2, Fig. 1;

Fig. 3, a view similar to Fig. 2, showing also the original plaster impression made from the plaster mold;

Fig. 4, a fragmentary section of the original plaster mold after the same has been cut away;

Fig. 5, a similar view of the original plaster impression;

Fig. 6, a fragmentary sectional view of the iron die obtained by using the plaster mold shown in Fig. 4, as a pattern;

Fig. 7, a fragmentary sectional view showing the manner in which the second plaster impression is obtained from the original plaster impression shown in Fig. 5;

Fig. 8, a similar view showing the manner in which the lead die is molded from the iron mold;

Fig. 9, a fragmentary sectional view of the iron die shown in Fig. 6, and the lead die shown in Fig. 8, showing the manner in which the dies fit together; and

Fig. 10, a sectional view through the iron and lead dies showing the sheet metal being formed therein, the dies being shown in the closed position.

Similar numerals refer to similar parts throughout the drawing.

In carrying out the invention, a plaster or wood mold such as indicated at 1 is first formed having the cross sectional shape desired to be produced in the sheet metal such as indicated at 2, and best illustrated in Fig. 2. A plaster impression is then made from the plaster or wood mold 1 as shown at 3 in Fig. 3, the impression having, of course, the cross sectional shape as shown at 4, which is the reverse of the face 2 of the plaster or wood mold 1.

The original plaster or wood mold 1 is then preferably cut away as shown in Fig. 4, all of the low points in the mold being deepened, forming the contour indicated at 5 in said figure, the dotted line 6 indicating the original contour of the face of the mold, showing the points at which the mold is cut away and the amount of material removed.

The original mold 1 after being cut away as shown in Fig. 4, is then used as a pattern and placed in an ordinary molding flask, the iron die 7 being molded therefrom and having the contour 8 conforming to the cut away contour 5 of the original mold 1. This iron die is used as the lower die in the press or hammer.

The plaster impression 3 is then preferably cut away as shown in Fig. 5, all of the low points in said impression being deepened, forming the contour as shown at 9 in said figure, the dotted line 10 indicating the original contour of the plaster impression and showing the portions of the impression which are cut away.

The original plaster impression 3 is then inverted as shown in Fig. 7, and used as a mold in which the second plaster impression 11 is cast, said second impression, of course, having the contour 12 which is the reverse of the contour 9 of the original plaster impression.

This second plaster impression is then used as a pattern and placed in the sand in an ordinary foundry flask and an iron mold 13 is cast therein, being the exact reproduction of the second plaster impression. This

iron mold as shown at 13 in Fig. 8, is then inverted and placed in a press and lead, or other soft metal, poured therein, as shown at 14 in Fig. 8, the lead impression being hammered to place in the iron mold, producing a lead upper die to be used in the press or hammer to co-act with the iron die 7 as shown in Fig. 9.

After the lead die is thus formed, a sheet of metal, of heavier gage than is used in the stamping of the products, may then be placed on the iron mold and hammered down by the lead die and is fastened to the face of the lead die to protect the wearing surfaces thereof.

If desired, two or three extra lead dies may be made in the above manner at this time to be stored away for future emergency use, when the first lead die becomes worn.

In order that the lead and iron dies used in the hammer or press will always be properly located with respect to each other, the original plaster mold 1 is provided upon one side with square sockets 15 and upon the other side with rounded sockets 16. When the plaster impression 3 is made from the original plaster mold, lugs 17 will thus be formed upon said plaster impression, corresponding to the sockets 15 and 16 of the mold. Throughout the several steps of the operation, these sockets and lugs will thus be formed upon the different members, producing the sockets 15 and 16 upon the lower iron die 7 and the lugs 17 corresponding therewith upon the upper lead die 14, thus assuring the proper relative location of the upper and lower dies within the press or hammer.

It will thus be seen that a process or method is provided for producing a true upper die in lead from the iron casting or mold, as by casting the lead die in the iron mold and then transferring it to the press or hammer to co-operate with the iron die, any irregularities in the lower iron die due to warping in casting, may be overcome by placing shim plates between the lead die and the reciprocating head of the press or hammer.

By cutting away the low points of the original plaster mold and impression, it will be seen that the two dies do not contact at any point excepting at the edge or border as shown at 18, and the lugs 17 and sockets 15 and 16, the low points of each of the dies being spaced from the high points of the other die. As shown in Fig. 10, the metal sheet 19 is not stretched or drawn by the dies, but is formed or bent to the required shape, both dies engaging the metal sheet only at the border or edge 18 of the design formed in the sheet, the remaining portions of the sheet being engaged only upon one side or the other, the high points of one die bending or forming the sheet over the adjacent high points of the other die, while the sheet is not forced down into the low points of the dies.

With this construction, it will be readily seen that as the upper die descends, and the high points thereof engage the sheet, the edges of the sheet will be free, allowing the sheet metal to be bent or formed as the upper die continues to descend, the metal being permitted to flow inward toward the center of the dies, the edge portions 18 of the dies not engaging the sheet upon both sides until the upper die has completed its downward movement at which time the sheet will be completely formed.

With the method above described and illustrated in the accompanying drawing, the iron and lead dies may be formed to properly correspond in shape and to co-operate with each other to bend the sheet metal into the desired form, the objections to the usual form of close fitting dies being overcome, as the sheet metal is allowed to flow over the dies toward the center thereof as it is bent or formed by the operation of the dies, doing away with the tearing of the metal at certain points.

It has been found by experience that one stroke of a press equipped with the improved dies above described, is sufficient to form sheet metal, while with the common type of dies in which the metal is engaged upon both sides throughout its extent, by the dies, it usually requires three or more blows of the hammer to properly form the metal, owing to the greater resistance met in stretching the metal at certain points.

I claim:—

1. The method of forming dies which consists in forming a mold having sockets upon opposite edge portions, making a plaster impression of the same, producing lugs in the impression interfitting with said sockets, using the original mold as a pattern to cast an iron die, making a second plaster impression from the first named plaster impression, using said second plaster impression as a pattern to cast an iron mold and making a lead impression of the iron mold, said lead impression forming a die to co-act with the iron die.

2. The method of forming dies which consists in forming a mold, making a plaster impression of the same, cutting away the low points of the mold and impression, using the cut away mold as a pattern to cast an iron die, making a second plaster impression of the cut away plaster impression, using the second plaster impression as a pattern to cast an iron mold and making a lead impression of the iron mold, said lead impression forming a die to co-act with the iron die.

3. The method of forming dies which consists in forming a mold, making a plaster

impression of the same, cutting away the low points of the mold and impression and reproducing the cut away mold and impression in metal.

4. The method of forming dies which consists in forming a mold, making a plaster impression of the same, cutting away the low points of the mold and impression and reproducing the cut away mold in hard metal and the cut away plaster impression in soft metal.

5. The method of forming dies which consists in forming a mold, making a plaster impression of the same, cutting away the low points of the mold and impression, using the cut away mold as a pattern to cast the metal die, molding an impression from the cut away plaster impression and molding a metal die from the last named impression.

6. The method of forming dies which consists in forming a mold, making a plaster impression of the same, cutting away the low points of the mold and impression, using the cut away mold as a pattern to cast the metal die, molding an iron impression from the cut away plaster impression and molding a lead die from the iron impression.

FRANK M. VOGAN.