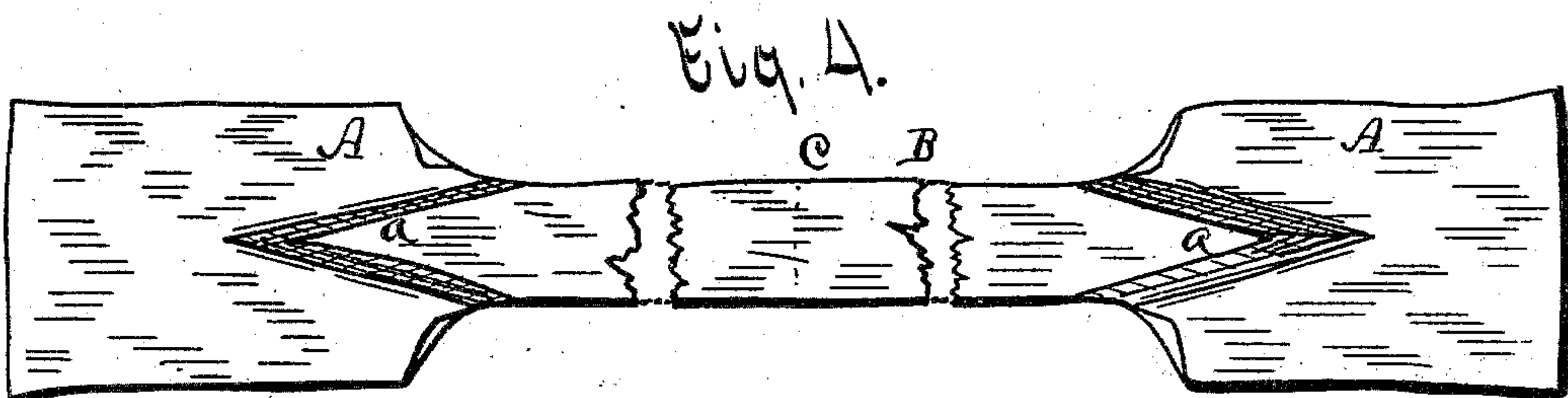
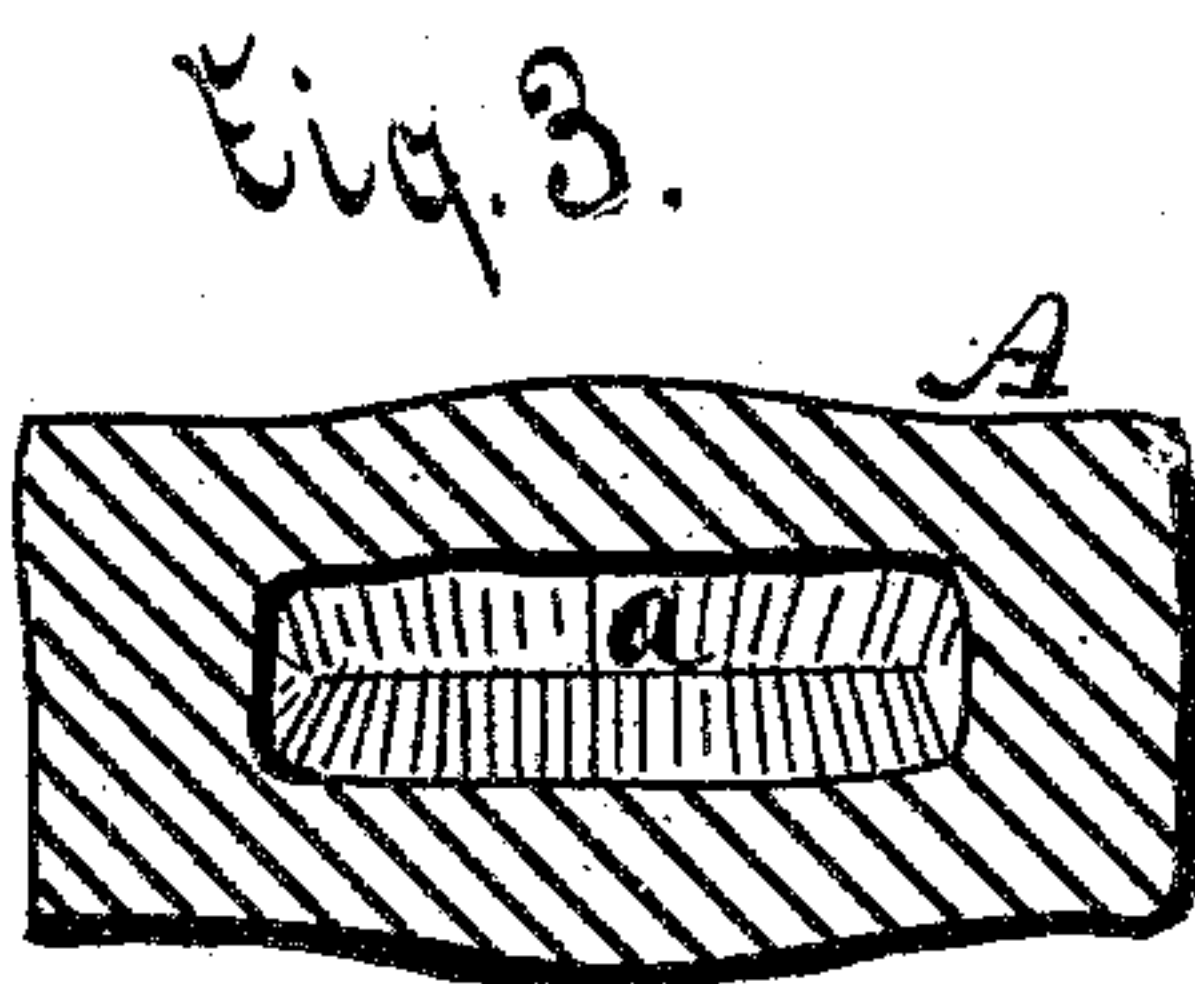
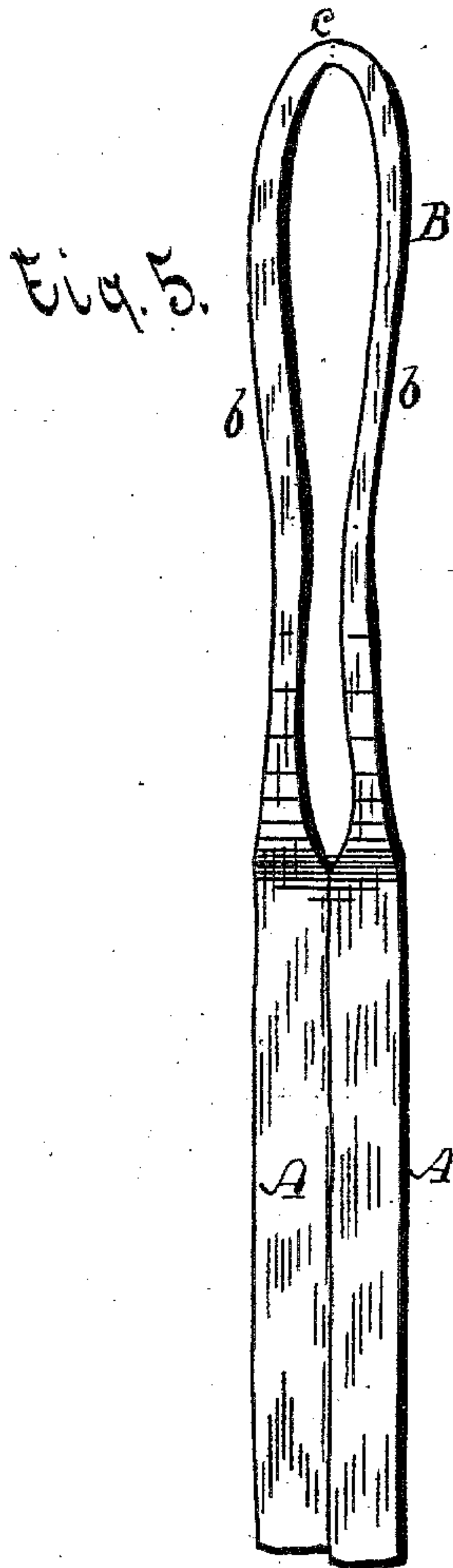
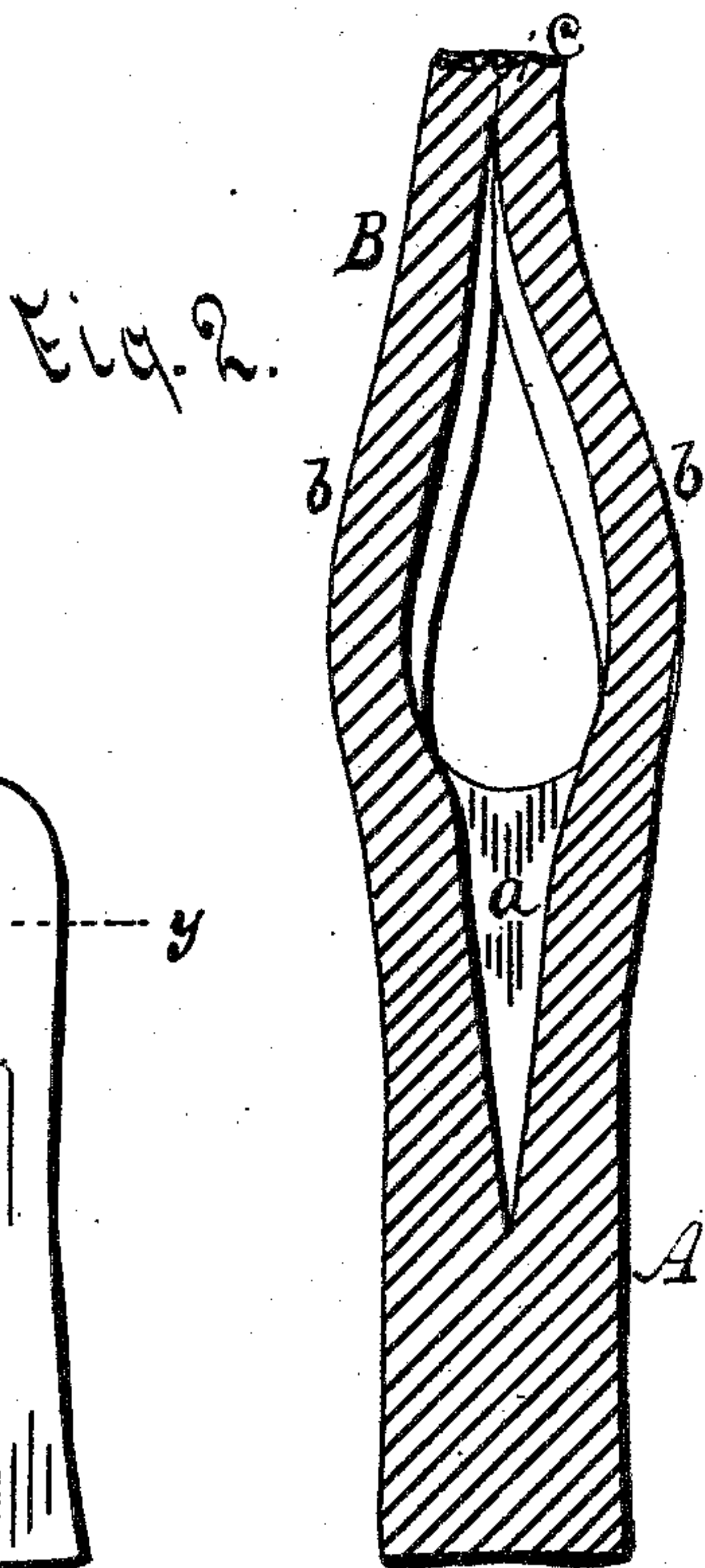
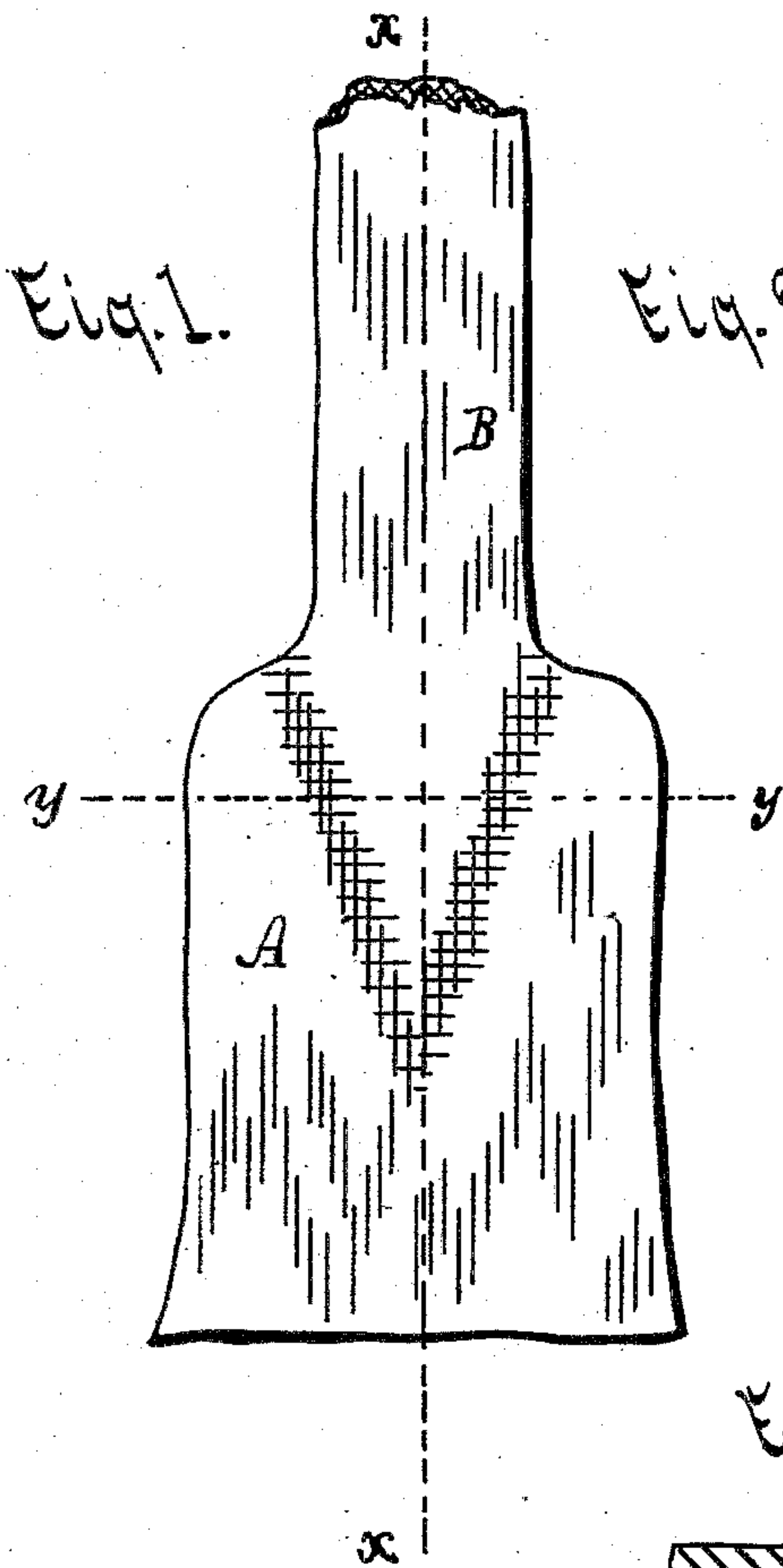


(No Model.)

E. A. BARNES.
PROCESS OF FORMING SHOVELS.

No. 296,719.

Patented Apr. 15, 1884.



Witnesses.

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UNITED STATES PATENT OFFICE.

ELMORE A. BARNES, OF PITTSBURG, PENNSYLVANIA.

PROCESS OF FORMING SHOVELS.

SPECIFICATION forming part of Letters Patent No. 296,719, dated April 15, 1884.

Application filed September 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, ELMORE A. BARNES, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented an Improved Process of Forming Shovel-Blanks; and I do hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

In Letters Patent issued to me on the 11th day of September, 1883, No. 284,710, I have described and claimed a method of forming shovel-blanks in a single piece by first casting an ingot with a socket parting or cavity therein; then rolling the ingot down to a uniform thickness about double the ultimate thickness of the blade; then completing the blank, so as to re-enforce it over the handle-socket by inserting it between revolving rolls from the discharge side thereof, the said rolls having recesses for forming the re-enforced portion of the blade, and one or both rolls having cut-away portions to furnish space for inserting the blank on the said discharge side thereof. The said method of forming shovel-blanks is excellent in every respect, and very superior shovels are made thereby in perhaps the cheapest possible manner. I have a means, also, of first forming the blanks ready for rolling different from that described in the said Letters Patent, which means also produces ultimately a very superior shovel, though the entire process is not quite so economical as that, yet superior in this respect, also, to other methods of making shovels heretofore in use. By my present method I forge or partly roll and forge the blank preparatory to the final or regular rolling, and forge the piece in such a way as to form a socket cavity or parting, and at the same time to connect the upper ends of the strap part, since these parts would not keep in proper position while rolling if they were entirely separate.

In the accompanying drawings, Figure 1 represents a side view of an ingot or block forged by my present method, ready for rolling; Fig. 2, a longitudinal section thereof, in a plane indicated by the line *x x*, Fig. 1; Fig. 3, a transverse section in a plane indicated by the line *y y*, Fig. 1. Fig. 4 is a side view of a forged block extended; and Fig. 5, an edge view of the

same with the two ends doubled together, showing a way of producing the form ready for rolling different from that represented in Figs. 1, 2, and 3.

Like letters denote corresponding parts in all the figures.

The manipulation of the block being required to be such as to form a socket parting or cavity and to unite the upper ends of the strap parts, I accomplish these results, according to the views shown in Figs. 1, 2, and 3, by forging or rolling the main or blade part A of the block in one solid piece of proper dimensions; then drawing out into narrower form the strap part B, as seen in Fig. 1; then splitting the strap part edgewise into two parts, *b b*, Fig. 2, and punching a cavity, *a*, in the upper end of the blade part A, between the strap parts B B, as shown in Figs. 1 and 2; and, finally, welding together the upper ends of the strap parts B B, as seen at *c* in Fig. 3; or the strap parts B B may not be separated at the upper ends when they are split apart. Also, any variation in the order of the manipulations above stated may be adopted without departing from my invention; or any unessential departure from the method described may be adopted, provided the ultimate result is as herein set forth.

According to the manner indicated in Figs. 4 and 5, the block is forged or rolled with the blade part in two portions, A A, Fig. 4, at the two ends of the bar, and the narrower and thinner part B in one continuous portion between these two end portions. The bar is then doubled over endwise, thus bringing the two parts A A together, one lying closely upon the other, as shown in Fig. 5, and tying the two strap parts B B, Fig. 5, at the bend *c*. The socket cavity or parting is provided for in this way of forming the block by making depressions *a* in the bar, as seen in Fig. 4. Then, when the ends of the bar are doubled together, these two depressions are brought opposite to each other and form the socket-cavity. Finally, the two parts A A are welded together around this socket-cavity. Any unessential variation from this way of forging may be adopted without departing from my invention. The principles of the two methods of forging above specified are substantially the same, and with the same result in both cases. The blocks prepared as above are then rolled, first, between

plain rolls to reduce them to a uniform thickness double the required thickness of the shovel-blade; then put between special rolls, with re-enforcing depressions and feed notches or
5 openings therein, in the same manner as specified in the aforesaid Letters Patent.

The shovels are preferably made of cast-steel; but they may be made of blister-steel, semi-steel, or of any proper material.

10 I claim as my invention—

1. The process of forming shovels which consists in first forging a block of metal of suitable form and thickness to produce the required shape and size of rolled blade-blanks,
15 with a socket parting or cavity therein, then rolling the said block to a uniform thickness double the required thickness of the shovel-blade, or thereabout, and then completing the blade-blank by inserting it between revolving
20 rolls from the discharge side thereof, to reduce the same, the said rolls having recesses for forming the re-enforced portion over the socket of the blade.

2. The improved process of forming shovels which consists in first forging a block of metal
25 of suitable form and thickness to produce the required shape and size of rolled blade-blank, with a socket parting or cavity therein and the upper ends of the strap part united, then rolling the said block to a uniform thickness double
30 the required thickness of the shovel-blade, or thereabout, and then completing the blade-blank by inserting it between revolving rolls from the discharge side thereof, to reduce the same, the said rolls having recesses for forming
35 the re-enforced portion over the socket of the blade.

In testimony whereof I have signed my name in presence of two witnesses.

ELMORE A. BARNES.

Witnesses:

O. T. THOMPSON,
CHAS. W. HUGUELY.