

No. 668,704.

Patented Feb. 26, 1901.

E. P. ALEXANDER.

DIE FOR FORGING AXES, HATCHETS, &c.

(Application filed Feb. 28, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

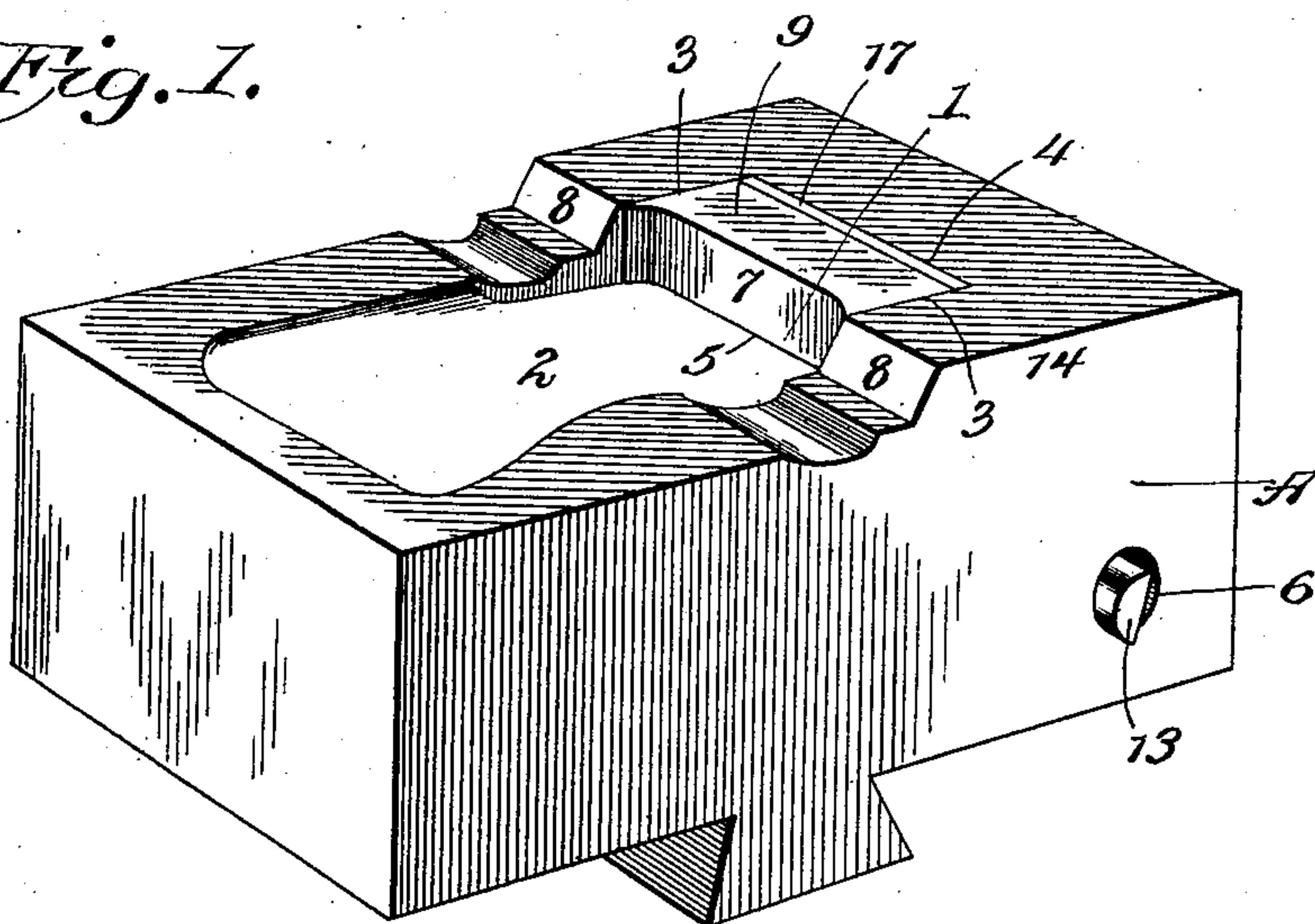


Fig. 2.

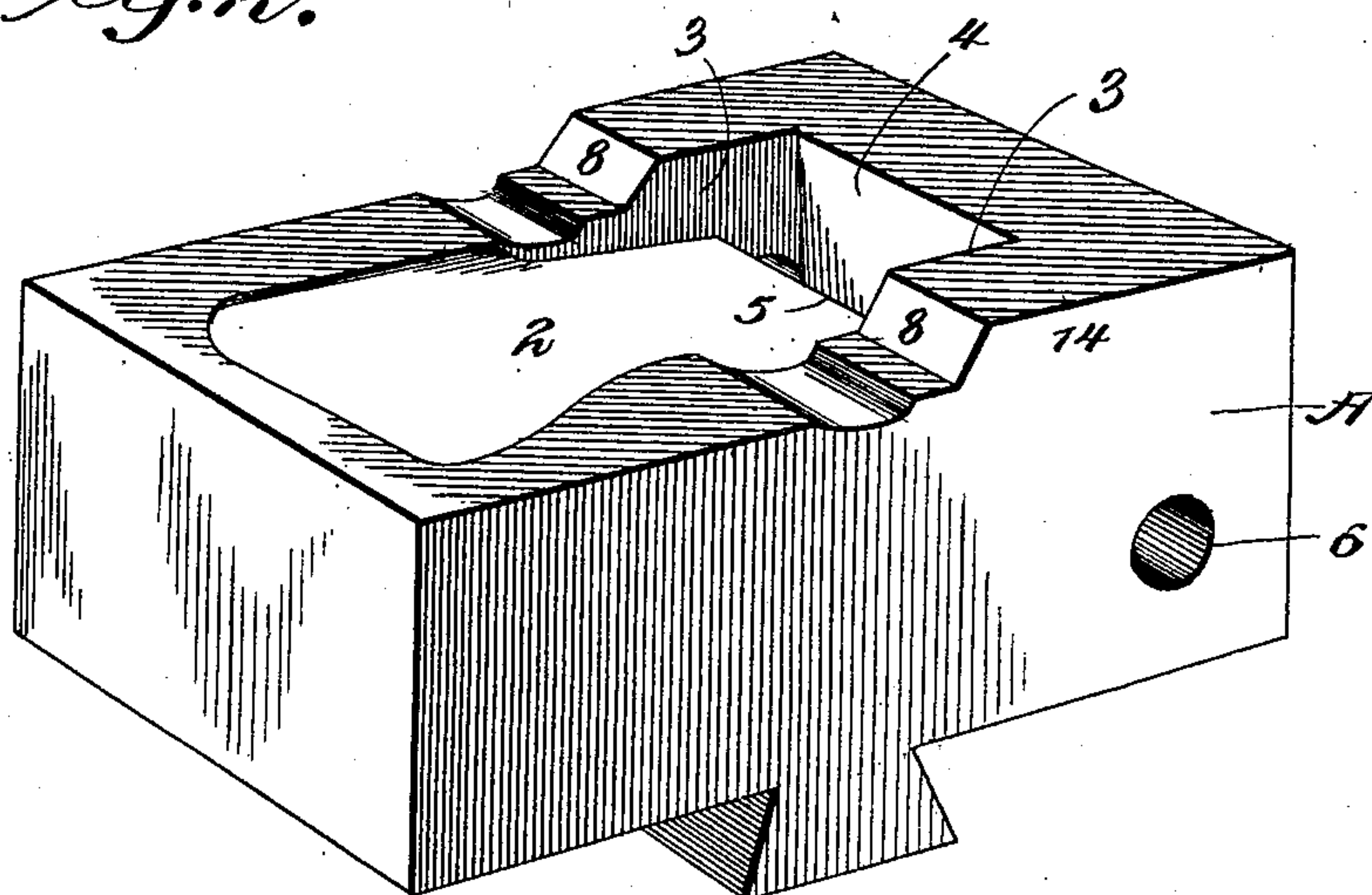
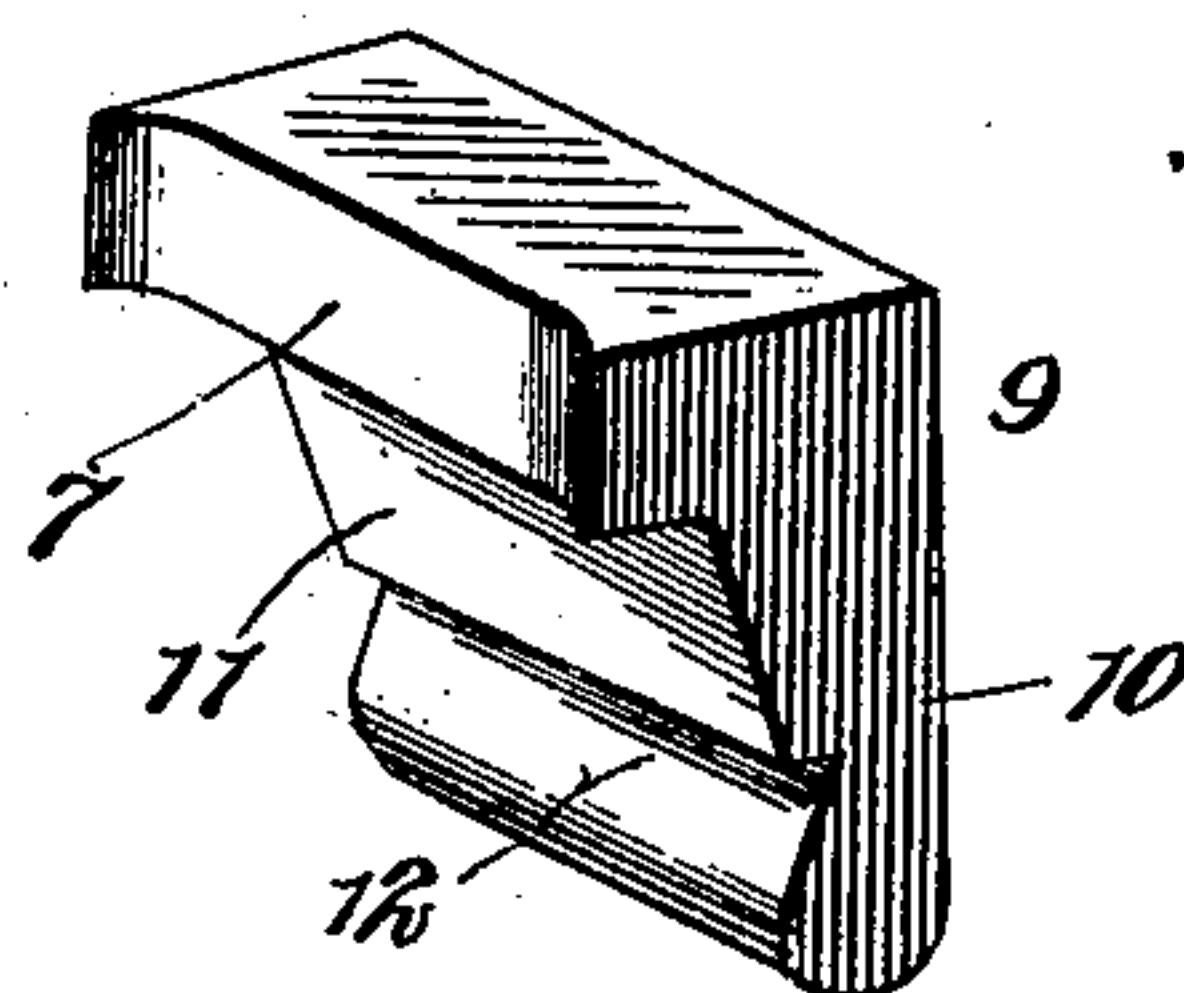


Fig. 3.



Witnesses

Howard D. Orr

By his Attorneys,

Elmer P. Alexander, Inventor,

J. W. Garner

C. A. Snow & Co.

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Fig. 4.

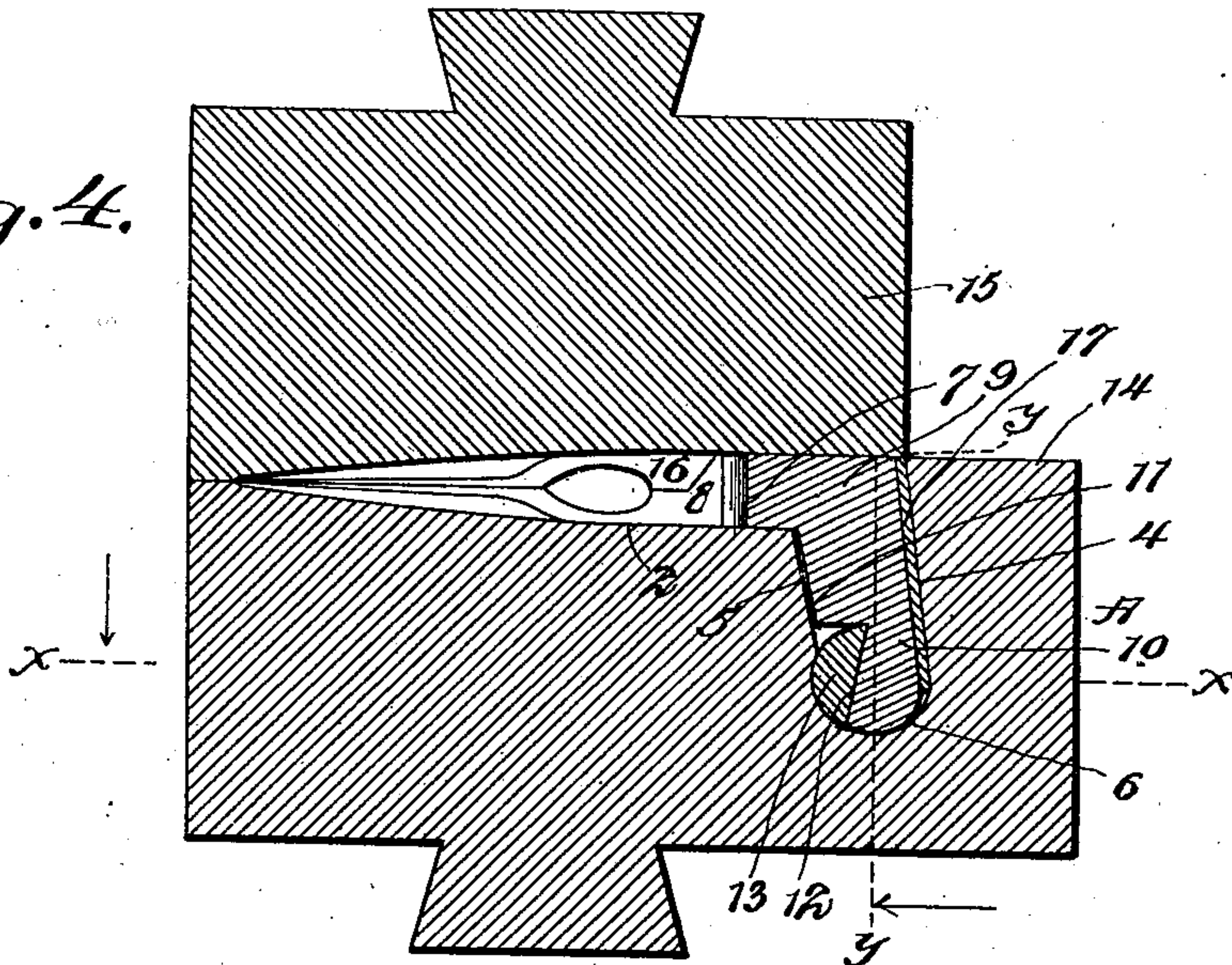


Fig. 5.

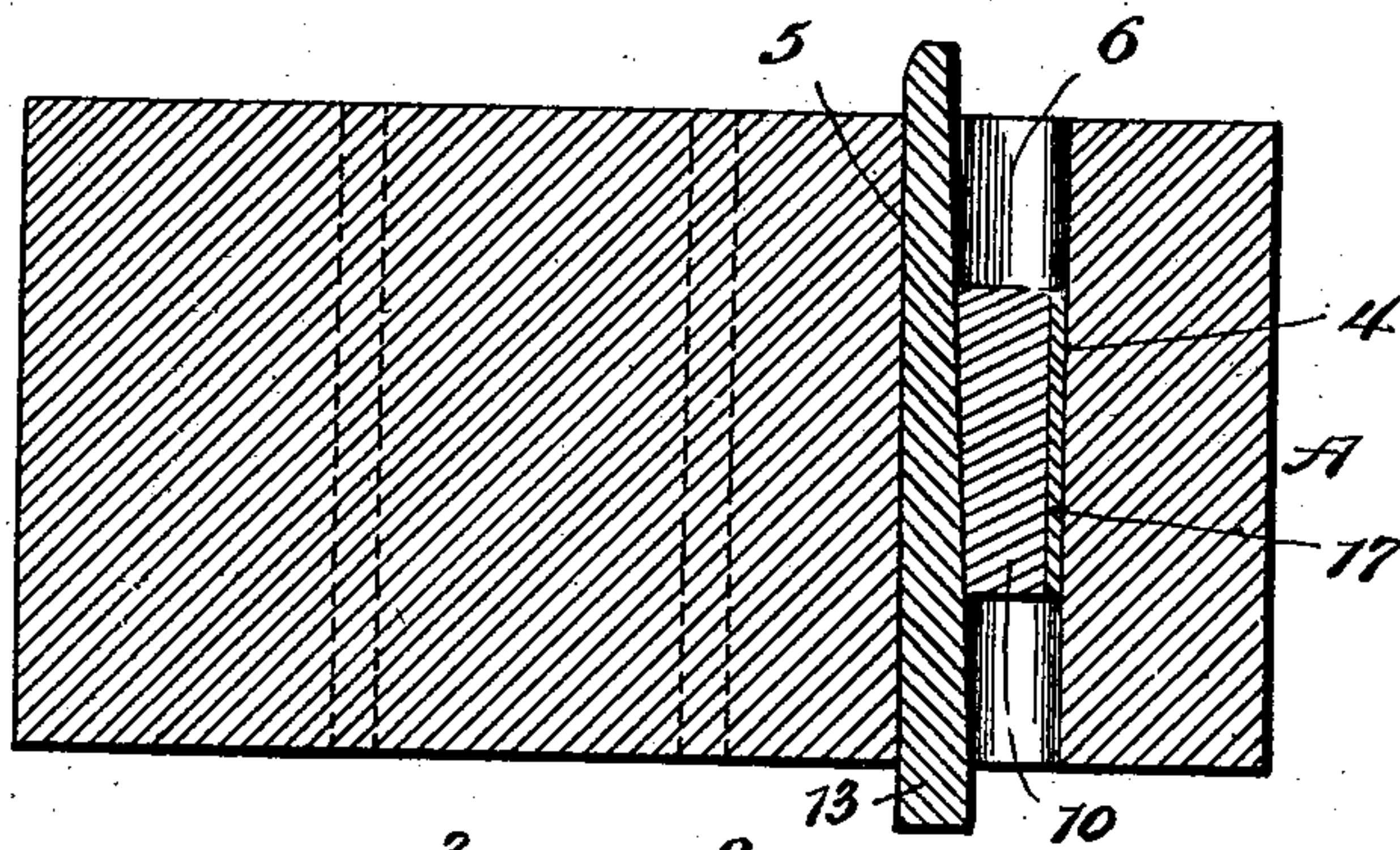
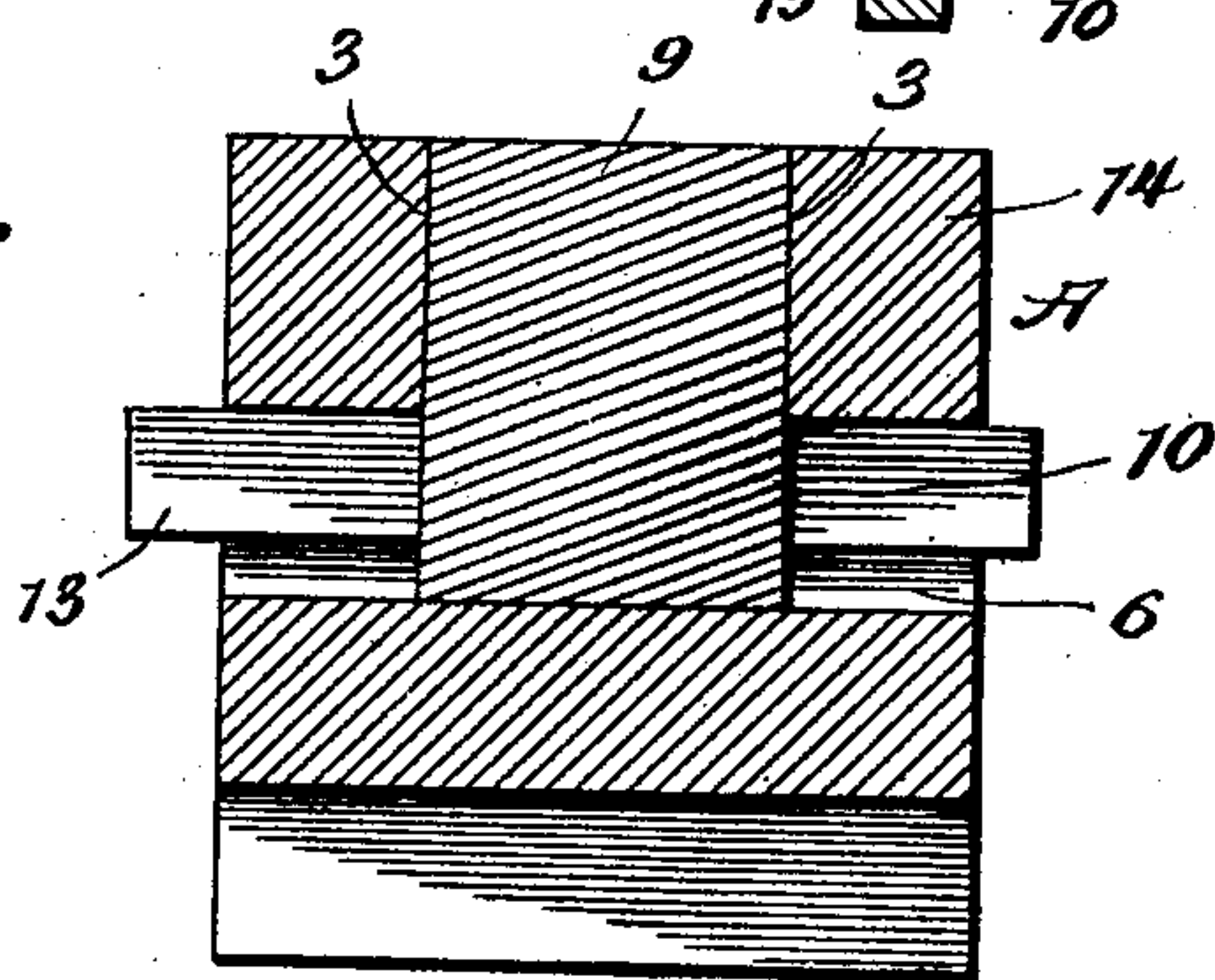


Fig. 6.



Witnesses
Howard D. Orr.
J. W. Garner

By *Elmer P. Alexander*, Inventor,
his Attorneys,

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

ELMER P. ALEXANDER, OF YEAGERTOWN, PENNSYLVANIA.

DIE FOR FORGING AXES, HATCHETS, &c.

SPECIFICATION forming part of Letters Patent No. 668,704, dated February 26, 1901.

Application filed February 28, 1900. Serial No. 6,811. (No model.)

To all whom it may concern:

Be it known that I, ELMER P. ALEXANDER, a citizen of the United States, residing at Yeagertown, in the county of Mifflin and State of Pennsylvania, have invented a new and useful Die for Forging Axes, Hatchets, Adzes, and Like Implements, of which the following is a specification.

My invention is an improved die used in the forging of axes, hatchets, adzes, and like implements of that class in which the head-block is carried by the die-block. Dies of this class have been heretofore constructed in which the adjustable head-block has a transverse dovetail rib on its lower side which fits in a transverse recess that extends entirely across the upper side of the die-block and is secured and adjusted therein by means of wedge-shaped keys, the said transverse recess and said keys being directly in the line of force of the impact of the blow when the die is struck and the ax forged therein, which construction is objectionable for the reason that it weakens the die-block at the point where it needs to be exceedingly strong and, moreover, subjects the adjusting and locking keys to the stress of the blow, with the result that they become compressed laterally and expanded longitudinally, thus permitting the head-block to yield to the stress, and hence causing an undesirable variation in the size of the axes forged in the die.

One object of my invention is to effect an improvement in the die and head-block whereby the removable and adjustable head-block is so firmly seated and retained in the die that it cannot spring or yield when the die is struck in the act of forging an ax.

A further object of my invention is to effect an improvement in the die, the head-block, and the counter-die whereby the head-block is entirely covered by the counter-die when struck and the vertical expansion of an adjusting-shim behind the head-block thereby effectually prevented, hence securing absolute stability of the head-block.

A further object of my invention is to effect an improvement in the construction of the die-block whereby the latter is not weakened by the clearance and key-seat.

A further object of my invention is to effect an improvement in the construction of the

die and head-block whereby the latter is firmly seated against the head of the die and the key is located in advance of the head-block, where it is not subjected to stress.

A further object of my invention is to effect an improvement in the construction of the die and head-block whereby the latter is adapted to be adjusted by means of shims, liners, or filling-strips and the use of a key or keys for adjusting the head-block avoided, a key being employed solely for the purpose of locking the head-block in the die when adjusted.

My invention consists in the peculiar construction and combination of devices hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a die and head-block embodying my improvements, showing the head-block in position in the countersunk recess of the die and with the upper side of the head-block on a level with the upper side of the die. Fig. 2 is a similar view of the die, the head-block being removed therefrom. Fig. 3 is a similar view of the head-block, showing the same detached from the die. Fig. 4 is a vertical longitudinal central sectional view of the die, head-block, locking-key, and counter-die. Fig. 5 is a longitudinal horizontal sectional view taken on the line *xx* of Fig. 4. Fig. 6 is a vertical transverse sectional view taken on the line *yy* of Fig. 4.

In the construction of my improved die A, I provide the same with a countersunk recess 2, communicating with the head of the die or open-ended matrix 1, which countersunk recess extends vertically downward in the die-block and has vertical sides 3. The outer side 4 is inclined outward downwardly, and the inner side 5 of said countersunk recess is correspondingly inclined at a somewhat greater angle. A clearance-opening 6 is drilled through the die-block in line with the countersunk recess and at the lower side thereof, said clearance-opening being transversely disposed, as shown. The head 7 of the die-block forms a vertical extension or offset on the upper side thereof and inclined shoulders 8 on opposite sides of the die or matrix.

My improved head-block 9 is adapted to fit

in the countersunk opening or recess in the die-block and is provided on its under side with a depending stock 10. The outer side of the stock and head-block is inclined at an angle corresponding with the outer side 4 of the countersunk recess, and the said stock extends downward to the bottom of the countersunk recess. The width of the stock longitudinally of the die-block is less than that of the countersunk recess, the inner side 11 of the stock corresponding with the angle of the inner side 5 of the recess, and thereby the said head-block is adapted to be adjusted in the die-block with relation to the head of the die to enable axes of varying sizes to be formed in the die.

It will be understood that when the head-block is moved inward in the matrix to reduce the size of the axes formed in the die a shim 17 of suitable thickness will be inserted between the outer side of the head-block and the side 4 of the recess 2, as shown in Fig. 4 of the drawings. By removing the shim or substituting one of less thickness the head-block may be adjusted outwardly from the matrix to uncover more of the latter and correspondingly increase the size of the axes formed in the die. The tapered key 13 coacts with the shim 17 in effecting the adjustment of the head-block, as will be understood from an inspection of Fig. 5 of the drawings.

The stock 10 of the head-block is provided on its front side with a dovetail rabbet 12, which forms the seat for a locking-key 13, the latter being inserted in said rabbet or key-seat through the clearance-opening 6. The said locking-key is thus arranged on the front side of the stock of the head-block at a point below and remote from the die and serves the purpose merely of locking the head-block against being lifted or moving vertically from the die, and this construction, combination, and arrangement of the die-block, head-block, and locking-key relieves the latter entirely from injurious stress, and the same is not subjected to the force of the impact when the die-block is struck by the counter-die and the ax forged in the matrix. In order to effect the adjustment of the head-block, it is only necessary to insert shims, liners, or filling-strips, of steel, one or more, between the head-block and the outer side of the countersunk recess in which the head-block is seated.

It will be observed by reference to the drawings, more particularly to Figs. 1, 4, and 6, that the head-block is entirely contained and seated in the countersunk recess 2 and that the upper side of said head-block is on the level of and in line with the upper side of the head of the die-block, so that the head-block is entirely removed from all possibility of its being upset, rocked, or tilted in the countersunk opening which forms the seat thereof, thus avoiding a serious objection to existing forms of dies provided with removable adjustable head-blocks, in which the

latter project above the upper faces of the die-blocks. It will be observed that the outer side of the seat for the head-block in my improved form thereof is coextensive with the outer side of the head-block, so that the latter is sustained throughout its entire area by the seat in the die-block, and it will be further observed by reference to the drawings and understood from the foregoing description that by reason of the outward downward inclination of the adjacent outer sides of the head-block and the countersunk recess forming the seat therefor any tendency of the head-block to tilt, rock, or upset under the force of the impact when the die is struck and the ax forged therein is counteracted. It will be further understood, more especially by reference to Fig. 6 of the drawings, that by reason of the dovetail key-seat or rabbet on the front side of the stock of the head-block and the key which locks the head-block any tendency of the head-block to rise in the die is further resisted and countervailed by said key and dovetail seat, and the ends of the locking-key, furthermore, extend laterally beyond the stock of the head-block and bear against the upper side of the clearance-opening in the die-block, which is below the plane of the matrix. It will be further understood by reference to the drawings that my improved die is not weakened by the clearance-opening, because the latter is disposed at a point below and remote from the matrix, the space between the matrix and the head of the die-block being effectually bridged by the mass of material constituting the sides of the countersunk recess, as at 14, whereby the die-block is effectually reinforced directly in the line of force of the impact of the blow when the die is struck and the ax forged therein, which is an advantage of very great importance, as in existing forms of die-blocks in which the clearance-opening is a transversely-disposed recess open on its upper side the die-block is weakened to such an extent as to cause the same to break below the said recess, thereby entirely destroying the same.

By my construction the seat for the head-block is a vertical recess extending downward in the die-block and closed at its sides, as at 14, whereby the masses of metal at 14 are left intact in the line of force and strengthen the die-block at the point which is subjected to the greatest stress, and I greatly strengthen the die-block as compared with those of the same weight heretofore constructed in which the seat for the head-block is a transverse recess extending entirely across the die-block and open on the upper side.

It will be observed by reference to the drawings, more particularly to Fig. 4 thereof, that the counter-die 15 is provided on its under side with an offset 16, corresponding with the offset or shoulder on the upper side of the die-block, and that when the die is struck the counter-die entirely covers and overlaps the

head-block, thereby effectually preventing the head-block from yielding in its seat or countersunk recess of the die-block. It will be further understood that my improved die-block may be entirely shaped by machinery and the die formed by machinery therein, thereby greatly reducing the cost of making the die-block by dispensing with expensive hand-labor in the making of the same, and this, too, without weakening the die-block or shortening the life thereof.

In the construction of my improved die-block after the same is outwardly shaped the key-seat 6 is drilled transversely through the die-block at an appropriate point about midway between the upper and lower sides thereof, and in the cutting of the recess for the head-block, which recess is formed by first boring and subsequently squaring and shaping, the bore 6 forms a clearance-opening for the discharge of the chips. In the subsequent formation of the matrix, which is cut by machinery, the seat for the head-block and the clearance-opening provide for the discharge of the chips. I thus effect a very considerable economy in the construction of the die-block, as will be understood. It will be further understood that by reason of the outer sides of the countersunk recess and head-block being inclined outwardly in a downward direction, as shown and hereinbefore described, the head-block is more firmly seated in the recess, and any tendency of the ax-blank when struck in the die to lift the head-block is effectually counteracted.

Having thus described my invention, I claim—

1. A die-block for forging axes and the like, having a downward-extending recess forming the seat for the head-block, at one end of and communicating with the matrix, the sides of said seat being closed by integral masses of the head-block disposed in the line of stress, and a clearance-opening made through said die-block and communicating with the said recess or seat, the said clearance-opening being disposed below the plane of the matrix, substantially as described.

2. A die-block for forging axes and the like, having a downward-extending recess forming the seat for the head-block, at one end of and communicating with the matrix, the sides of said seat being closed by integral masses of the head-block disposed in the line of stress, and a clearance-opening made through said die-block, and communicating with said recess or seat, the said clearance-opening being disposed below the plane of the matrix, in combination with a removable head-block seated in said recess, and having a downward-extending shank, and a key in said clearance-opening and engaging said shank, substantially as described.

3. A die for forging axes and the like, having a removable adjustable head-block, the upper side of which is on a level with the upper side of the die, the latter having also a shoulder or offset in its upper side forming a head in which the head-block is seated, in combination with a counter-die which covers said head-block when struck, said counter-die having on its lower side a shoulder or offset corresponding to that on the upper side of the die, substantially as described.

4. A die-block for forging axes and the like, having a downward-extending recess forming the seat for the head-block, at one end of and communicating with the matrix, and a clearance-opening made through said die-block and communicating with said recess or seat at a point below the plane of the matrix, in combination with a removable head-block in said recess or seat and having a downward-extending shank provided with a key-seat on its front side, said key-seat registering with said clearance-opening, and a key in said clearance-opening and engaging said key-seat, for the purpose set forth, substantially as described.

5. A die-block for forging axes and the like, having a downward-extending recess forming the seat for the head-block, at one end of and communicating with the matrix, and a clearance-opening made through said die-block and communicating with said recess or seat at a point below the plane of the matrix, in combination with a removable adjustable head-block in said recess or seat and having a downward-extending shank of less width than the corresponding portion of said recess (whereby said head-block is rendered adjustable), said shank having a key-seat on its front side registering with said clearance-opening, and a key in said clearance-opening and engaging said key-seat, substantially as described.

6. A die-block for forging axes and the like, having an open-ended matrix and a downward-extending recess communicating with the said matrix, the sides of said recess being otherwise entirely closed by the mass of the die-block, in combination with a head-block seated in said recess and a counter-die block which covers said head-block and recess when struck, whereby expansion in any direction of an adjusting-shim behind the said head-block is prevented, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ELMER P. ALEXANDER.

Witnesses:

J. W. GARNER,
M. C. GLADMOND.