

(No Model.)

J. W. BOWERS.  
DIE FOR MAKING AXES.

No. 311,867.

Patented Feb. 10, 1885.

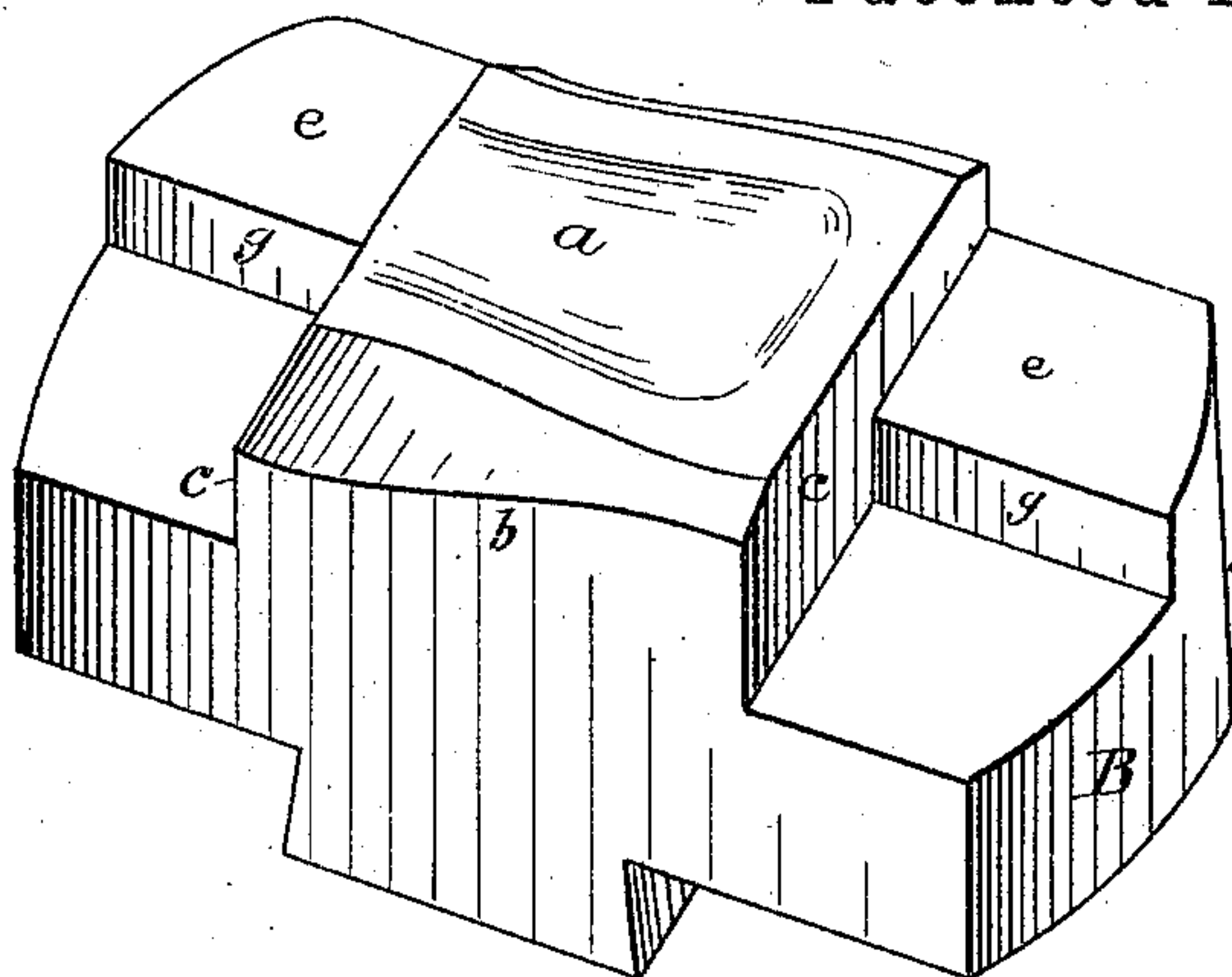


Fig. 1 -

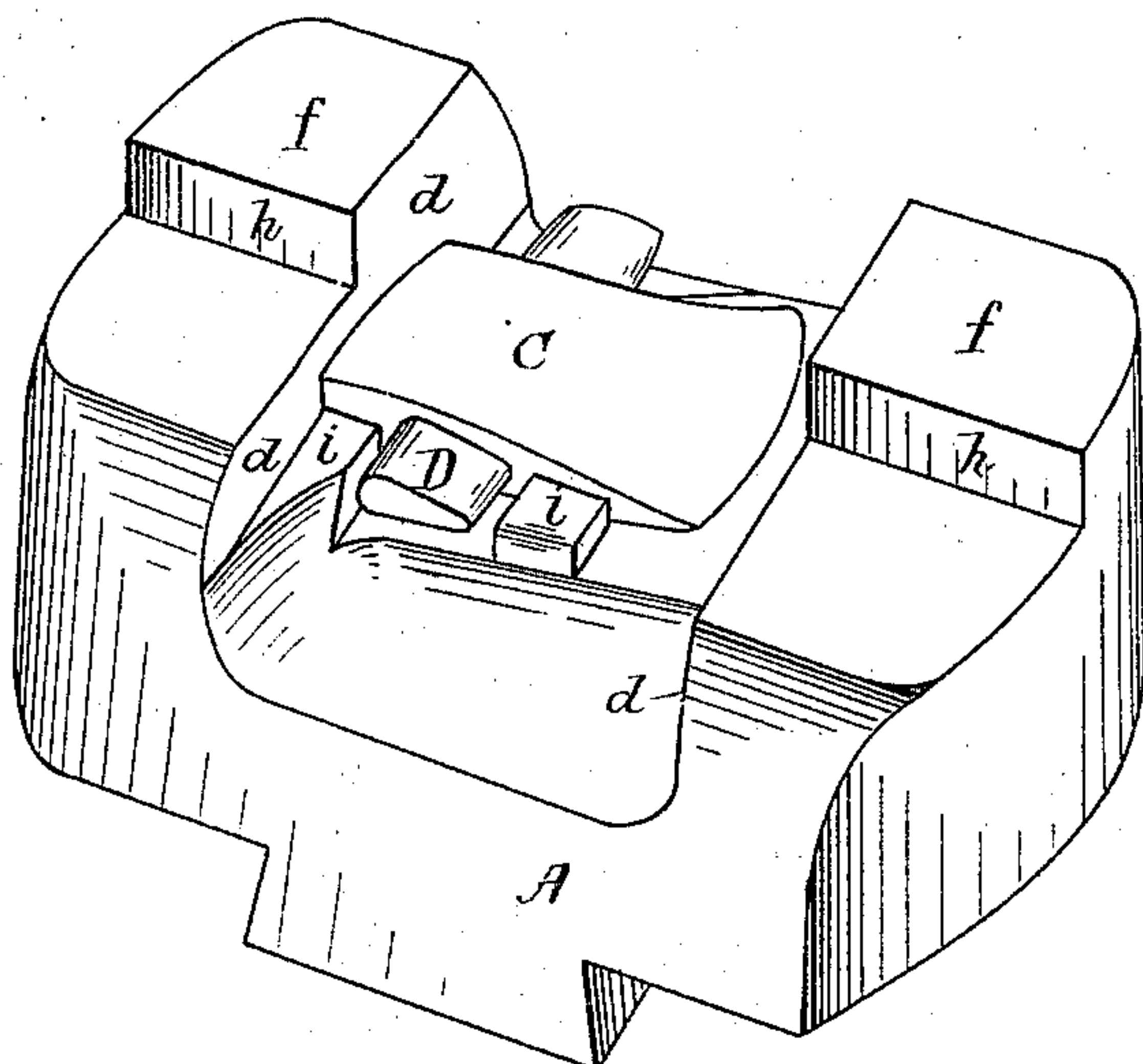


Fig. 2 -

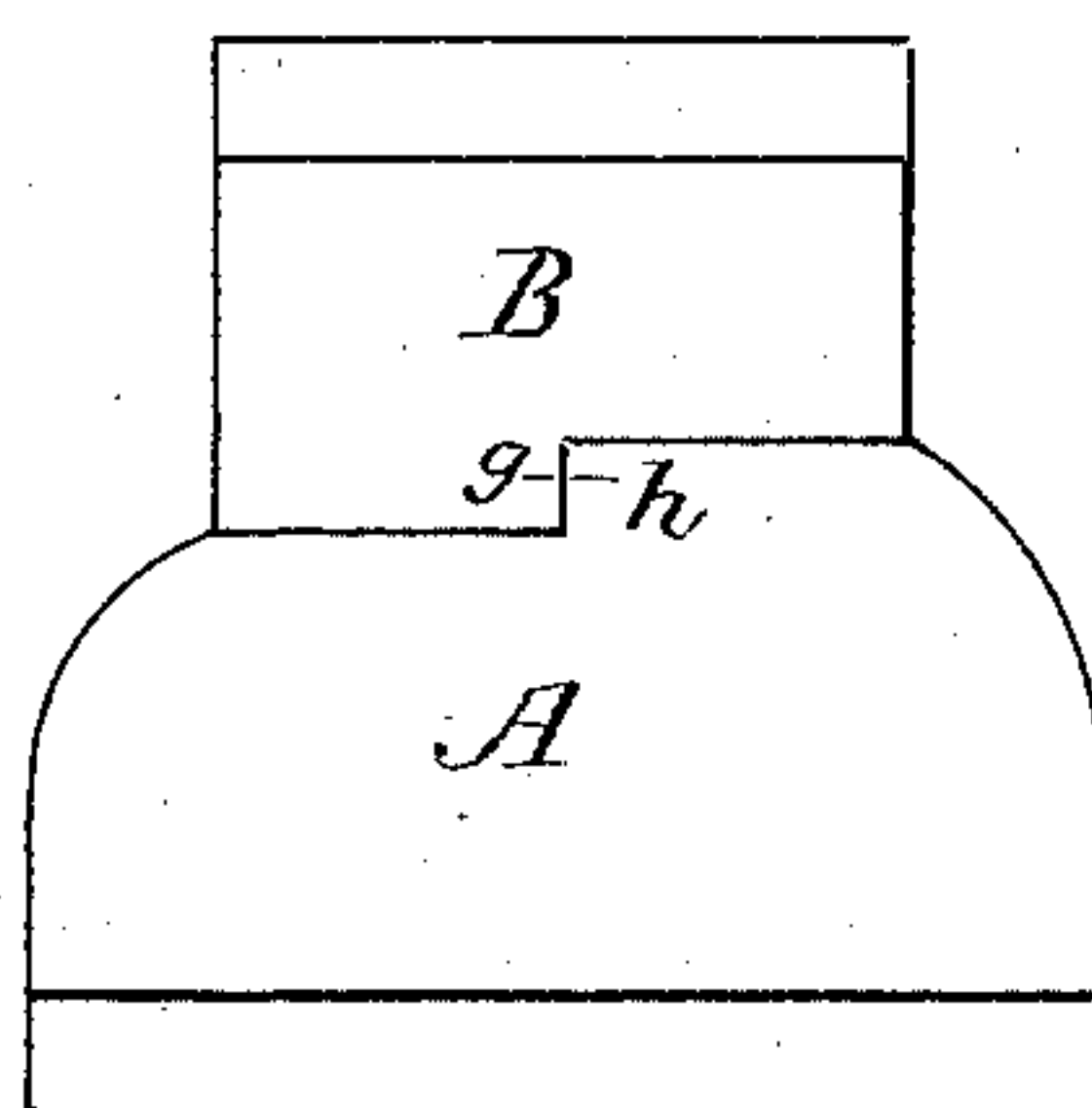


Fig. 3 -

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## DIE FOR MAKING AXES.

SPECIFICATION forming part of Letters Patent No. 311,867, dated February 10, 1885.

Application filed July 1, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. BOWERS, of East Douglas, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Dies for Making Axes and Similar Tools; and the following is a specification thereof.

This invention relates, particularly, to dies used in swaging axes and other tools of similar tapering form after the eyes have been made therein and the articles have been brought approximately to the final shape desired. When operating upon such articles, after the eye has been formed therein, it is necessary to insert a pin in the eye in order to prevent the metal being crushed in at that part and thereby destroying the shape of the eye; also, by striking such articles with suitable dies upon the outside, while an eye-pin of the proper shape is inserted, the eye is swaged into the desirable finished form. It is usual to make such eye-pins larger at one end than at the other, so as to produce an eye of tapering form, and this is done for the purpose of holding the ax more securely upon the handle after it has been wedged into the eye.

I have found in the operation of swaging partly-finished axes with an eye-pin of tapering form inserted in the eye that when the upper die strikes these tapering blanks with the tapering eye-pin through them there is a strong force exerted to crowd the upper die in the direction of the smaller or thin end of the blank, and also toward the smaller end of the eye-pin, which force will very soon loosen the upper die from its fastenings and throw it out of proper relation with the lower die.

As I have found it practicable to fasten the lower die securely to the bed of the machine in order to keep the upper die from being forced out of proper relation thereto, I so construct the meeting surfaces of the two dies that they shall interlock before the operating-face of the upper die strikes the tapering blank with the tapering eye-pin through it. One of the most convenient and simple means for accomplishing this I have illustrated in the drawings which accompany this specification and form a part thereof, wherein—

Figure 1 is a perspective view of the upper die turned over with its striking face upward.

Fig. 2 is a perspective view of the lower part of the die, showing an ax lying therein after it has been struck by the upper die. Fig. 3 is an end elevation of the two dies when in working contact.

Like parts of the dies in the several figures are designated by the same letters.

A is the lower die; B, the upper die; C, the ax; D, the eye-pin inserted in the eye of the ax.

*a*, Fig. 1, is the operating-face of the upper die. The operating-face of the lower die is covered by the ax C.

*b* is the projecting part of the upper die, which accurately fits into the groove or depression in the lower die when the two dies are brought together, and the faces *c* of the projection *b* on the upper die interlocking with the sides or faces *d* of the lower die prevents any movement sideways between the two dies. The projections *e e* of the upper die and the projections *f f* of the lower die so interlock that their respective perpendicular faces *g g h h* bear against one another, as shown at *g h*, Fig. 3, when the dies are in contact. The lower die is open at the parts corresponding to the edges of the ax with the exception of two stops, *i i*, which project from the working-face of that die, and against which one edge of the ax is placed to insure its proper position in the die when it is to be operated upon.

The operation of the dies is as follows: The ax C, after being heated to the proper temperature, has the tapering eye-pin D driven into the eye, and is then placed in the lower die, A, in the position shown in Fig. 2, the larger end of the eye-pin being that marked with the letter D. The upper die, B, is then brought down, and before its operating-face *a* strikes the ax placed in the lower die, the edges of the faces *c* of the upper die have passed by the edges of the faces *d* of the lower die, and a portion of the perpendicular faces *g g* have also passed a portion of the perpendicular faces *h h*. When the working-face *a* of the upper die strikes the inclined side of the ax C, it tends to force that die toward the thin or cutting edge of the ax; but the interlocking of the faces *c* and *d* prevents any such movement. At the same time the tapering eye-pin D tends to force the upper die toward its



smaller end; but any material movement in that direction is prevented by the interlocking of the projections *e e* and *f f*.

If the two dies were not constructed so as to  
5 interlock substantially as described, the upper die would soon be loosened from its connection with the drop in the machine, and if the respective dies were so securely keyed to the machine that its operation could not  
10 loosen the dies from their connection therewith, then, except for the interlocking of the two dies substantially in the manner described, each blow of the drop-hammer would force not only the upper die, but also the hammer, toward the smaller end of the eye-pin, which  
15 would cause the lower end of the drop-hammer to crowd against its guides every time an ax was struck by the upper die, and thus in a short time render the guides unfit for use.

20 The said dies are made with two open sides, in order to allow the metal of the ax to spread in the direction of its width, and the edges of the ax are subsequently finished in dies of the proper form.

25 It will be evident to those familiar with the use of drop-hammer machines that other forms of projections and depressions may be used to lock the two parts of the die together; but it will be found desirable to provide as large a  
30 surface as possible upon each die, to resist the

force which is exerted by each blow of the hammer to crowd the upper die toward the small ends of the blank and eye-pin.

I am aware of the machine for swaging the heads of hatchets described and shown in the 35 Letters Patent of Levi Dodge, No. 18,087, dated September 1, 1857; and I do not claim dies constructed as therein shown, so that the projecting parts of the upper die shut over those of the lower for the purpose of forcing 40 moving portions of the lower die together to effect lateral pressure upon the article being operated upon; but

What I claim is—

A pair of swaging-dies consisting of two 45 solid parts, each of which parts has shoulders or projections upon its face opposed to the other part, and each of which has counter-depressions corresponding to the projections 50 in the other, substantially as shown and described, whereby lateral displacement of the two parts of the die in relation to each other will be prevented when they are brought together in the operation of swaging articles of tapering form.

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Witnesses:

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