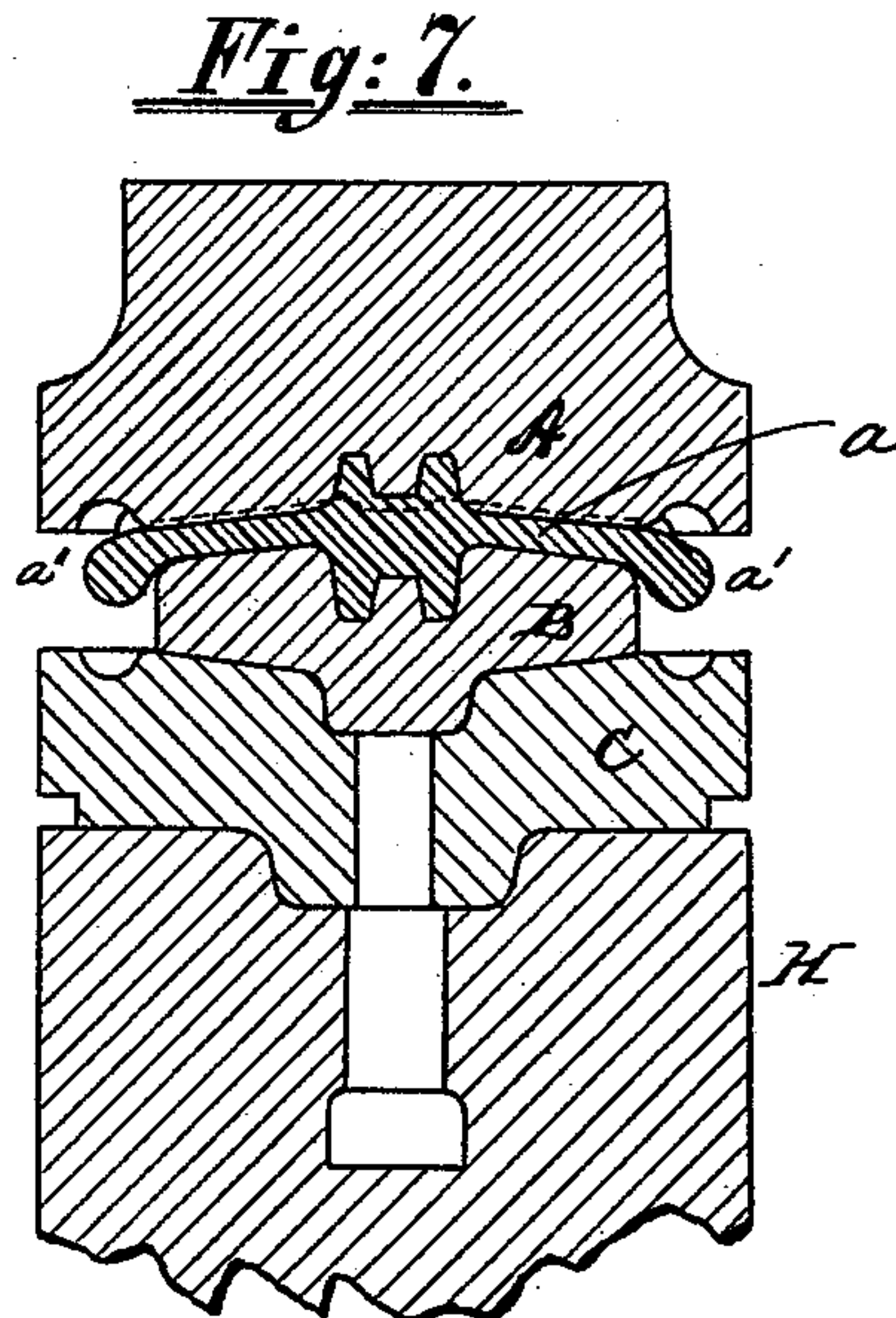
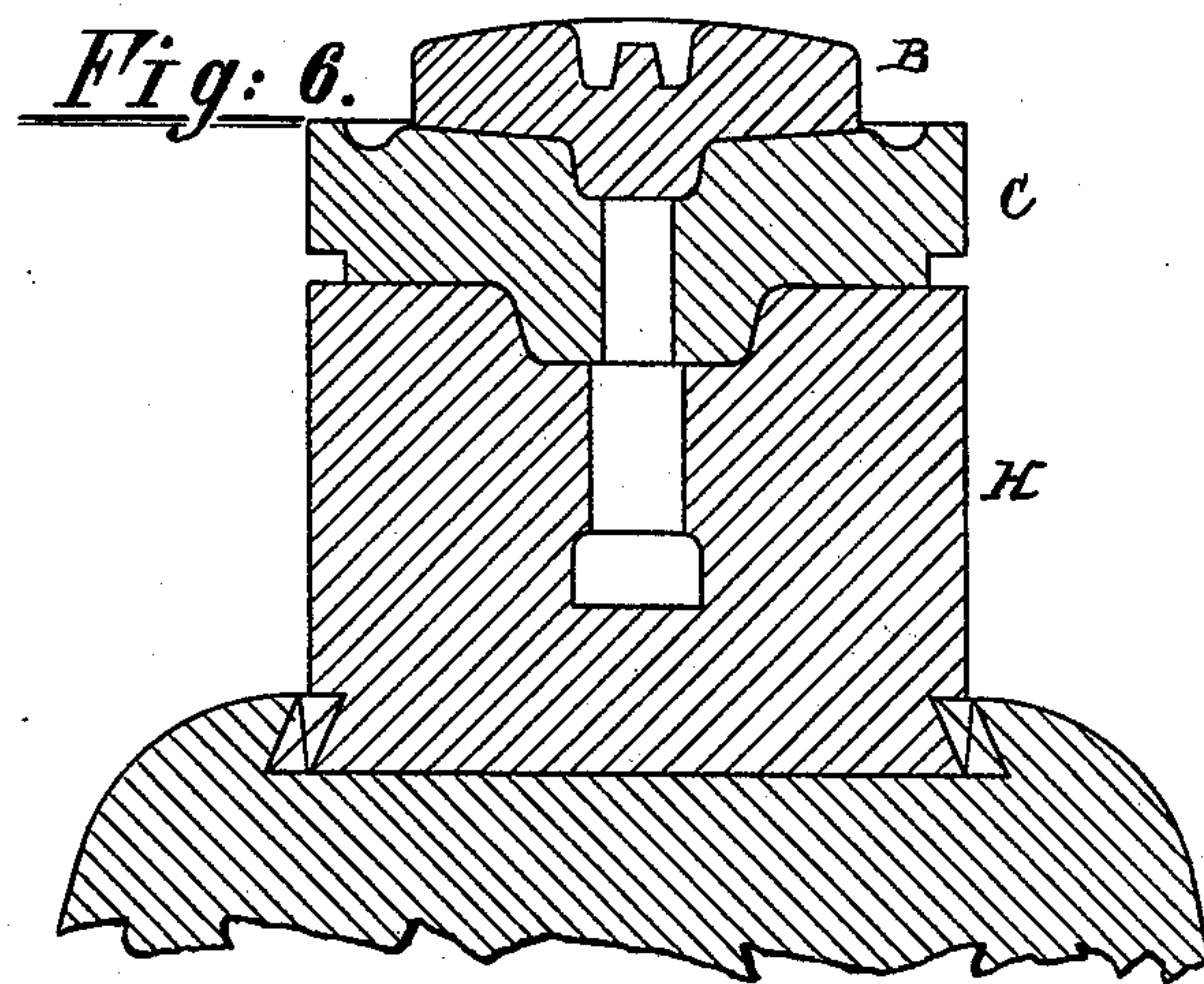
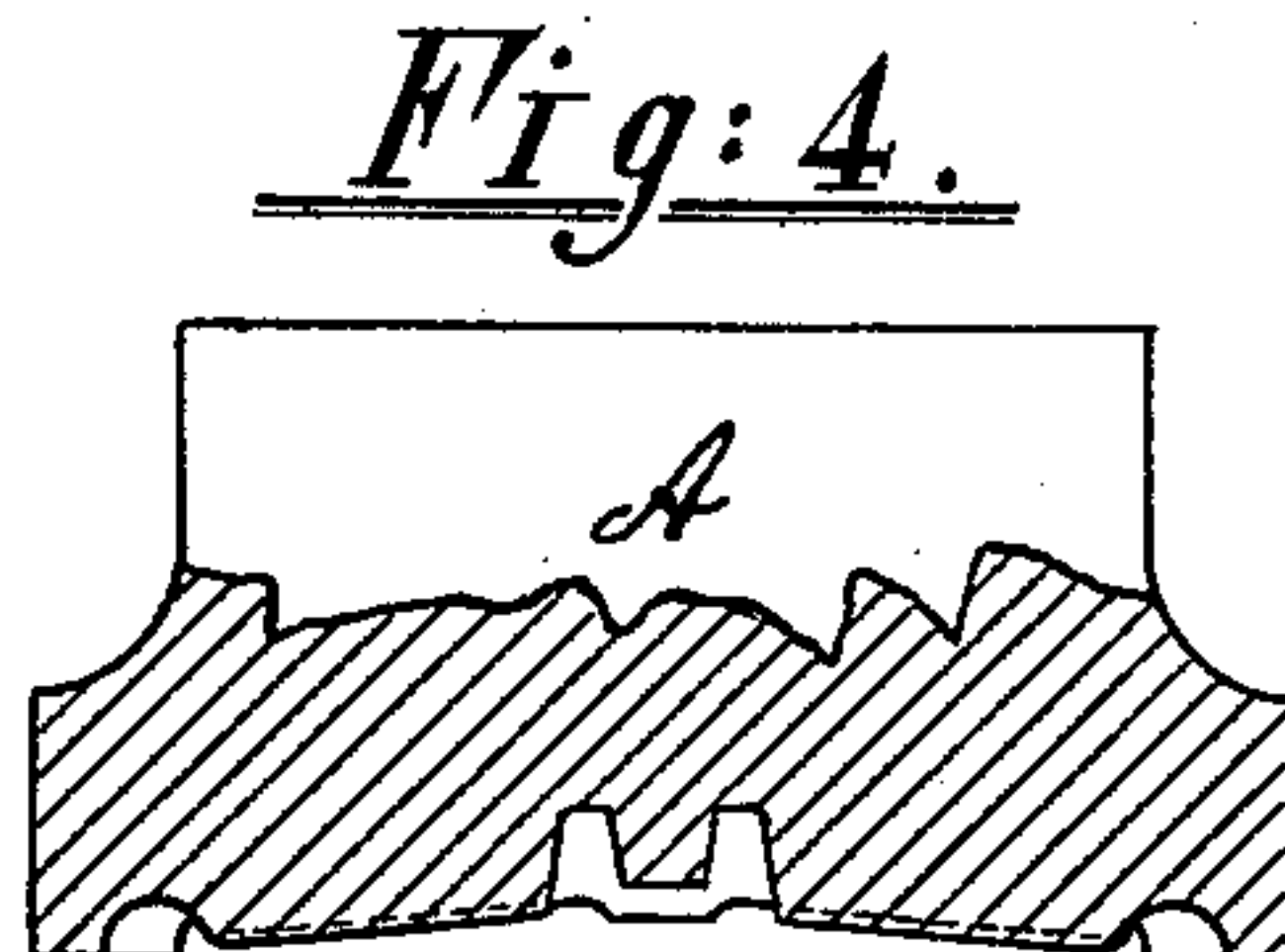
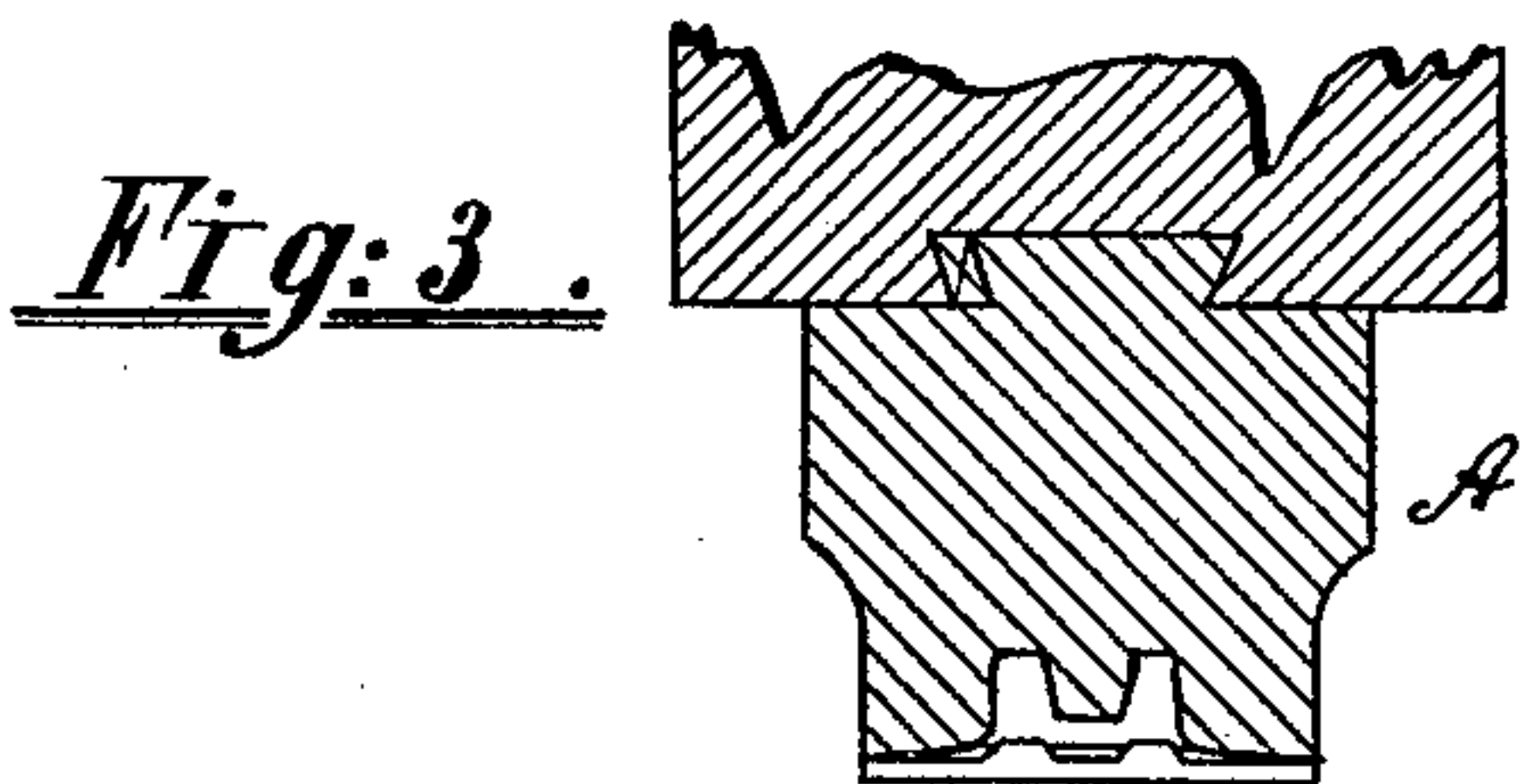
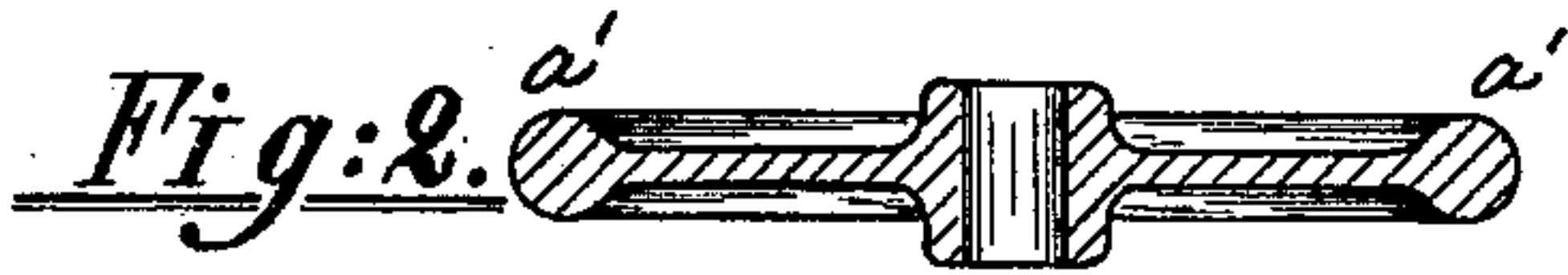
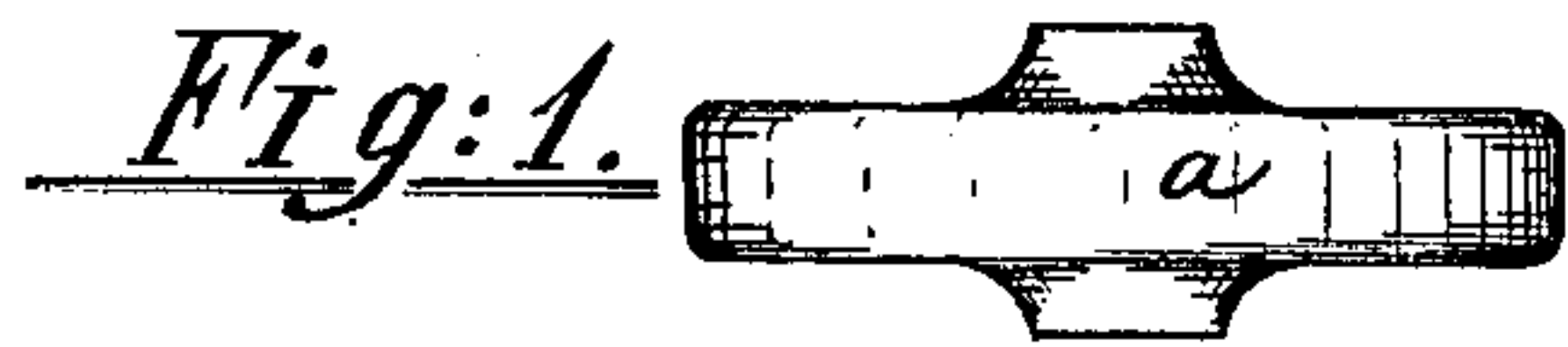


(No Model.)

G. ALTHAUSSE.  
APPARATUS FOR MANUFACTURING CAR WHEELS.

No. 587,141.

Patented July 27, 1897.



Witnesses:  
Frederick Seidel.  
William Schulz.

Inventor:  
Guido Althausse  
by his attorneys  
Roeber & Brosen



# UNITED STATES PATENT OFFICE.

GUIDO ALTHAUSSE, OF DUSSELDORF, GERMANY.

## APPARATUS FOR MANUFACTURING CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 587,141, dated July 27, 1897.

Application filed December 19, 1895. Serial No. 572,653. (No model.) Patented in Germany January 17, 1893, No. 79,955; in Hungary April 12, 1895, No. 2,628; in Belgium May 24, 1895, No. 104,803, and in Austria June 26, 1895, No. 2,270.

*To all whom it may concern:*

Be it known that I, GUIDO ALTHAUSSE, a subject of the German Emperor, residing at Dusseldorf-Oberbilkin, Germany, have invented certain new and useful Improvements in Apparatus for Manufacturing Car-Wheels, (for which I have obtained the following patents: in Germany, No. 79,955, dated January 17, 1893; in Austria, No. 2,270, dated June 26, 1895; in Hungary, No. 2,628, dated April 12, 1895, and in Belgium, No. 104,803, dated May 24, 1895,) of which the following is a specification.

This invention relates to an improved apparatus for manufacturing forged car-wheels out of one piece and by a minimum of manipulations.

My improved apparatus consists of an anvil, a lower die supported thereon and corresponding in contour to the surface of the wheel to be formed, a smaller intermediate die having a central socket, and an upper die having forging-ways that permit a distention of the metal during the forging operation.

In the accompanying drawings, Figure 1 is an end view of the work-piece; Fig. 2, a cross-section of the car-wheel as forged by the dies. Fig. 3 is a vertical cross-section of the upper die; Fig. 4, a vertical longitudinal section thereof; Fig. 5, a bottom view thereof; Fig. 6, a vertical central section of the two lower dies; Fig. 7, a vertical longitudinal section of the dies A B C, showing the work-piece in place.

The work-piece *a*, Fig. 1, formed in a mold or otherwise, is made disk-shaped and is provided with a central boss on each face. This work-piece is operated upon by a steam-hammer or forging-press and by a set of dies. Of these the upper and lower die remain permanently in place during the whole operation, while an intermediate die, which is placed upon the lower die at the beginning of the process, is subsequently removed. By the aid of these dies the hub as well as the web are completely forged in such a manner that a bead is formed at the circumference of the flat web, Fig. 2, out of which the rim is subsequently shaped. While forging the work-piece on the intermediate die the bore

of the hub is so far punched out that after the removal of the intermediate die and during the treatment of the work-piece on the lowermost die the bore is entirely completed by a separate punch. The result of the forging operation will thus be a work-piece of the form illustrated in Fig. 2.

The upper die A, which remains in place during the entire process, is provided with, say, three forging ways or grooves in order to permit the radial and tangential distention of the metal. Between the forging-ways sufficient space is left to allow the metal while stretching to escape laterally. It is, however, thought practicable to provide the upper die with one, two, three, or more forging ways or grooves. At any rate the upper die should be so formed that the metal can expand radially or tangentially during the stretching operation. To comply with this condition, the upper die should not present a circular surface to the work-piece, and it is therefore reduced by cutting off a pair of segments from opposite sides, Fig. 5. The center of the upper die is shaped to conform to the form of the wheel at this point, while a central cavity and punch on the die, working in conjunction with a similar cavity and punch on the intermediate die B, forms a rudimentary hub.

The intermediate die B is set upon the lower die C, Fig. 6, and can be lifted off the same. After being put in place the die B forms in effect a single piece with die C and can be revolved with the same. The upper surface of the die B is convex and provided with a central socket and punch to form the hub and the preliminary central boring. The surface of the die B corresponds to the surface of the wheel to be formed, while the body of the die B is so much smaller in diameter than the body of the die A that the bead *a'* at the periphery of the work-piece projects beyond the edge of the die B, Fig. 7. The lower female die C has the shape of the wheel to be forged, including hub and a peripheral groove for the outer bead. At the center it is perforated in line with the bore of the hub, so that the metal which is punched out may fall through the die and can thus be



removed. The lower die is revolvably supported upon the base H by means of a central hub or enlargement.

5 The rotation of the dies B and C is effected by a pair of diametrically-placed hand-bars (not shown) secured to the dies.

10 The wheel is forged in the following manner: A block of iron or steel, properly heated and in the form of a disk (having, if desired, a central perforation) or a casting having central bosses, is placed upon the intermediate die and is partly revolved, together with dies B C, before each blow from die A. Thus the rudimentary hub is first formed and  
15 partially bored (in case the work-piece has no central perforation) and then the web is distended or drawn in a radial or tangential direction until the work-piece has assumed a curved form similar to that shown in Fig. 7.  
20 The die B is now removed and the work-piece placed upon die C, together with which it is again revolved and subjected to the action of the forging-die A.

25 Inasmuch as the principal distention of the work-piece has taken place on the die B the die C is used only for finishing purposes to perfect the work-piece and give it the shape shown in Fig. 2.

30 During the manipulation of the work-piece on die C the hub and its perforation are com-

pleted by means of a punch and the severed metal is discharged through the central opening of the die.

By my invention I produce a wheel which is of perfect manufacture and complies with  
35 all requirements desired in a high-class car-wheel.

By forging the entire wheel in the manner indicated it will acquire a durability superior to that of a rolled wheel. Moreover, the  
40 manufacture of the wheel is simplified and may be accomplished by inexpensive machinery, so that my invention produces not only a superior wheel, but also one which is commercially preferable.  
45

What I claim is—

In a machine for forging car-wheels, an anvil, a lower die supported thereon and corresponding in contour to the surface of the wheel to be formed, a smaller intermediate  
50 die having a central socket, and an upper die having forging-ways that permit a distention of the metal, substantially as specified.

In testimony whereof I have signed this specification in the presence of two subscrib-  
55 ing witnesses.

GUIDO ALTHAUSSE.

Witnesses:

WILHELM ESSENWEIN,  
HANS FRIEDRICH.