

(No Model.)

3 Sheets—Sheet 1.

J. H. SIMPSON.

DIE FOR FORGING DRAW BARS.

No. 386,724.

Patented July 24, 1888.

Fig. 1.

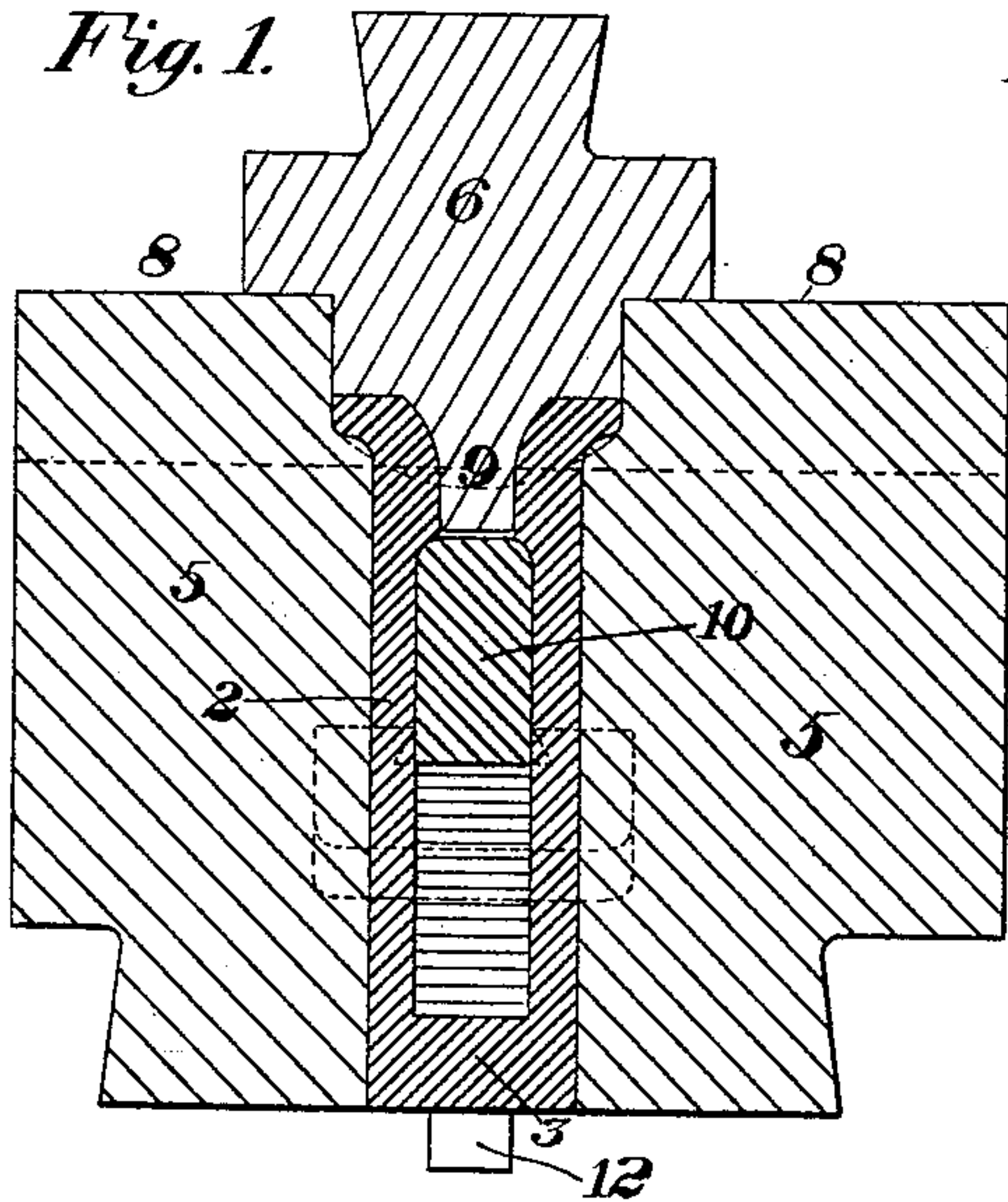


Fig. 2.

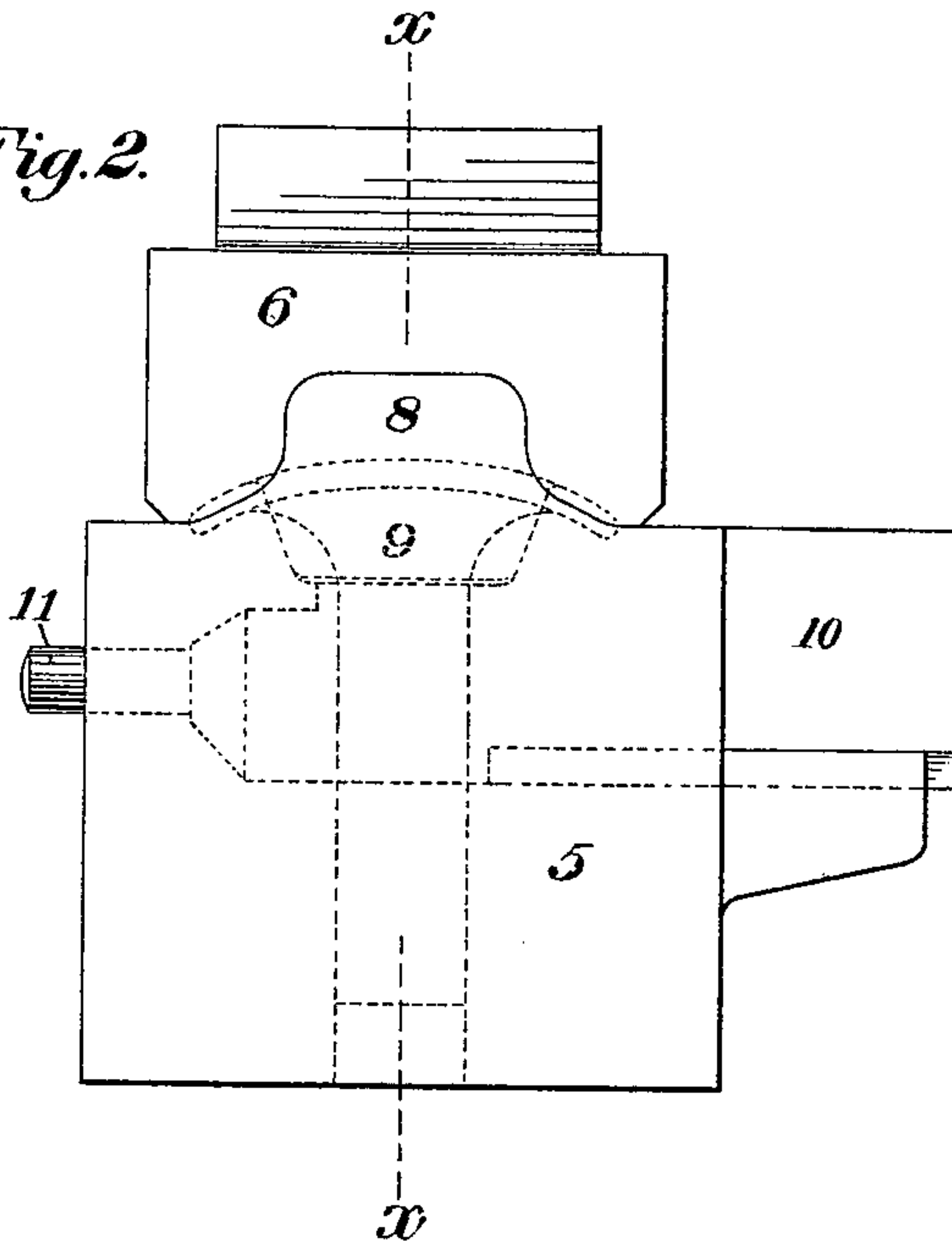


Fig. 3.

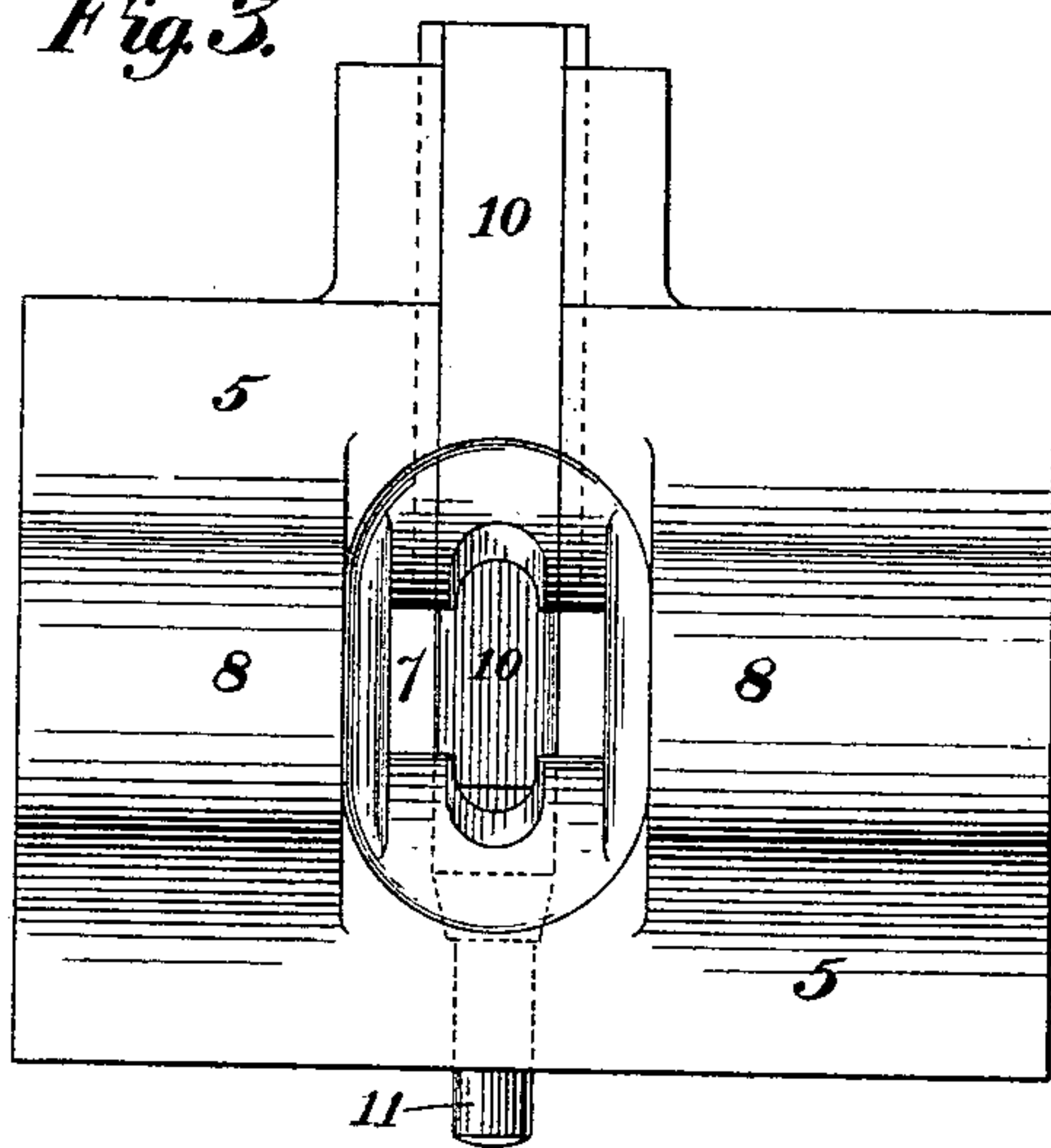
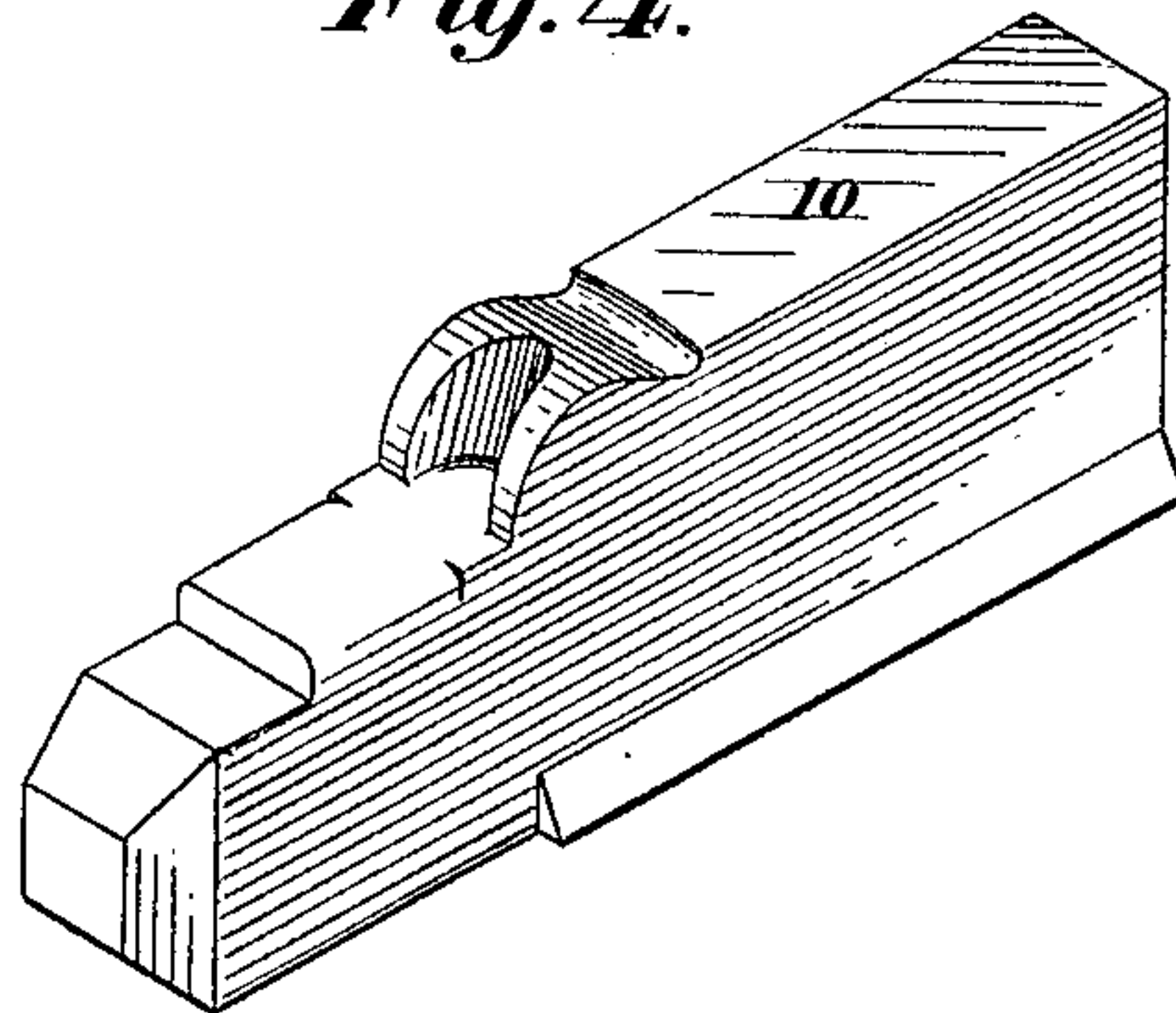


Fig. 4.



WITNESSES:

O. M. Clarke.
H. L. Gill.

INVENTOR,

James H. Simpson.
by W. B. Russell & Sons.

Att'y's

J. H. SIMPSON.

DIE FOR FORGING DRAW BARS.

No. 386,724.

Patented July 24, 1888.

Fig. 5.

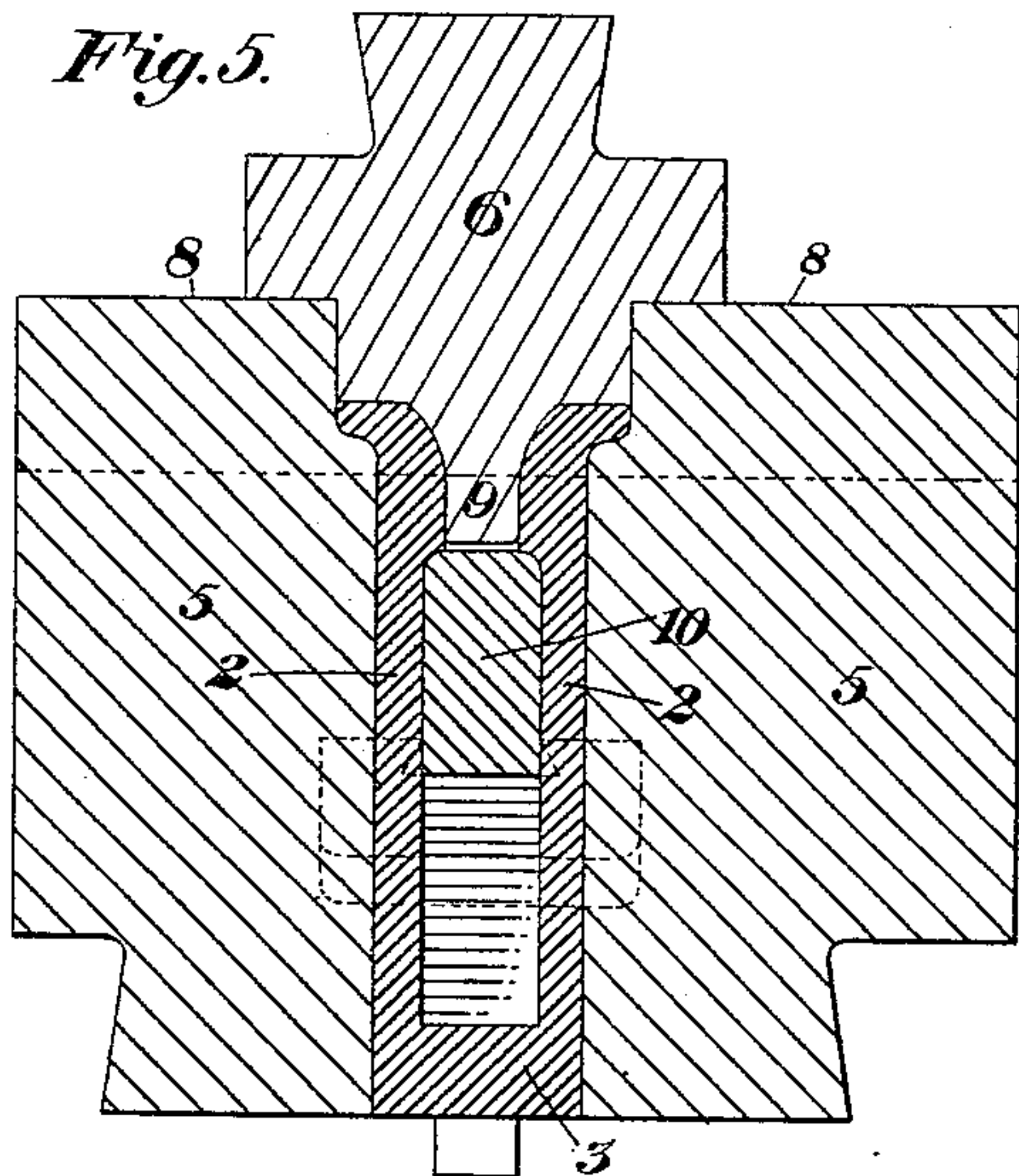


Fig. 6.

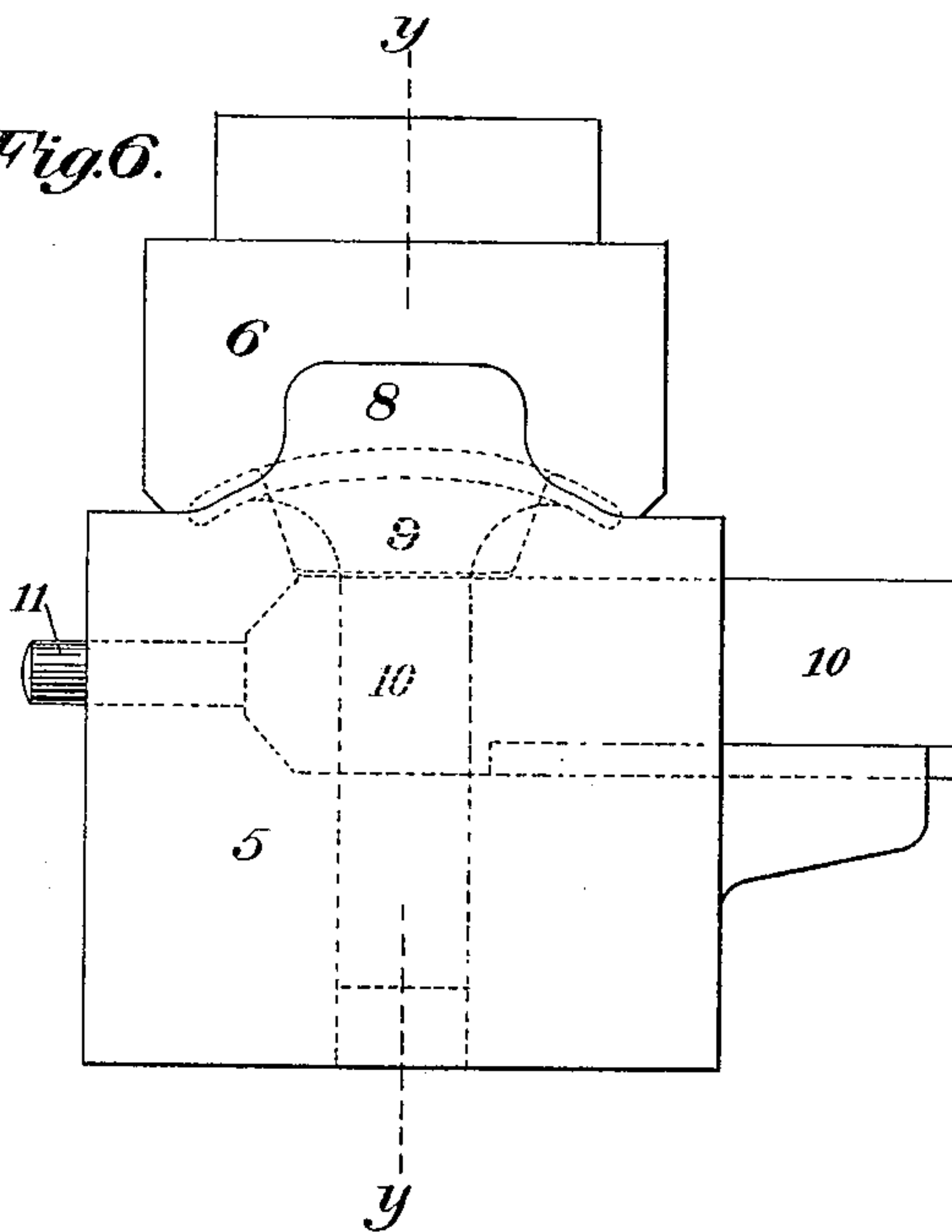


Fig. 7.

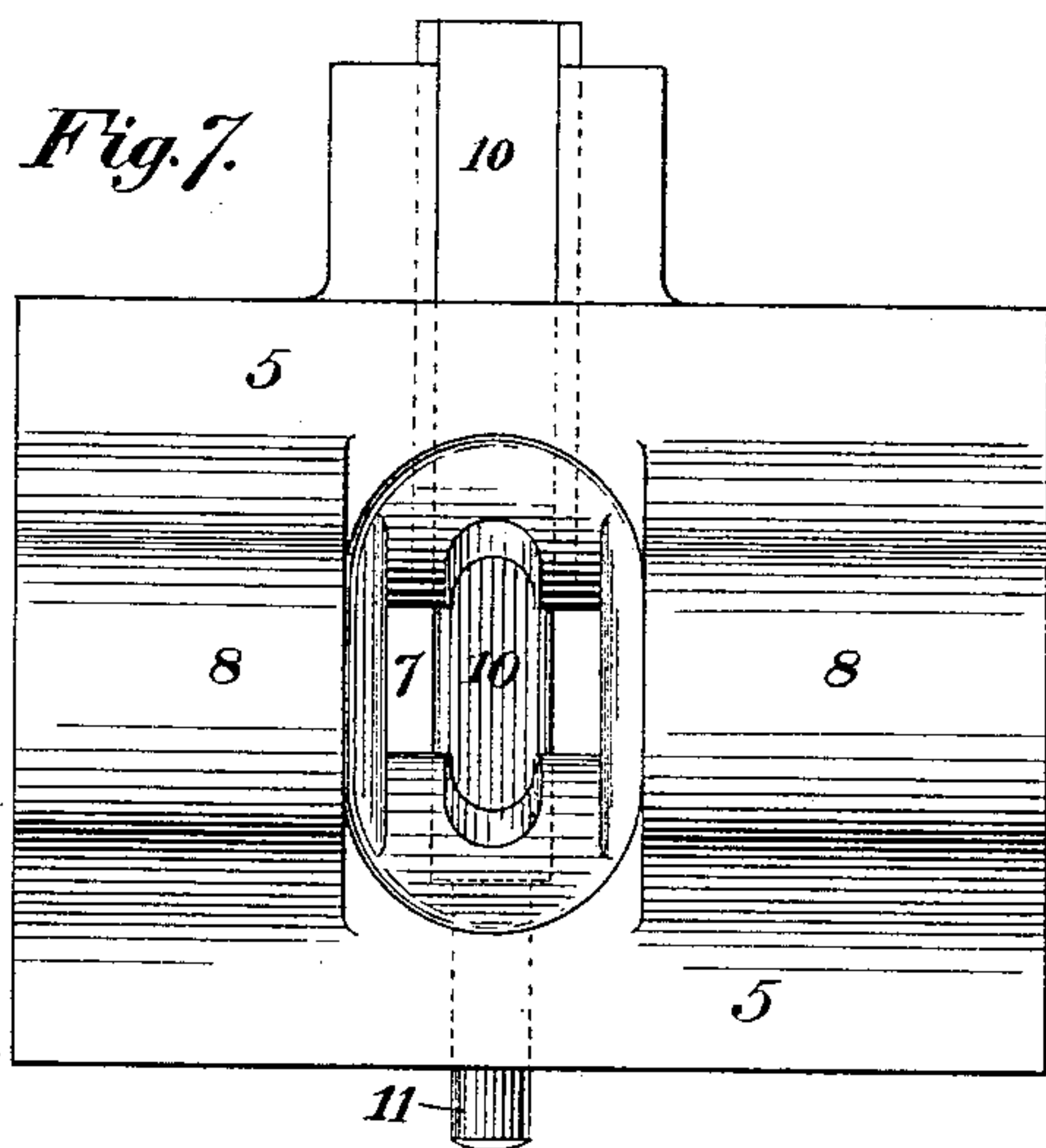
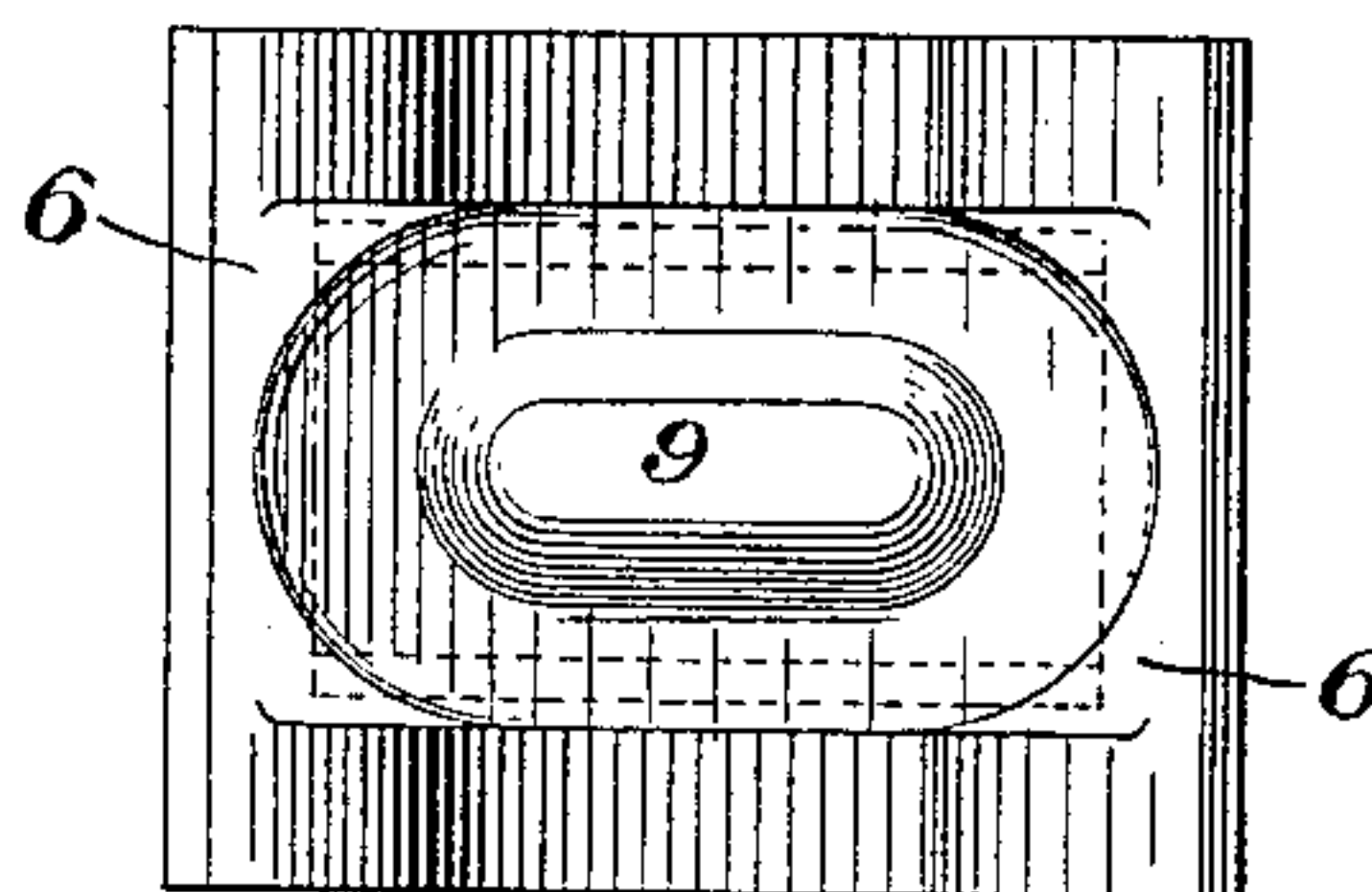


Fig. 8.



WITNESSES:

C. M. Clarke,
H. L. Gill.

James H. Simpson, INVENTOR,
by W. Baxendale Son,
his attorneys.

(No Model.)

3 Sheets—Sheet 3.

J. H. SIMPSON.
DIE FOR FORGING DRAW BARS.

No. 386,724.

Patented July 24, 1888.

Fig. 9.

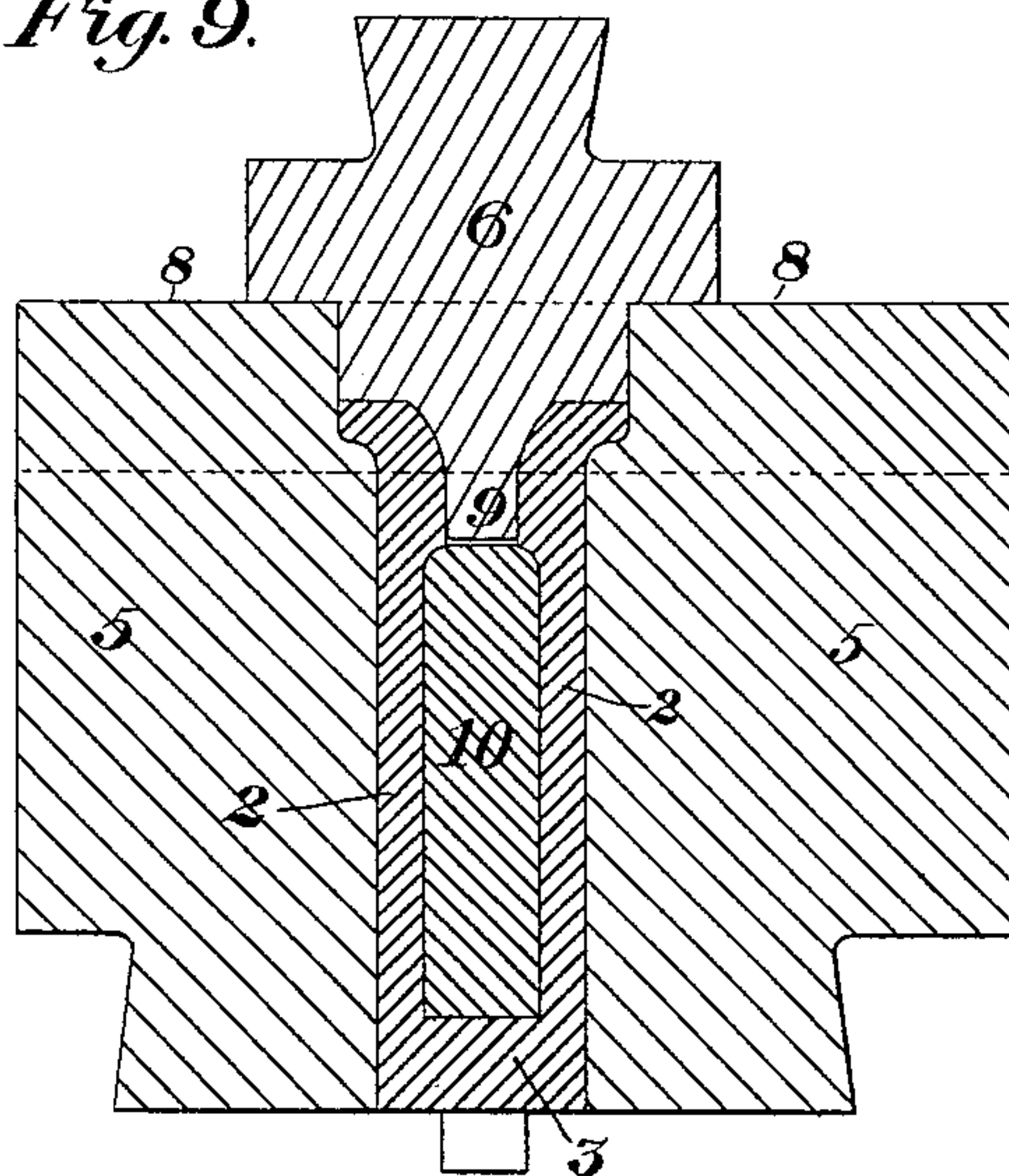
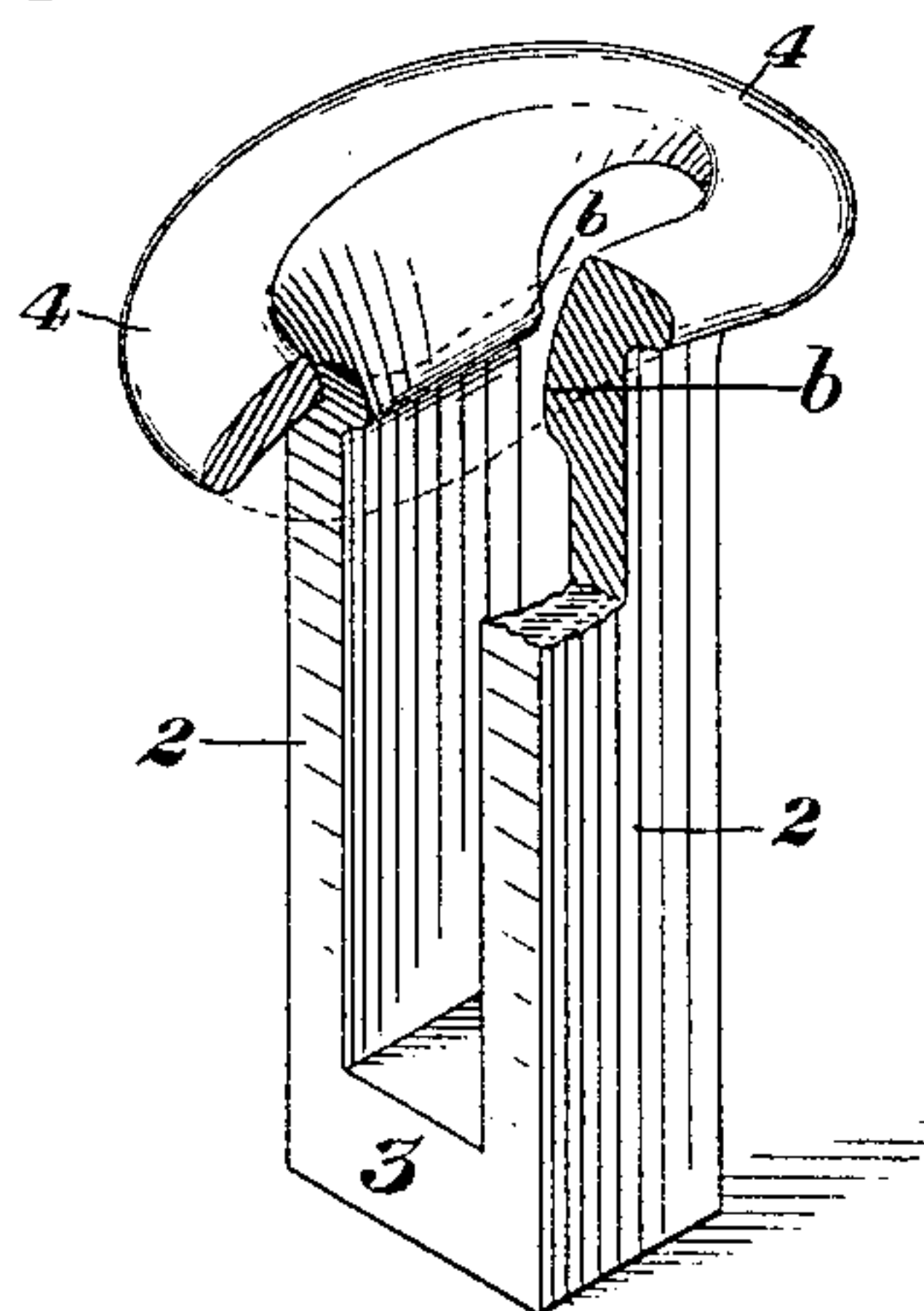


Fig. 10.



WITNESSES:

L. M. Clarke.
H. L. Gile.

INVENTOR,

James H. Simpson.
by W. B. Russell & Co.

Att'y's.

UNITED STATES PATENT OFFICE.

JAMES H. SIMPSON, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO CARNEGIE, PHIPPS & CO., (LIMITED,) OF SAME PLACE.

DIE FOR FORGING DRAW-BARS.

SPECIFICATION forming part of Letters Patent No. 386,724, dated July 24, 1888.

Application filed March 12, 1888. Serial No. 266,935. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. SIMPSON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Dies for Forging Draw-Bars; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical cross sectional view of my improved dies on the line *x x* of Fig. 2. Fig. 2 is a side view. Fig. 3 is a plan view of the bed-die and mandrel. Fig. 4 is a perspective view of the mandrel. The figures on the second sheet of the drawings illustrate a modification. Fig. 5 is a vertical cross section on the line *y y* of Fig. 6. Fig. 6 is a side view. Fig. 7 is a plan view of the bed-die and mandrel. Fig. 8 is a bottom plan view of the moving die. Fig. 9 is a vertical cross section showing a further modification. Fig. 10 is a perspective view of one of the finished draw-bars made by any of these forms of dies.

Like symbols of reference indicate like parts in each.

The draw-bar which it is the object of my invention to make is one of the form shown in Fig. 10, in which 2 represents the side bars or straps, 3 the connecting end piece, and 4 the head or ring. The side bars have shoulders or enlargements *b* on their opposing faces; and it is the object of my invention to provide for the proper support of these shoulders or enlargements during the operation of welding the head to the side bars.

Referring to the figures on Sheet 1 of the drawings, 5 is the bed-die, and 6 is the moving die which is fixed to the end of a reciprocating plunger, drop, or hydraulic press. The surface of the bed-die is shaped to correspond with the under side of the finished draw-bar head, and in the center is a vertical hole, 7, in which the shank of the draw-bar fits.

8 8 are lugs or stops on the top of the die-block at the side, arranged to limit the motion of the moving die. The moving die or plunger 6 has a central tongue, 9, which is adapted to enter through the ring 4 into the space between the side bars, 2, as shown in Fig. 1. The face

of the moving die is made to conform to the shape of the head of the draw-bar.

There is a cavity made in the die-block, extending from the side through the block to the central hole, 7, and in this cavity is adapted to be placed a removable piece or mandrel, 10, which is made of proper size and shape to fill up the cavity of the die-block and to afford a support on the upper size for the projecting flange of the draw-bar head. At the forward end of the mandrel 10 it fits between the straps of the draw-bar, and has its bearings and supports in a cavity on the other side of the hole 7. This last-named cavity also extends entirely through the die block to the outside, so as to afford room through which a pin, 11, can be inserted for the purpose of ejecting the mandrel. As shown in Fig. 1, this mandrel, in fitting between the straps of the draw-bar, supports the inwardly-projecting shoulders *b* at the upper ends of the latter, and thus prevents distortion or displacement of these shoulders and insures perfect uniformity in their positions on the different draw-bars produced by the dies. To hold the mandrel firmly in position it is dovetailed at the bottom and fits within a correspondingly-mortised slideway in the bottom of its cavity in the die-block.

The operation of the dies is as follows: The shank and head of the draw-bar, which have been first preferably united as a preliminary step in the manner described in my Patent No. 369,264, dated August 30, 1887, are heated to a welding heat and are placed in the bed-die, the shank of the draw-bar fitting in the vertical cavity 7 of the bed die, as shown in Figs. 1 and 2. The mandrel 10 is then inserted through the bed-die, as shown in Figs. 2 and 3, so that its tongue shall fit between the straps of the draw-bar shank, being supported in the cavity on the other side of the shank, and that the upper part of the mandrel shall fit under that part of the head of the draw-bar which is left unsupported by the cavity in the die-block. The moving die is then caused to reciprocate and to strike upon the head of the draw-bar, thus welding it firmly to the straps and giving the proper curvature and shape to the head. The man-

drel during this operation fits under and supports the shoulders on the opposing faces of the straps of the draw-bar shank, thus preventing them from being distorted or displaced. All this is clearly shown in Figs. 1 and 2 of the drawings. When the welding operation is completed, the moving die 6 is retracted, a wedge is inserted through a hole, 12, under the bottom of the draw-bar shank, and by driving in this wedge the shank is raised within the die-block, so as to lift the head of the draw-bar above the top of the mandrel and to clear the mandrel so that the mandrel may be drawn out to release the draw-bar. The pin 11 is then inserted into the end of the mandrel-cavity and is driven in by a hammer, so that it shall strike the end of the mandrel and shall drive the latter back out of the die-block. The mandrel having been removed from between the straps of the draw-bar shank, the draw-bar can easily be removed from the die.

From this description it will be seen that the whole operation of the dies is such that the draw-bars are made rapidly and with a minimum of manual labor and with great uniformity in the product of the dies.

I do not claim herein, broadly, the general construction of the dies themselves, since my invention relates to the mandrel which fits between the straps of the draw-bar, holding them apart and preventing distortion of the straps during the operation of the moving die.

In the modified form of the dies, which is shown in the figures on Sheet 2 of the drawings, the construction of the upper moving die is the same, and that of the lower die is also the same, except that instead of having a part of the lower die-block integral with the mandrel 10 the mandrel is made altogether separate and fits within a hole made through the side of the die-block, but not extending to the top thereof. The mandrel then supports and strengthens the upper face of the die-block, as shown in Fig. 6. The face of the lower die-block is unbroken, except for the central cavity 7. The mandrel is inserted and removed in the same manner, as I have already described, and its action is in all respects the same, except that in order to remove it it is not necessary to apply the wedge to raise the head of the draw-bar before driving back the mandrel.

The modification shown in Fig. 9 is the

same as that shown in the figures on Sheet 2, except that the mandrel is made of such depth as entirely to fill up the space between the side bars of the draw-bar shank. These dies may also be used for making articles having the same general form as draw-bars. They may also be used for making draw-bars having a projecting shoulder, *b*, on the inner face of one strap only, in which case the mandrel would support this projection in the same manner as hereinbefore described.

All these modifications are obviously based on the same principle, and I desire to cover them by the claims in this patent.

I claim—

1. An improvement in dies for forging draw-bars, which consists of a bed-die having a cavity for the reception of the shank of the draw-bar, and a lateral cavity communicating therewith, and a removable mandrel which is inserted in the said lateral cavity between the side bars of the shank, substantially as and for the purposes described.

2. An improvement in dies for forging draw-bars, which consists in the combination of a bed-die having a cavity for the reception of the shank of the draw-bar, and a mandrel which fits between the side bars of the shank and bears against shoulders on the inner faces of the side bars, substantially as and for the purposes described.

3. An improvement in dies for forging draw-bars, which consists in the combination of a bed-die having a cavity for the reception of the shank of the draw-bar, a mandrel which fits between the side bars of the shank, and a pin which is inserted through the die-block opposite to the end of the mandrel to afford means for removal of the same, substantially as and for the purposes described.

4. An improvement in dies for forging draw-bars, which consists in the combination of a bed-die having a cavity for the reception of the shank of the draw-bar, and a mandrel which fits between the side bars of the shank, said mandrel being secured to the die-block to prevent rise thereof, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 8th day of March, A. D. 1888.

JAMES H. SIMPSON.

Witnesses:

W. B. CORWIN,
J. K. SMITH.