

No. 685,256.

Patented Oct. 29, 1901.

T. F. CARNS.

PROCESS OF PRODUCING WROUGHT METAL WRENCH JAWS.

(Application filed Mar. 20, 1901.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1

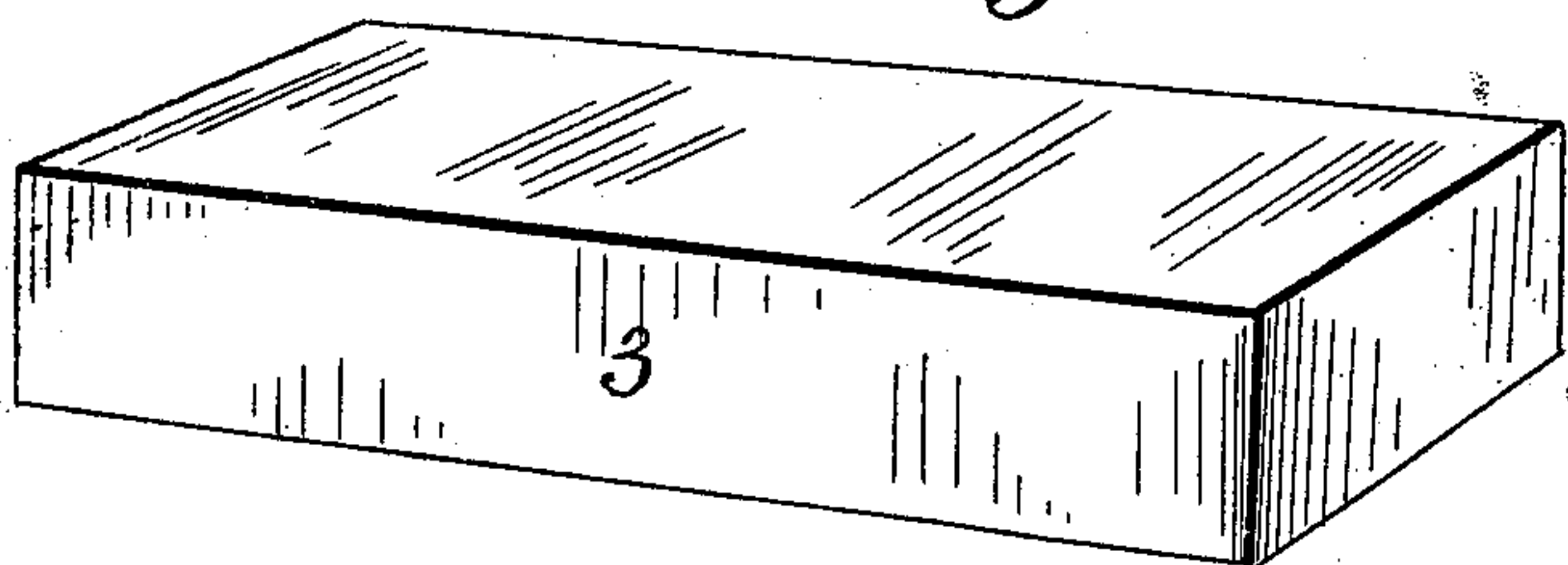


Fig. 2

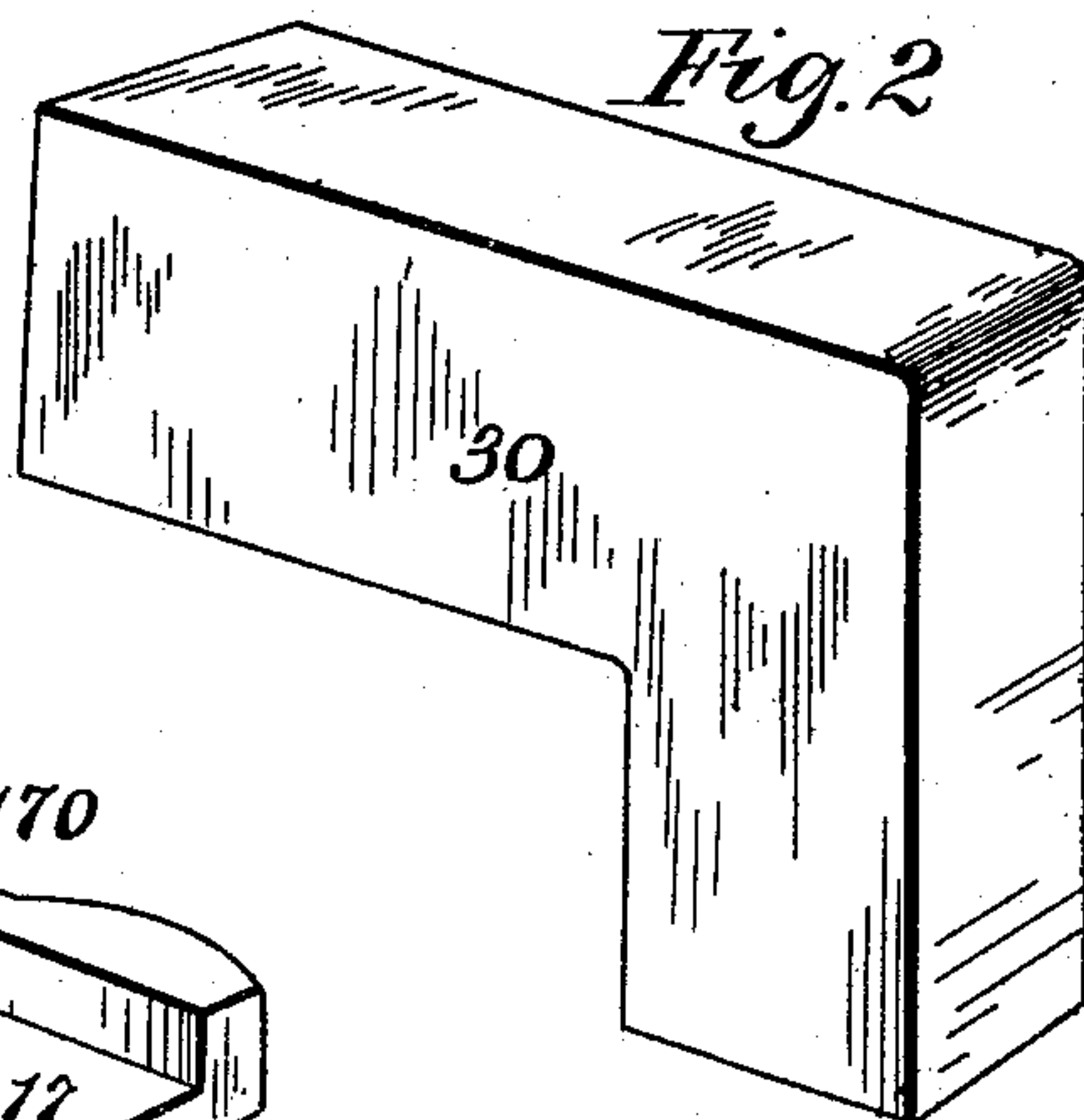


Fig. 3

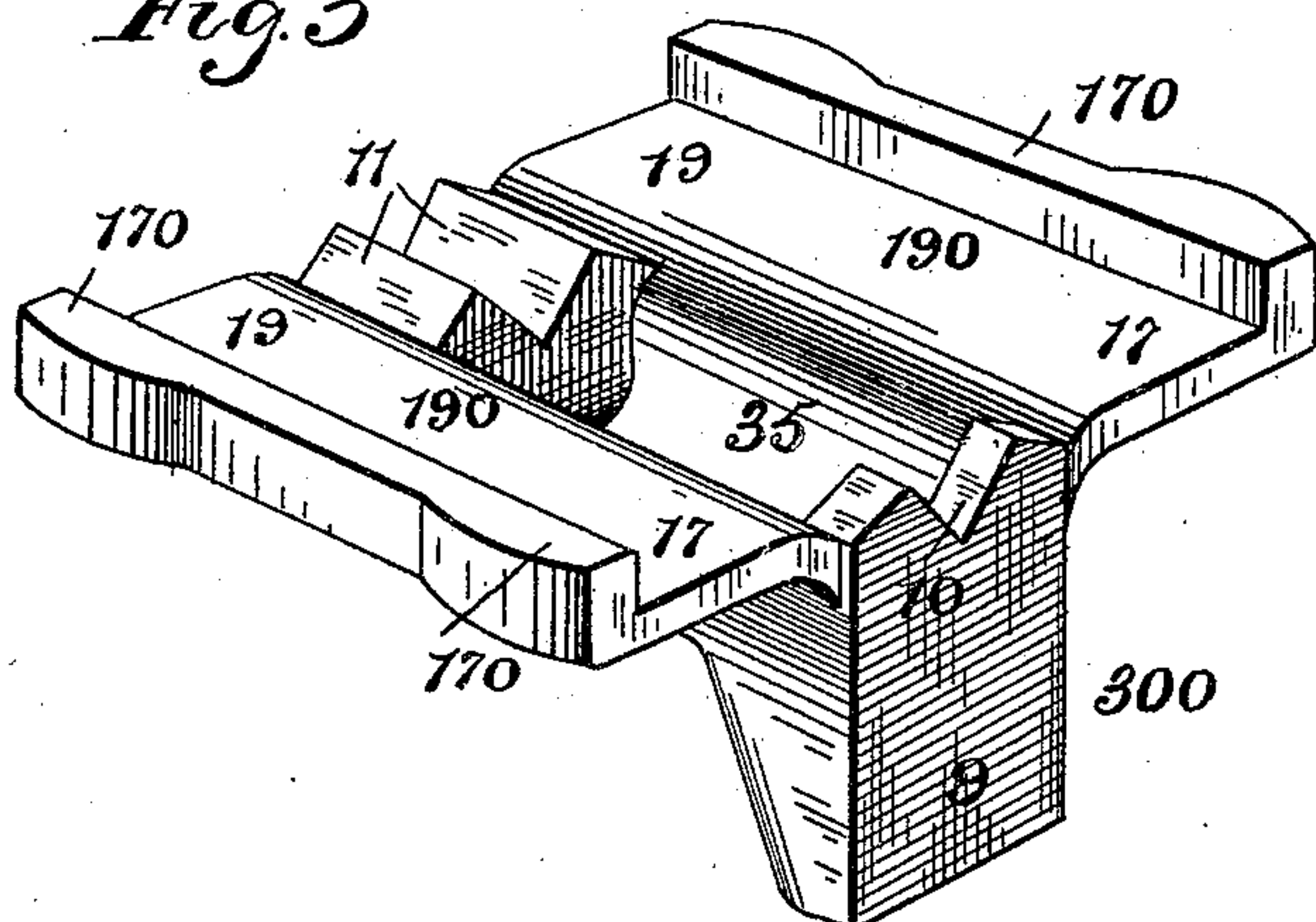
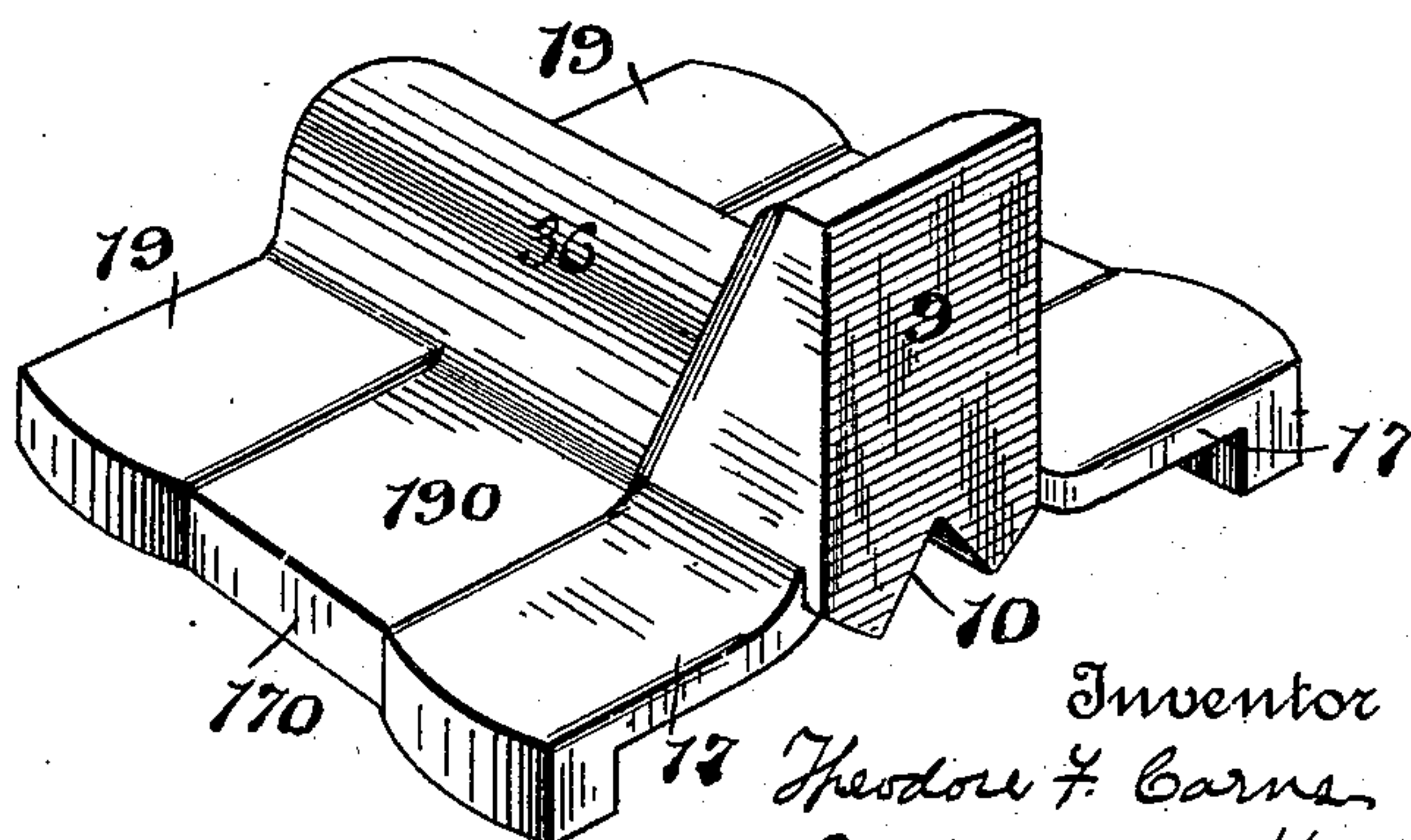


Fig. 4



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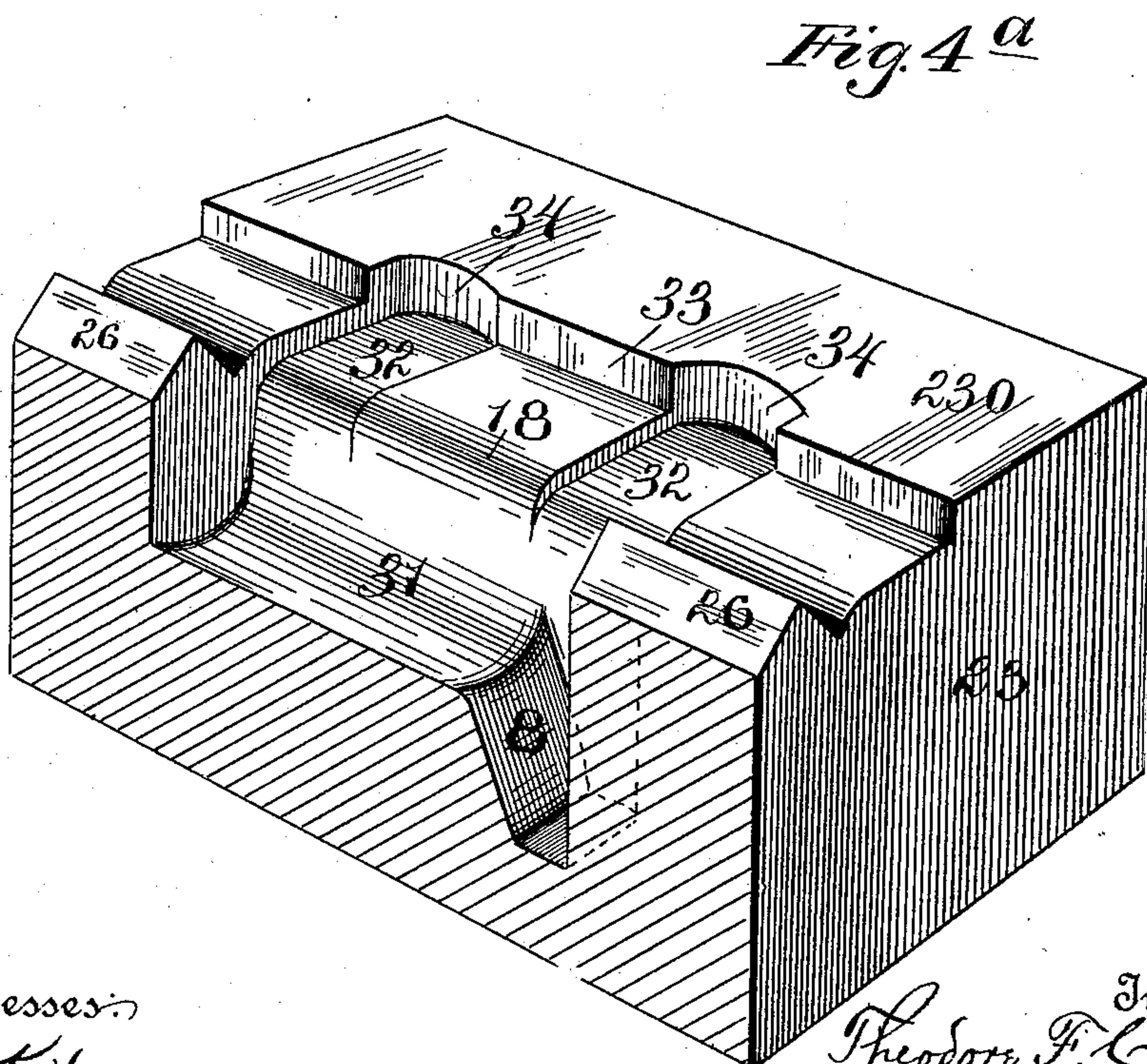
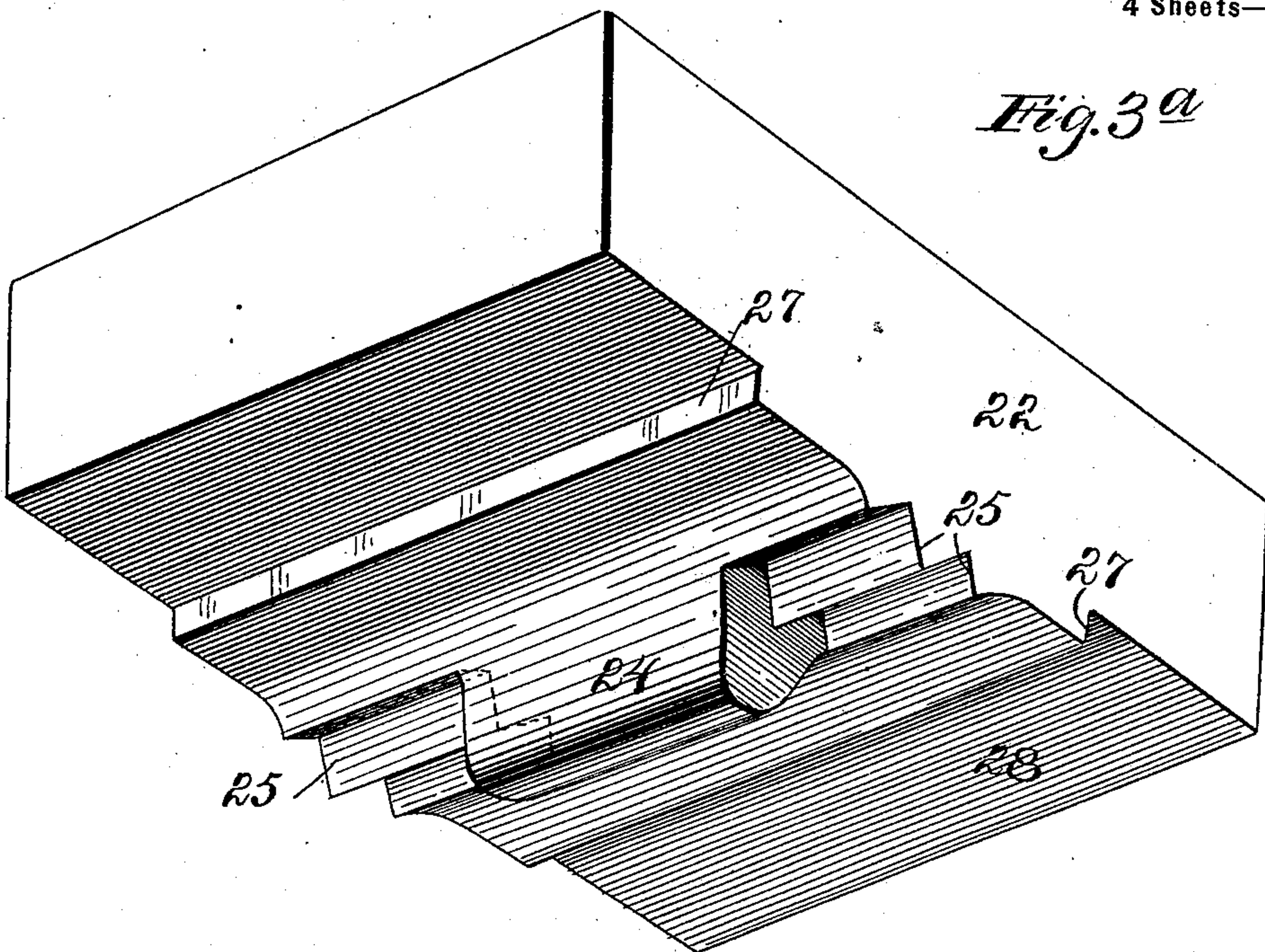
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Fig. 5

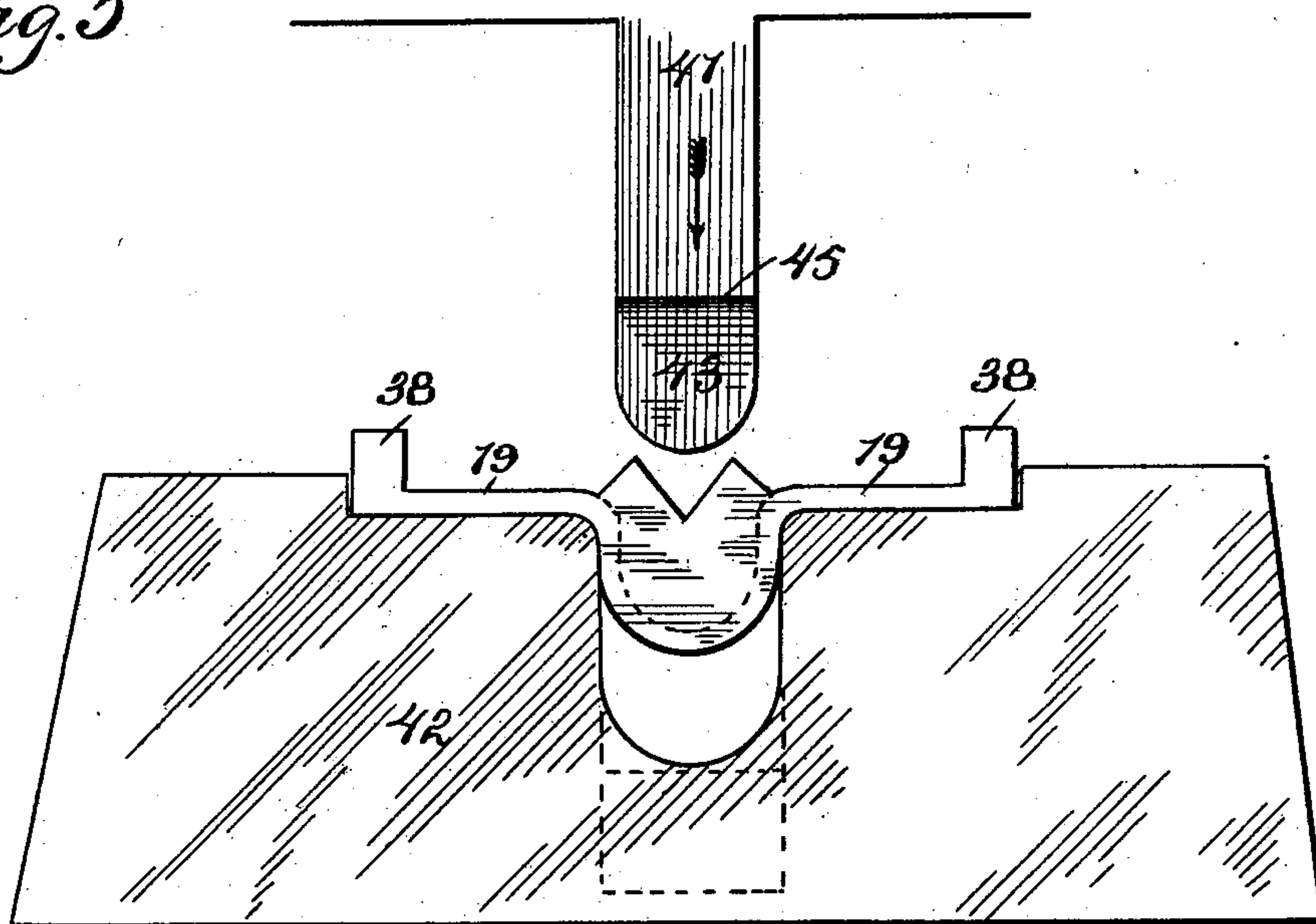
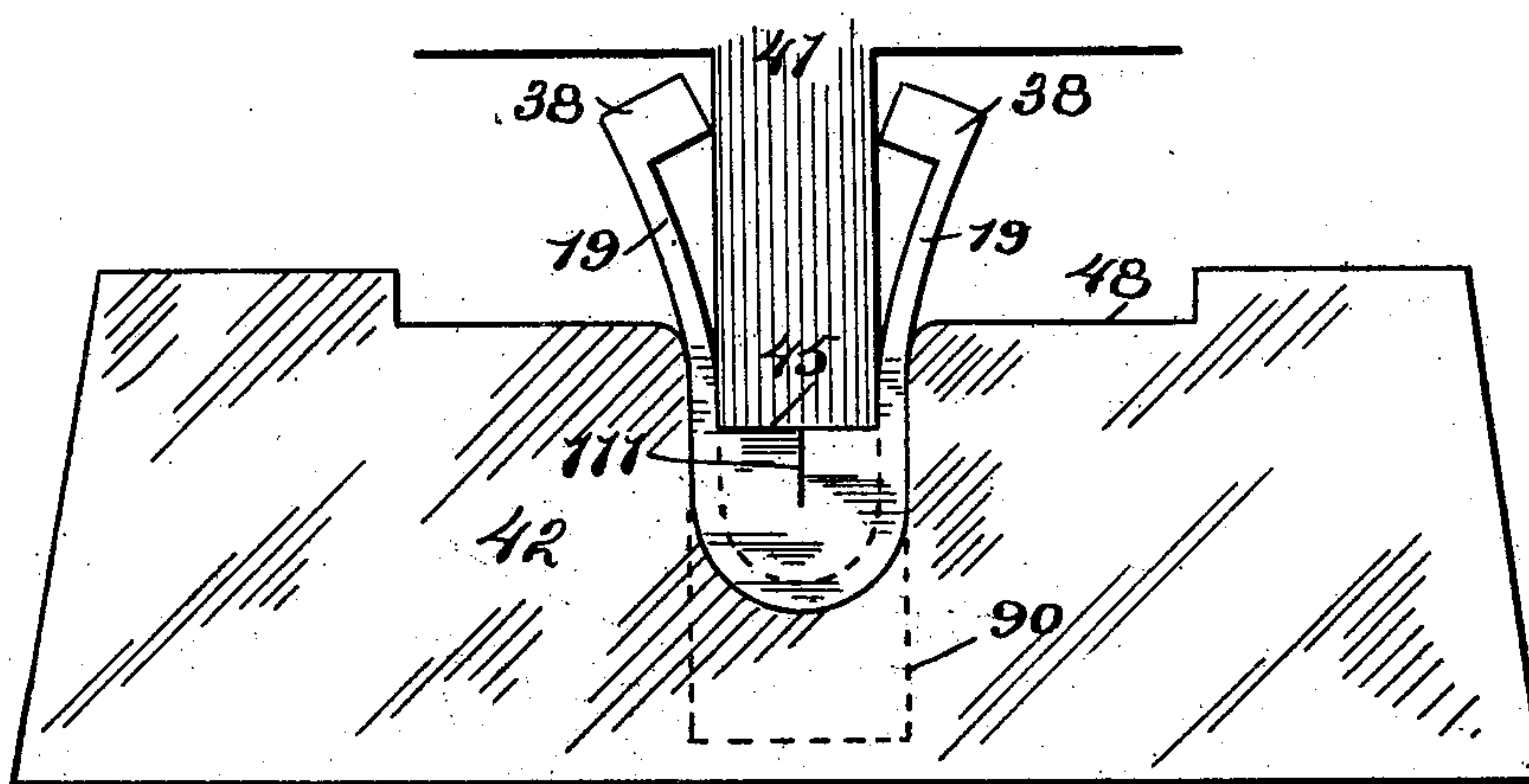


Fig. 6



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Fig. 7

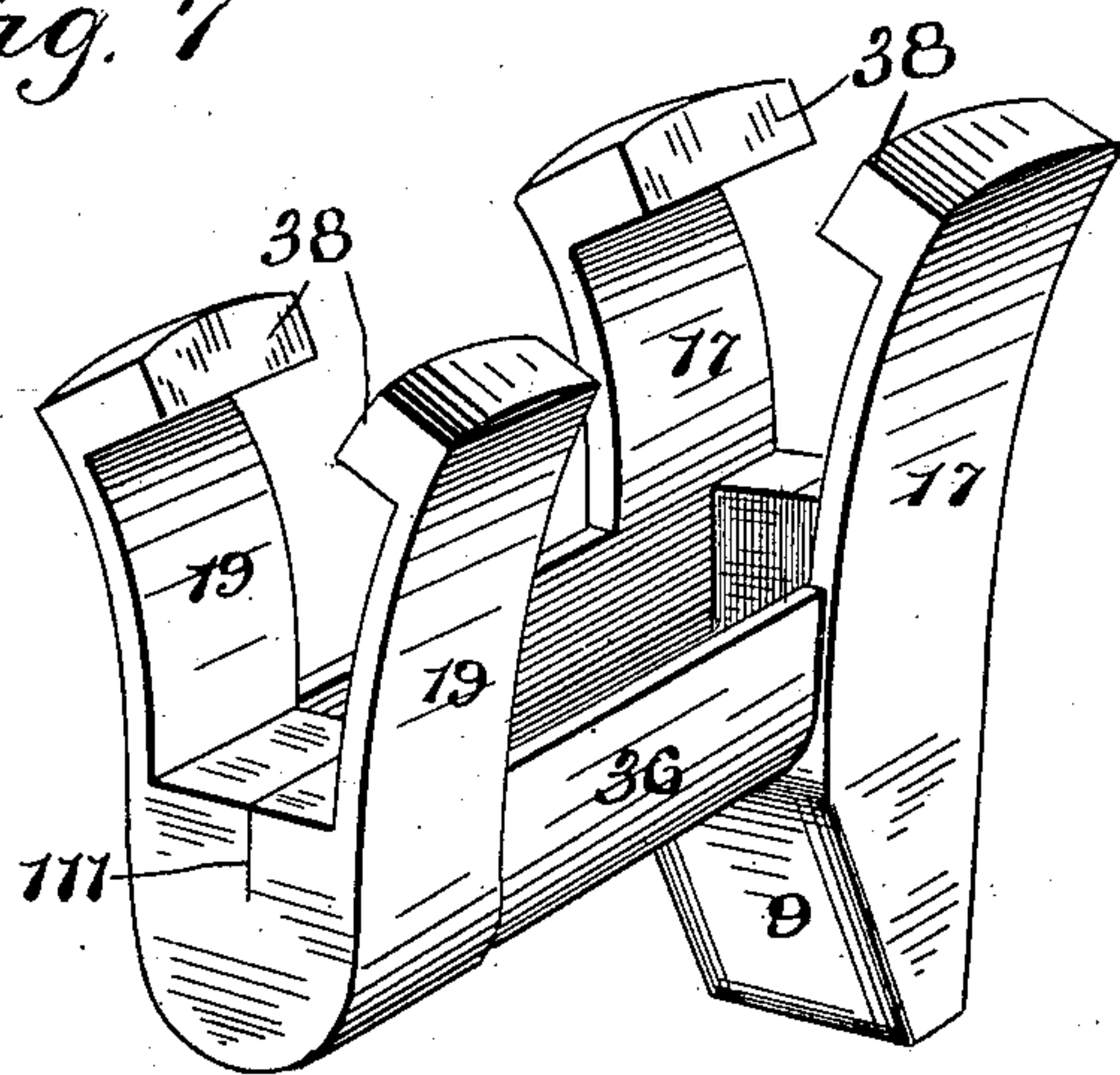


Fig. 8

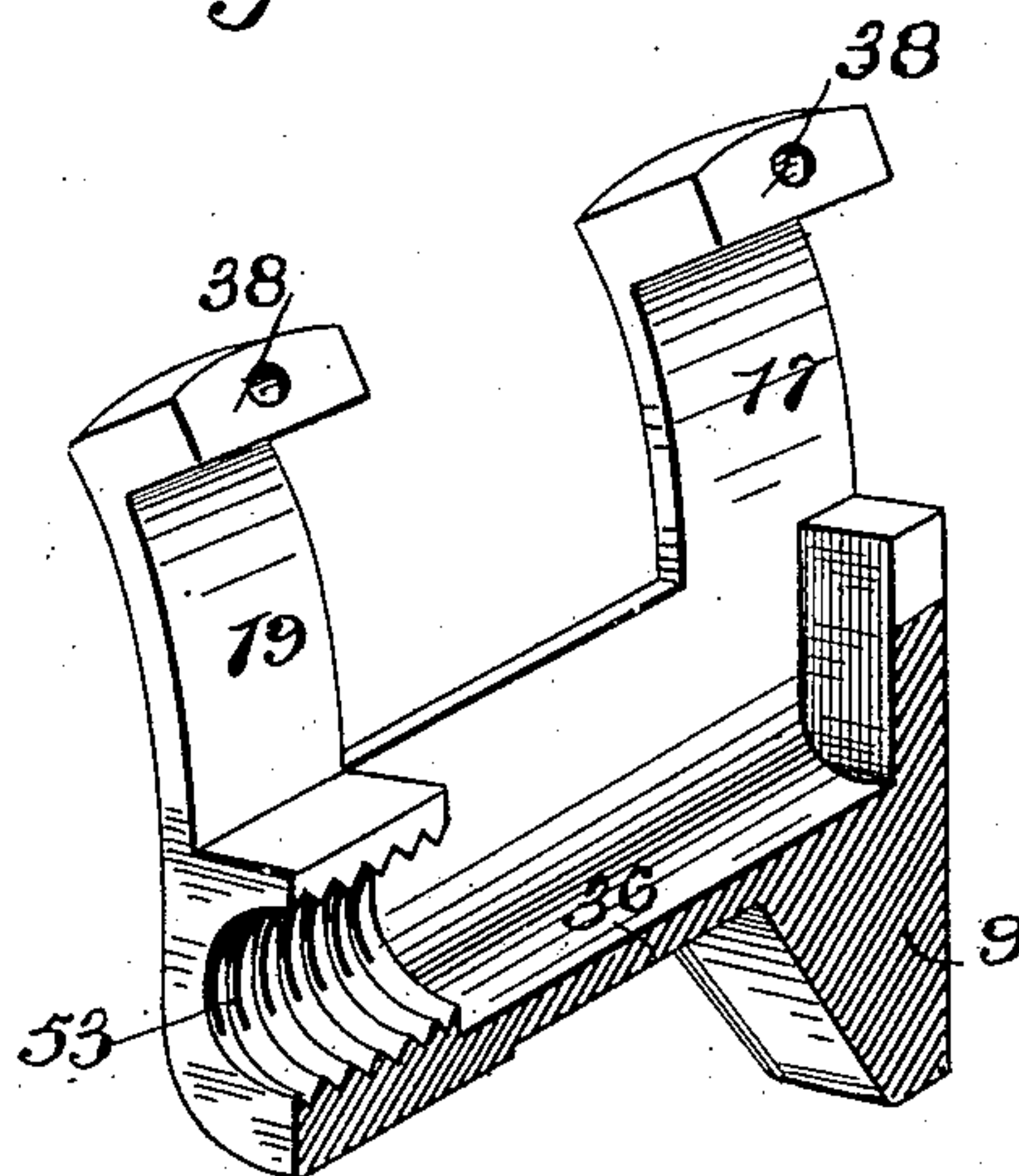
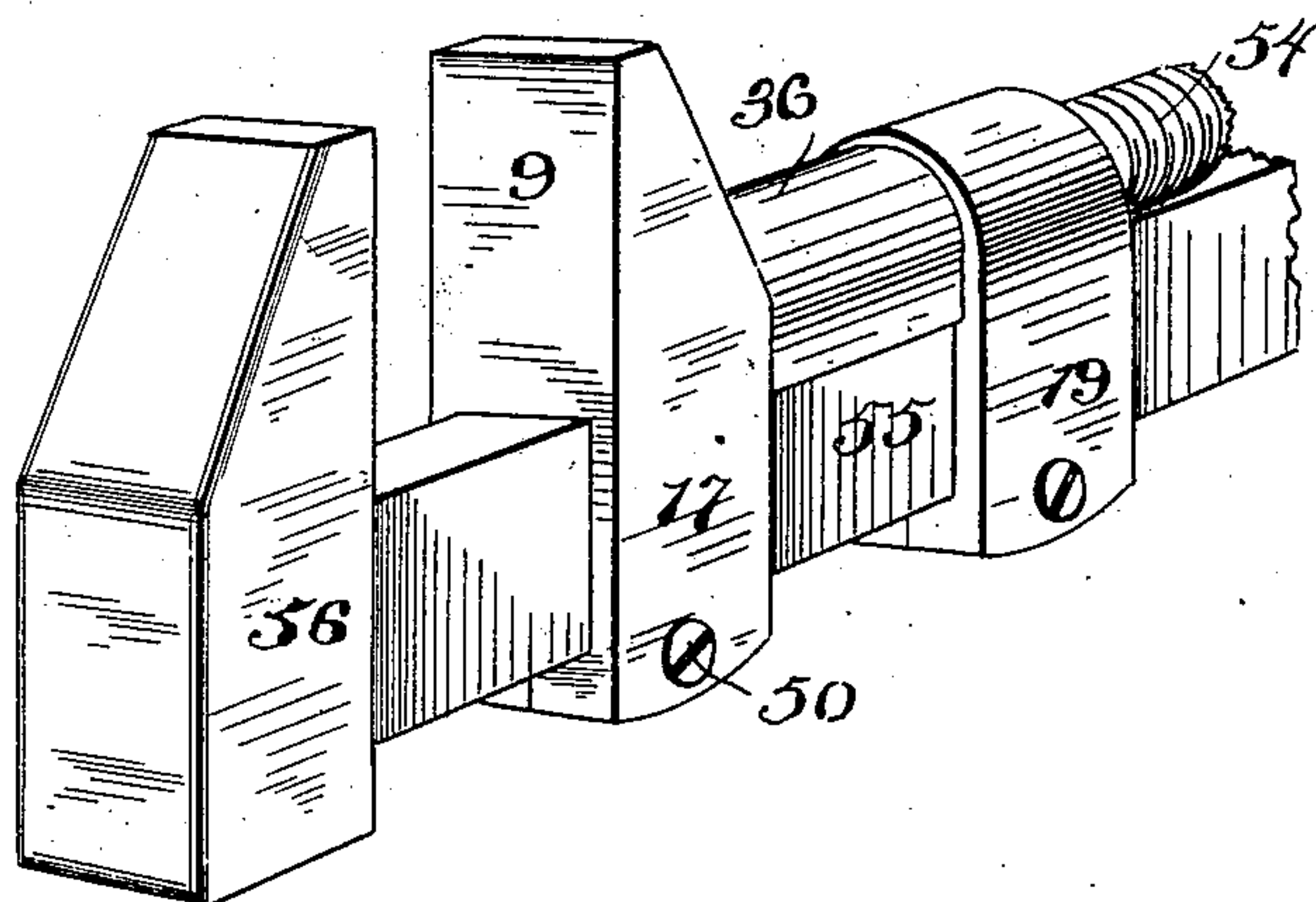


Fig. 9.



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PROCESS OF PRODUCING WROUGHT-METAL WRENCH-JAWS.

SPECIFICATION forming part of Letters Patent No. 685,256, dated October 29, 1901.

Application filed March 20, 1901. Serial No. 52,086. (No specimens.)

To all whom it may concern:

Be it known that I, THEODORE F. CARNS, a citizen of the United States of America, residing at East Berlin, in the county of Hartford and State of Connecticut, have invented a certain new and useful Process of Producing Wrought-Metal Wrench-Jaws, of which the following is a description, reference being had to the accompanying drawings, wherein—

10 Figure 1 is a view of a plain bar of steel, of suitable shape to undergo the subsequent operations of forming a wrench-jaw by said process. Fig. 2 is a view of the stock, which is shown in Fig. 1, bent or upset at one end. 15 Fig. 3 is a perspective view of one face of the blank into which the blank of Fig. 2 is formed in the practice of said process. Fig. 4 is a perspective view of the other face of the blank which is shown in Fig. 3. Figs. 3^a and 4^a are 20 perspective views of the first set of dies, being those which produce the blank shown in Figs. 3 and 4, the lower die being in section. Fig. 5 is an end view of the dies, including the blank of Figs. 3 and 4, ready for the forming 25 of that blank into the shape which is shown in Fig. 6. Fig. 6 is another end view of the dies and blank which are shown in Fig. 5 after the upper die has operated. Fig. 7 is a perspective view of the blank as it comes from 30 the dies of Fig. 6. Fig. 8 is a view of substantially one-half of the blank which is shown in Fig. 7—a view partly in central longitudinal section. The view also shows the screw-thread in the wrench-jaw and the holes 35 for screws or rivets for uniting the arms of the wrench-jaw. Fig. 9 is a perspective view of a portion of a wrench embracing the finished wrench-jaw.

The object of this invention is the production of the movable jaw of a wrench, which is accomplished by the process hereinafter set forth, and illustrated in the drawings, the same involving the use of two sets of dies and their operation upon a bar of stock, which 45 is plain, with the exception that it is upset at one end. The first set of dies operates upon this upset bar, and the second or finishing set operates on the stock as it comes from the first set. For this reason I necessarily use these sets of dies in combination or 50 conjunction with each other, their faces be-

ing so formed as to act on the stock in the shape it possesses when it comes to them.

In Fig. 1 is shown a plain bar of stock 3. In Fig. 2 one end of this bar is bent or upset, 55 so as to produce the stock 30. Any suitable means may be employed for thus upsetting one end of the plain stock 3, and as the processes for doing this work are numberless I do not call it a step in my present invention. 60 It is only desirable that the stock to be worked on shall be upset at one end, and this upset portion eventually forms the peen of the wrench-jaw.

The first set of dies 22 and 23 are shown in 65 Figs. 3^a and 4^a, respectively, and their product is shown in Figs. 3 and 4. The upper die 22 has a long rounded nose 24 and at each end thereof a pair of longitudinal teeth 25 in cross-section, resembling the letter W, and the face 70 28 of the die at opposite sides of the nose and these teeth is provided with shoulders 27. The lower die 23 has a deep socket 8 for the peen 9 and a longitudinal mortise, which is transversely rounded at its bottom, as at 31, 75 above which its sides curve outward, as at 18, the curvature of these sides opposite the ends of the mortise being a little greater, so as to produce cavities 32, as seen in Fig. 4^a. Between these cavities each side of the mor- 80 tise curves into a flat face 6, terminating in an upright shoulder 33, which coöperates with that numbered 27 in the die 22, and the outer ends of the cavities preferably terminate in rounded sockets 34. At each end of the mor- 85 tise is a single tooth 26, of A shape, which enters between the two teeth 25 of the other die. The product 300, produced by these dies, has the peen 9, which was formed by the deep socket 8, adjacent which it has been 90 rounded on the back, as at 36, by the mortise 31. It has been rounded interiorly, as at 35, by the nose 34. It has been notched above its peen, as at 10, and at the other end of its body, as at 11, by the teeth on the two dies, 95 and it has been provided with two pairs of arms 17 and 19, having rounded ears 38 at their outer ends, the arms having been produced by the cavities 32 and the ears by the sockets 34. In Figs. 3 and 4 the two arms at 100 each side of the body are shown connected by a web 190 and the two ears 38 connected

by a flange 170, these parts resulting from the presence of the die-faces 6 and the shoulder 33. This web is useful in large wrenches; but in order to produce a light wrench-jaw I may dispense with the web in any suitable manner, and in the wrench-jaw shown in Figs. 7, 8, and 9 this web and flange are absent. While these parts might be sawed out or cut away, it is obvious that by decreasing the curvature 18 in the die 23 and raising the face 6 flush with the top 230 of the die, the other parts being properly proportioned to receive all the metal, this web and flange would not be formed.

The second set of dies I call the "finishing-dies," because they take the product from the first set and bend it into shape. They are illustrated in Figs. 5 and 6 and numbered 41 and 42. The upper die 41 has a nose 43, of a length to enter the rounded interior 35 of the wrench-body, and at the ends of this nose it has flat shoulders 45, whose purpose is best seen in Fig. 6. The lower die 42 is shaped on its face, as at 48, to receive the backs of the arms 17 and 19 and of the webs 190, if they are present, and at the center this die is shaped to receive the rounded outside 36 of the wrench-body and has a deep socket 90 (indicated in dotted lines) to receive the peen 9. When these dies come together, the flat shoulders 45 close the notches 10 and 11 into cracks 111, above which is a flat-bottomed notch 37 between the two arms 19, and a similar notch 370 is between the two arms 17. Simultaneously the side walls of the lower die 42 bend up the arms 19 until their lugs 38 strike the sides of the die 41, and if the webs and flanges are absent the product 3,000 is what is shown in Fig. 7.

In finishing the product, the lugs 38 are tapped with holes, as seen in Fig. 8, and the arms 19 and 17 are bent together in pairs and the lugs connected by screws 50, as seen in Fig. 9. The crack 111 between the arms 19 is then tapped with a threaded hole 53 to receive the screw 54, by which this wrench-jaw is moved toward and from the fixed jaw 56, the shank 55 passing between the pairs of arms which stand at its sides and between the inner edges of the lugs 38 and the flat-bottomed notches 37 and 370.

It will be understood by those skilled in the art to which this improvement appertains

that the stock is suitably heated at intervals in this process, and that fins when they occur are sheared off at the proper times. It is also well known to those skilled in the art that it is not necessary to provide separate sets of die-blocks for each operation in this process, as it is customary in drop-forging work in order to save the cost of an extra drop to cut into a single set of die-blocks the impressions for two successive steps in the operation.

What I claim as new is—

1. The improvement in the process of making wrought-metal wrench-jaws from a piece of stock which is upset at one end, the same consisting in first subjecting said stock to the action of a set of dies which produces a peen at the back, two pairs of side arms with lugs at their outer ends, a rounded cavity within the body, and a V-shaped notch at each end of the cavity; then subjecting the product of this set of dies to the action of a second set of dies which bend the arms toward each other and close the notches into cracks; and finally further bending said arms toward each other and connecting their ears in pairs, and tapping a threaded hole through one of said cracks; substantially as described and for the purposes set forth.

2. The improvement in the process of making wrought-metal wrench-jaws from a piece of stock which is upset at one end, the same consisting in first subjecting said stock to the action of a set of dies which produces a peen at the back, two pairs of side arms with lugs at their outer ends, two side webs interposed between these side arms and having flanges at their outer ends interposed between the lugs, a rounded cavity within the body, and a V-shaped notch at each end of the cavity; then subjecting the product of this set of dies to the action of a second set of dies which bend the arms and webs toward each other and close the notches into cracks; and finally further bending said arms and webs toward each other and connecting their ears in pairs, and tapping a threaded hole through one of said cracks; substantially as described and for the purposes set forth.

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