(No Model.) 3 Sheets—Sheet 1.

J. H. SIMPSON.

METHOD OF MANUFACTURING DRAW BARS.

No. 328,436. Patented Oct. 13, 1885.

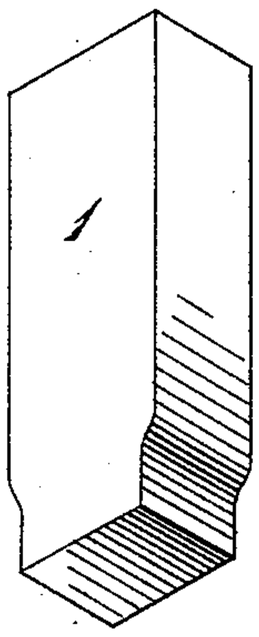

Fig. 8.

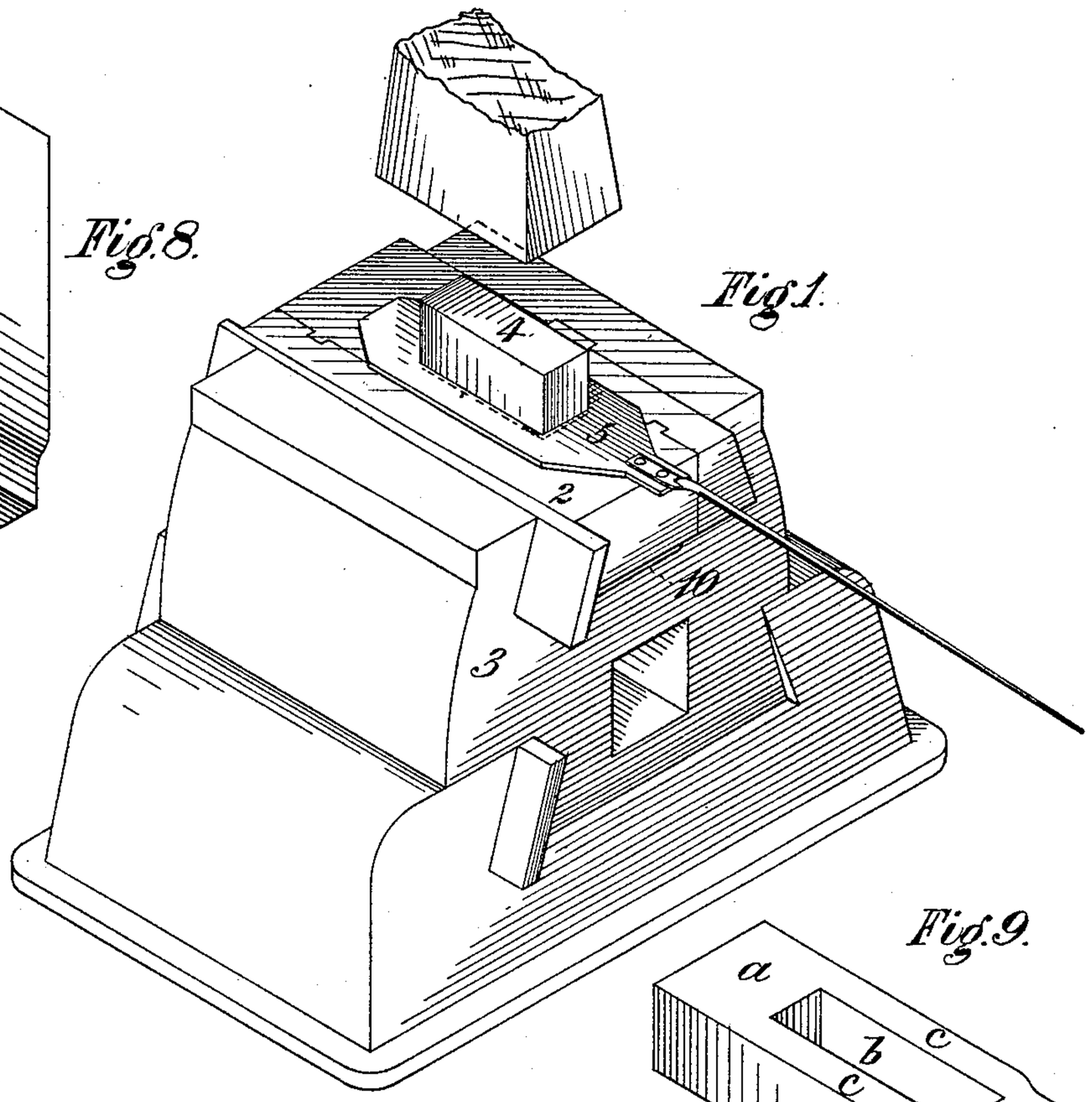

Fig. 1.

Fig. 9.

Fig. 2.

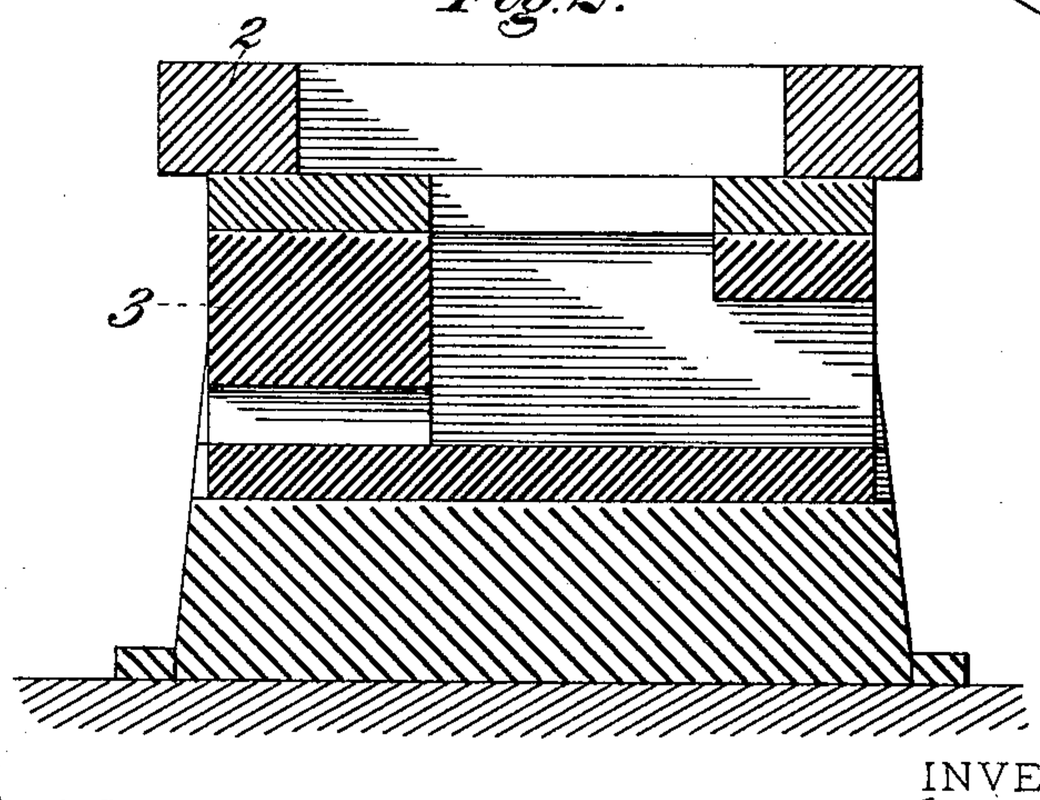

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Fig. 3.

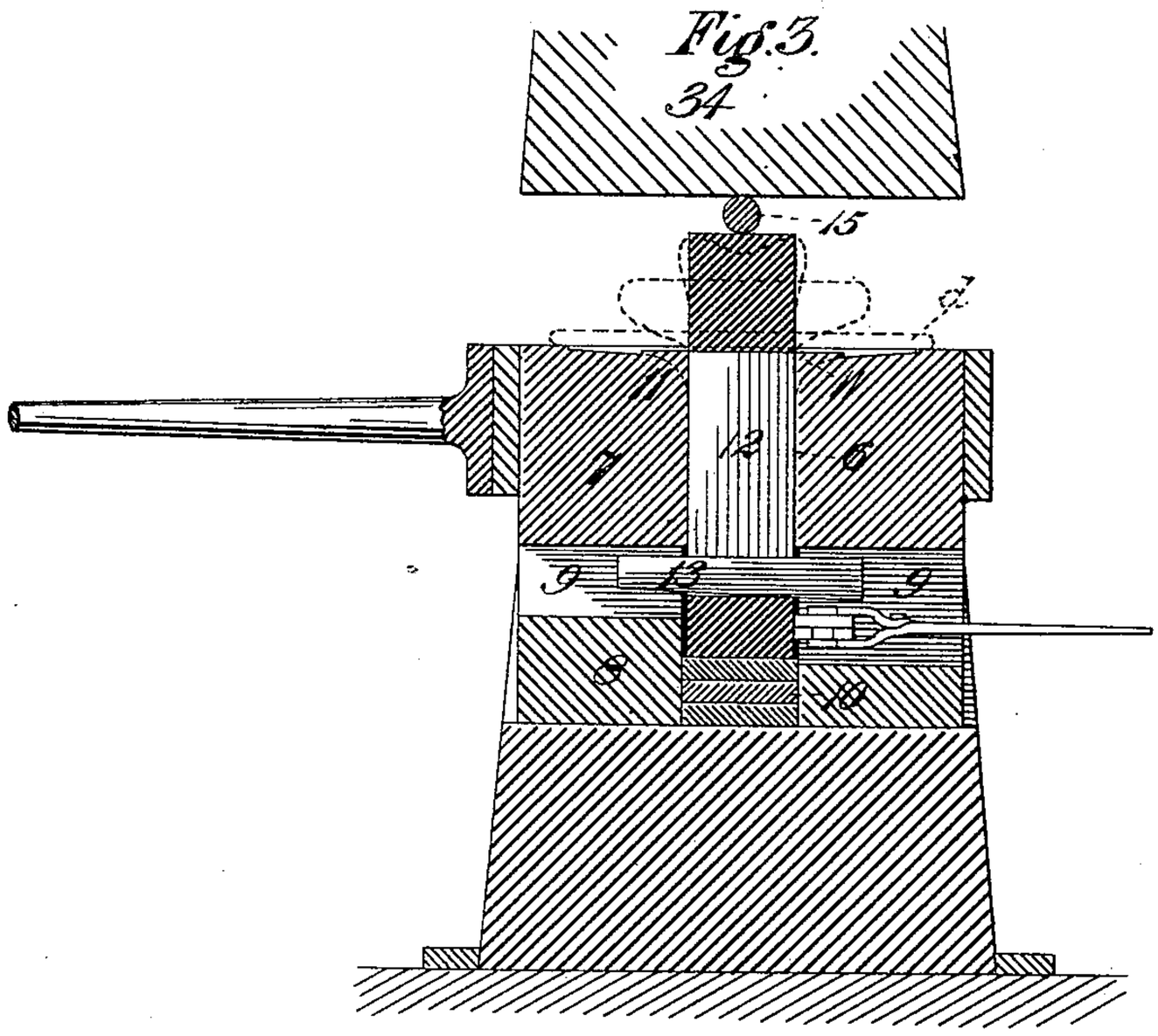
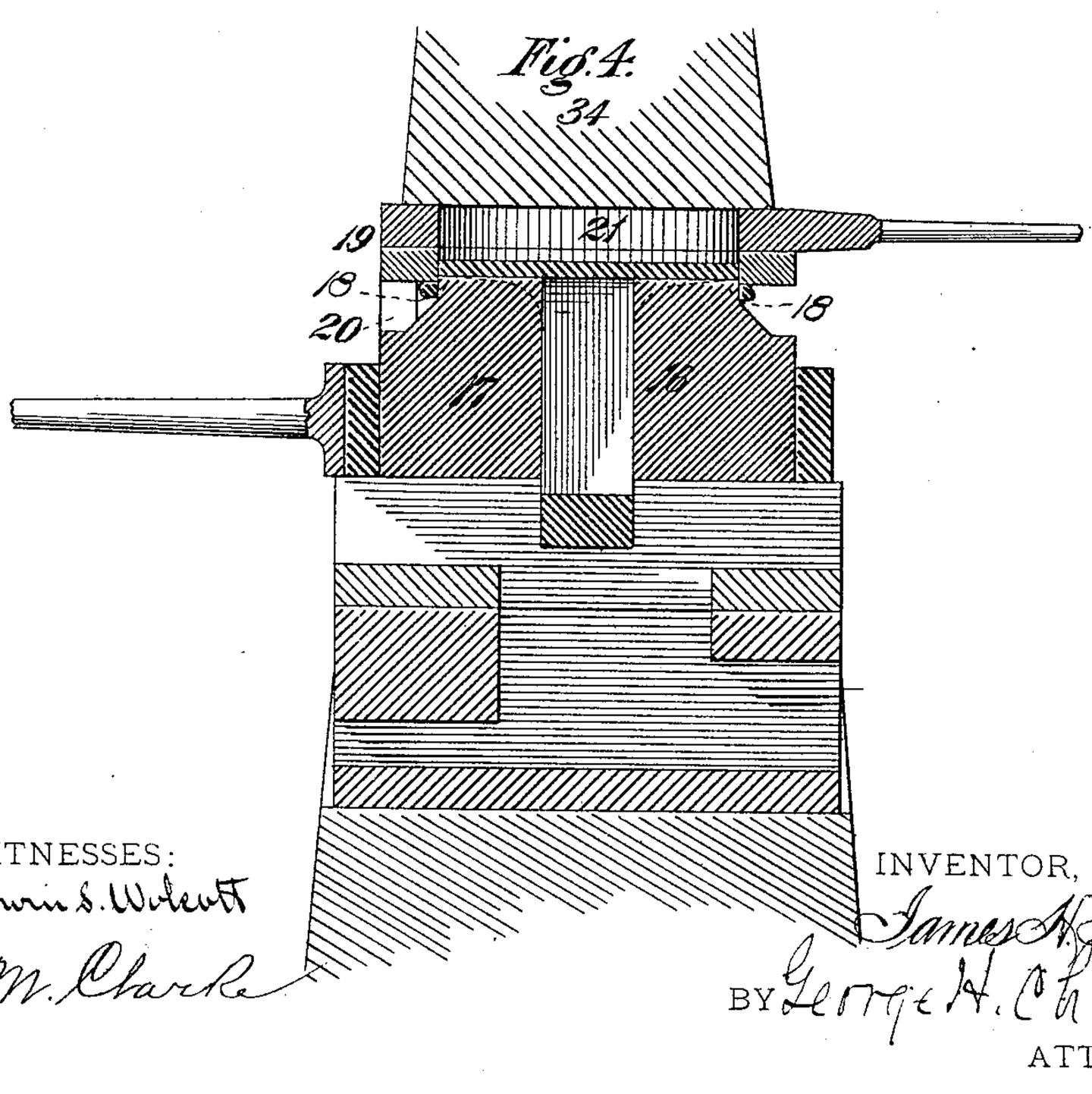


Fig. 4.



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METHOD OF MANUFACTURING DRAW BARS.

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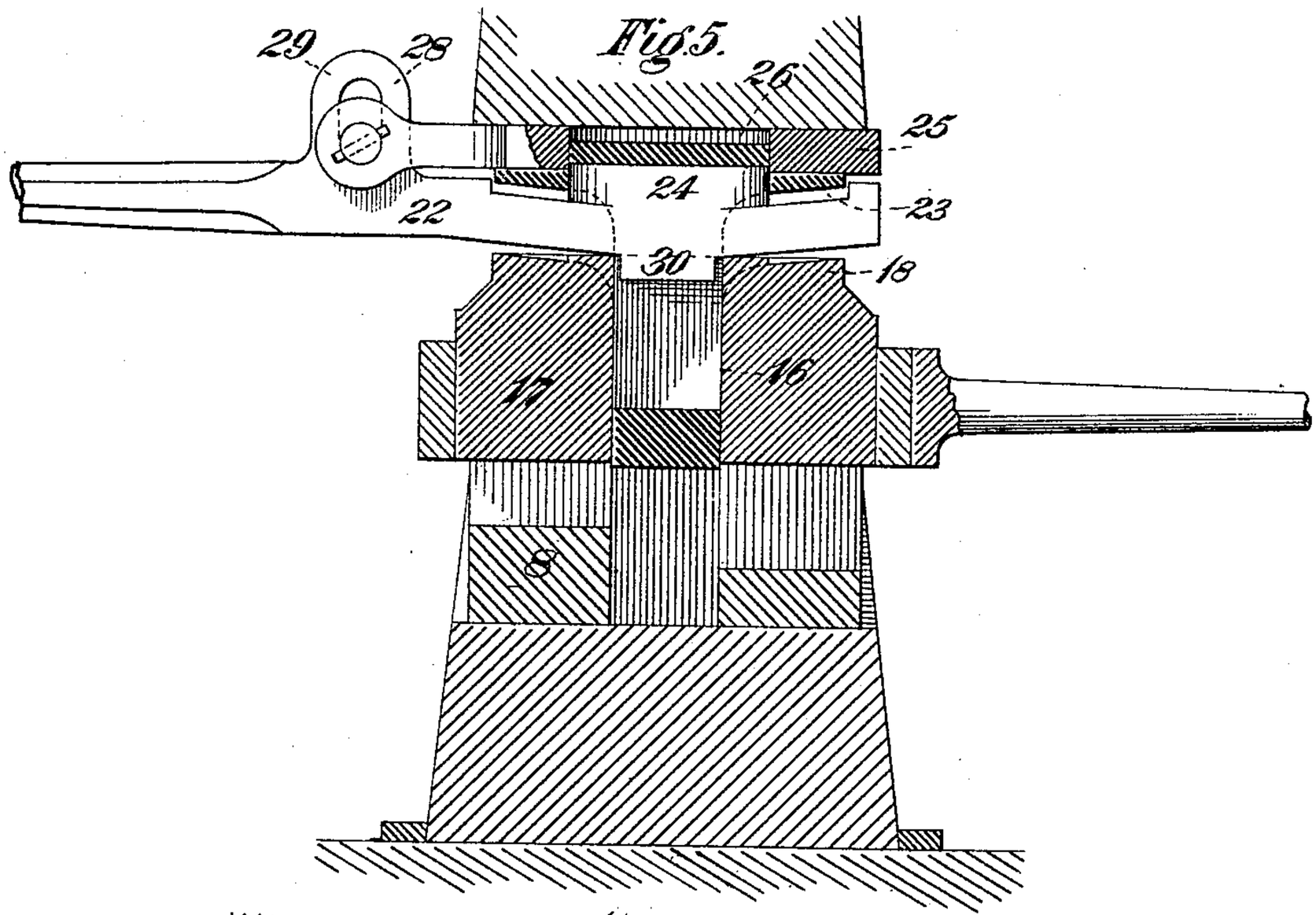
Fig. 5.



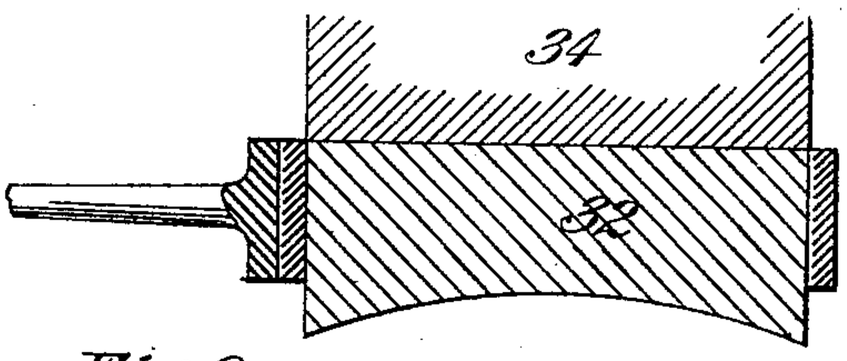
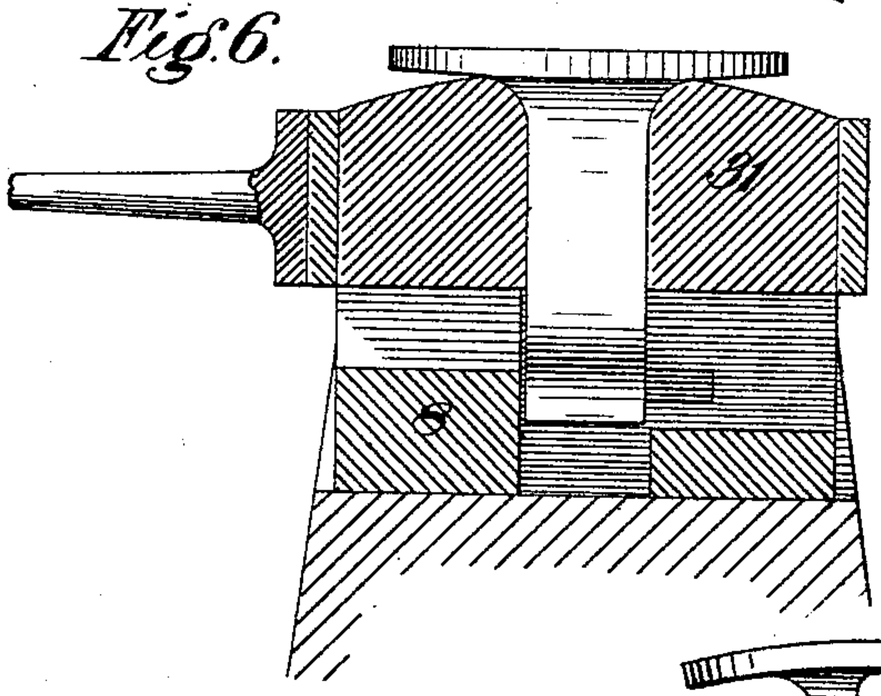


Fig. 6.



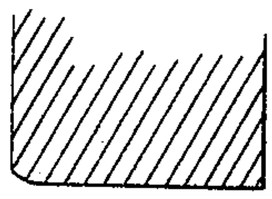
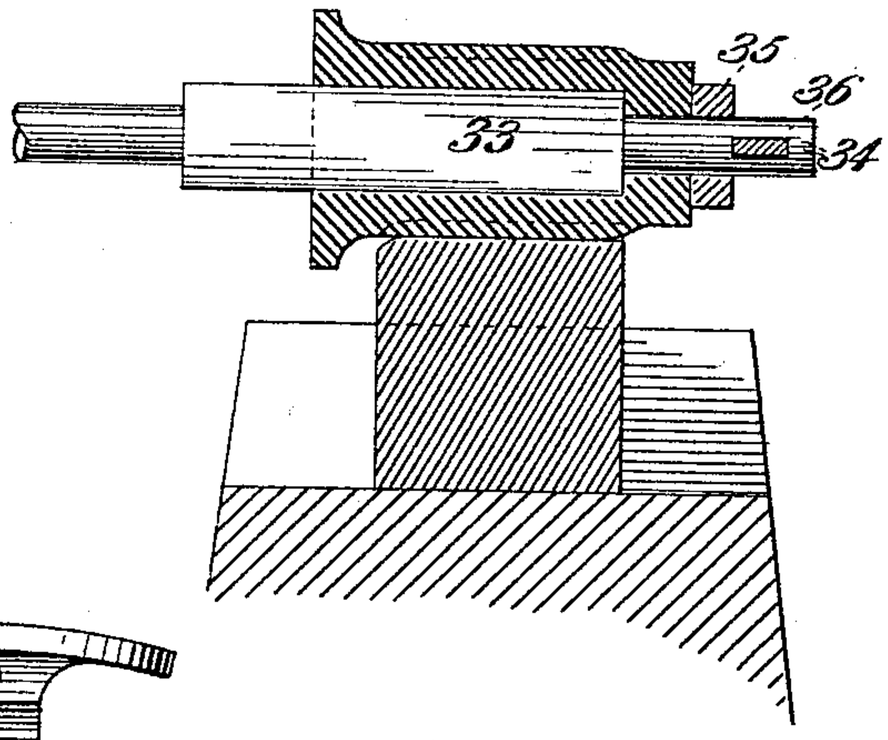


Fig. 7.



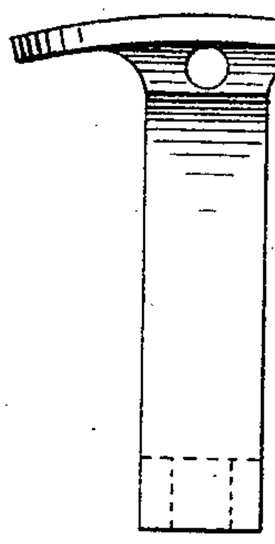


Fig. 10.

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UNITED STATES PATENT OFFICE.

JAMES H. SIMPSON, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO WILSON, WALKER & COMPANY, (LIMITED,) OF SAME PLACE.

METHOD OF MANUFACTURING DRAW-BARS.

SPECIFICATION forming part of Letters Patent No. 328,436, dated October 13, 1885.

Application filed August 1, 1885. Serial No. 173,227. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. SIMPSON, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in the Method of Manufacturing Draw-Bars, of which improvements the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a perspective of the female die used in punching the blank, and also showing punch and gage in place. Fig. 2 is a longitudinal sectional view of the same. Fig. 3 is a similar view of the die for forming face-plate. Fig. 4 is a like view of apparatus for trimming edges of face-plate. Fig. 5 is a sectional elevation of the punch for forming link-opening in face-plate. Fig. 6 is a similar view of dies for shaping face-plate. Fig. 7 is a sectional view of apparatus for drawing down side bars or straps. Figs. 8, 9, and 10 are views of blank and completed draw-bar.

The invention herein relates to an improved method of forming solid forged steel draw-bars as distinguished from the draw-bars the parts of which are separately formed and are then secured together by welding or otherwise. To avoid the expense and delay incident to this manner of forming the draw-bars, it has been customary to form them of steel or iron by casting; but these cast draw-bars are objectionable on account of their brittleness or incapability of withstanding the blows or shocks to which they are subjected while in use.

The object of my invention is to produce by means of a series of manipulations, such as "punching," "forging," "trimming," and "drawing down and out," successively performed on a suitably-shaped blank, a solid forged steel or iron draw-bar; and to this end my invention consists in the method of operation substantially as hereinafter described and claimed.

In another application of even date herewith I have fully shown, described, and claimed a series of dies and other apparatus by which my improved method is carried out, and to that application reference is hereby had for the full and exact description and illustration of the dies and other devices, which will be only generally referred to herein.

The blank 1 is suitably heated and then placed within the separable box 2, located in a recess in the die 3, attached to or located in the anvil or bed-plate of a steam or other suitable power hammer. The punch 4 is then placed on the blank, a guide or gage plate, 5, being employed to properly locate the punch. The punch is then forced through the blank 1, thereby removing a portion of the metal in the middle of the blank. This operation produces the blank 1^a, having a head portion, *a*, the opening *b*, and the side bars, *c*. This blank 1^a having been properly heated, is placed in a vertical position in the opening 6 in the die 7, said die being supported on a block, 8, resting on the anvil of a steam-hammer, said block being provided with a longitudinal passage, 9, and a vertical opening, 10, in line with the opening 6 in the die 7, when properly located in the block 8. The face of the die 7 adjacent to the opening 6 is constructed to form the rear side of the face-plate of the draw-bar, and is provided with abutments 11, which, in connection with the mandrel 12, serve to prevent any inward movement or bending of the side bars, *c*, during the formation of the face-plate. The mandrel 12 is placed in the opening *b* in the blank before the latter is inserted in the die 7, and after the blank is in place a key, 13, is driven through the passage 9 in between the lower end of the mandrel and the end of the opening *b* in the blank, thus causing the mandrel to bear against the under side of the head *a*, and providing a firm support for said head through the medium of the mandrel, the wedge or key 13, and the lower end of the blank, which in turn is supported by blocks placed in the opening 10 in the block 8. The head of the hammer is then operated against the head *a*, a round or other suitably shaped bar, 15, being interposed during the first part of this swaging operation for the purpose of properly spreading the head *a* until the head is flattened out over the face of the die 7, as clearly shown in Fig. 3, thus forming the face-plate *d*.

The next step in the formation of the draw-bar consists in trimming or cutting the edges of the face-plate to reduce the same to the de-

sired size and shape. In this operation the draw-bar is heated and placed in a vertical position in the opening 16 in the die 17, said die being provided on its upper surface with a rim or bead, 18, having a vertical outer wall, as shown, and of a contour and size corresponding to the size and shape of the perimeter of the completed face-plate. The face of this die included within the rim 18 and adjacent to the opening 16 is constructed to correspond to the under side of the face-plate and to evenly support the same during the trimming operation. The heated draw-bar having been placed on the die 17, the cutter 19 is placed upon the face-plate, it being guided into position by the guide-pins 20, attached to the die 17. This cutter is provided with a steel face, through which and the stock of the cutter is formed an opening, 21, of a size and shape corresponding to the size and shape of the rim 18. This cutter, in connection with the vertical edge of the rim 18, acts as shears or cutters to remove the surplus metal around the edges of the face-plate, the cutter 19 being forced down by blows of the hammer. After trimming or cutting the face-plate to the desired size and shape, the blank is partially lifted from the opening 16 in the die 17, and the stem portion of the die-punch 22 is inserted through the opening *b* in the blank and between the face-plate thereof and the top of the die 17. In a recess, 23, in the forward end of the stem portion of the die-punch 22 is located a punch or cutter, 24, having a shape and size corresponding to the shape and size of the link-openings in draw-bars, and to the stem in the rear of the recess is pivoted the female punch or cutter 25, provided with an opening, 26, adapted to fit over and around the male punch or cutter 24. The pivot-pin 27, connecting the female punch with the stem, passes through a vertical slot, 28, in a lug, 29, in the stem, by which construction the female punch is permitted to lie evenly on the face-plate, and when struck by the hammer-head will move down in a straight line over the punch 24, thereby forcing the face-plate down over said male punch. On the under side of the stem and in line with the punch 24 is formed a depending lug or projection, 30, adapted to fit in the opening 16 of the die 17, thereby properly adjusting the male punch with reference to the face-plate, which is held in position by the lower portion of the blank, also located within said opening 16. This step of forming the link-opening may be performed prior to cutting or trimming the face-plate, and the die-punch 22 may be used in connection with the die 7, as the dies 7 and 17 have their faces adjacent to the vertical openings 6 and 16 therein similar in construction and dimensions.

The next step consists in imparting the proper curvature to the face-plate of the blank, which is effected by placing the face-plate of the properly-heated blank on the die 31, the stem of said blank projecting down into a vertical opening in said die, as clearly shown in Fig. 6. The face of the die 31 is constructed with the desired curvature to be imparted to the face-plate, on which is placed a correspondingly-shaped die, 32, which, when struck by the hammer, will cause the face-plate to assume the desired curvature.

The blank is next removed to a drill-press and a hole is drilled through the rear end of the blank for the purpose of securing the blank to the mandrel 33, for the purpose of drawing down and out the side bars, *c*, said hole being also adapted for the reception of the draw-bar bolt employed in securing the draw-bar to the cars. After the hole has been drilled as above stated, the blank is again heated and then slipped into the mandrel 33, the pin 34 on the end of said mandrel passing through the hole in the end of the blank, which is secured in place by the washer 35 and key 36. The blank and mandrel are then placed on the anvil of a drop-hammer, and the side bars are drawn down and out to the thickness indicated by dotted lines in Fig. 7. If desired, the side bars may be drawn down prior to swaging the face-plate to shape as above stated.

I claim herein as my invention—

The herein-described method of forming solid forged steel draw-bars, which consists in punching out or removing a portion of the metal from the body of a properly-shaped blank, hammering or swaging down the head of said blank for the purpose of forming the face-plate, trimming or cutting said face-plate to shape, punching a link-opening in said face-plate, and then drawing down the side bars, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES H. SIMPSON.

Witnesses:

DARWIN S. WOLCOTT,

R. H. WHITTLESEY.