

(No Model.)

2 Sheets—Sheet 1.

S. H. RALSTON.

METHOD OF FORGING SOLID METAL CAR WHEELS.

No. 587,401.

Patented Aug. 3, 1897.

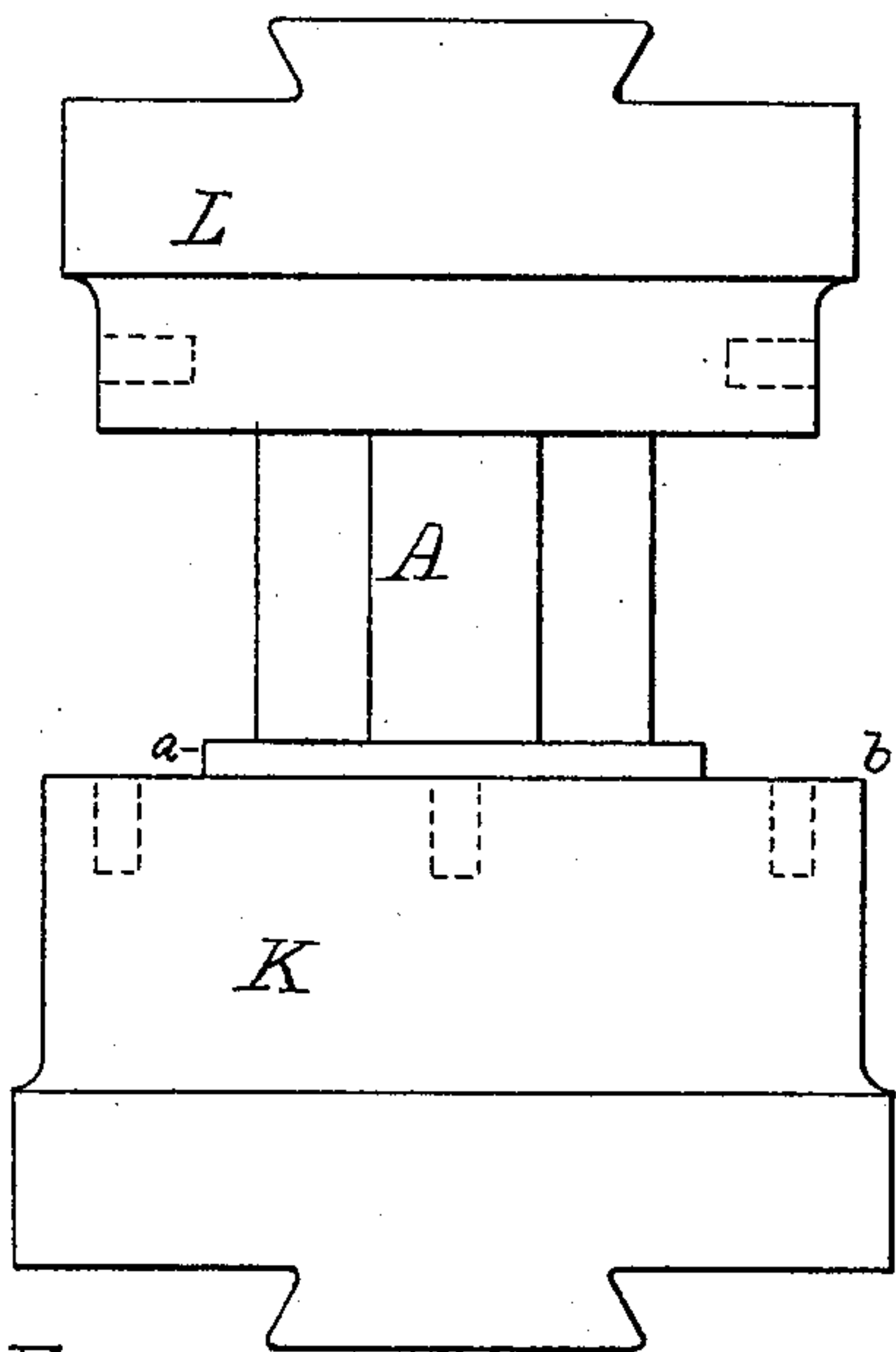


Fig. 1

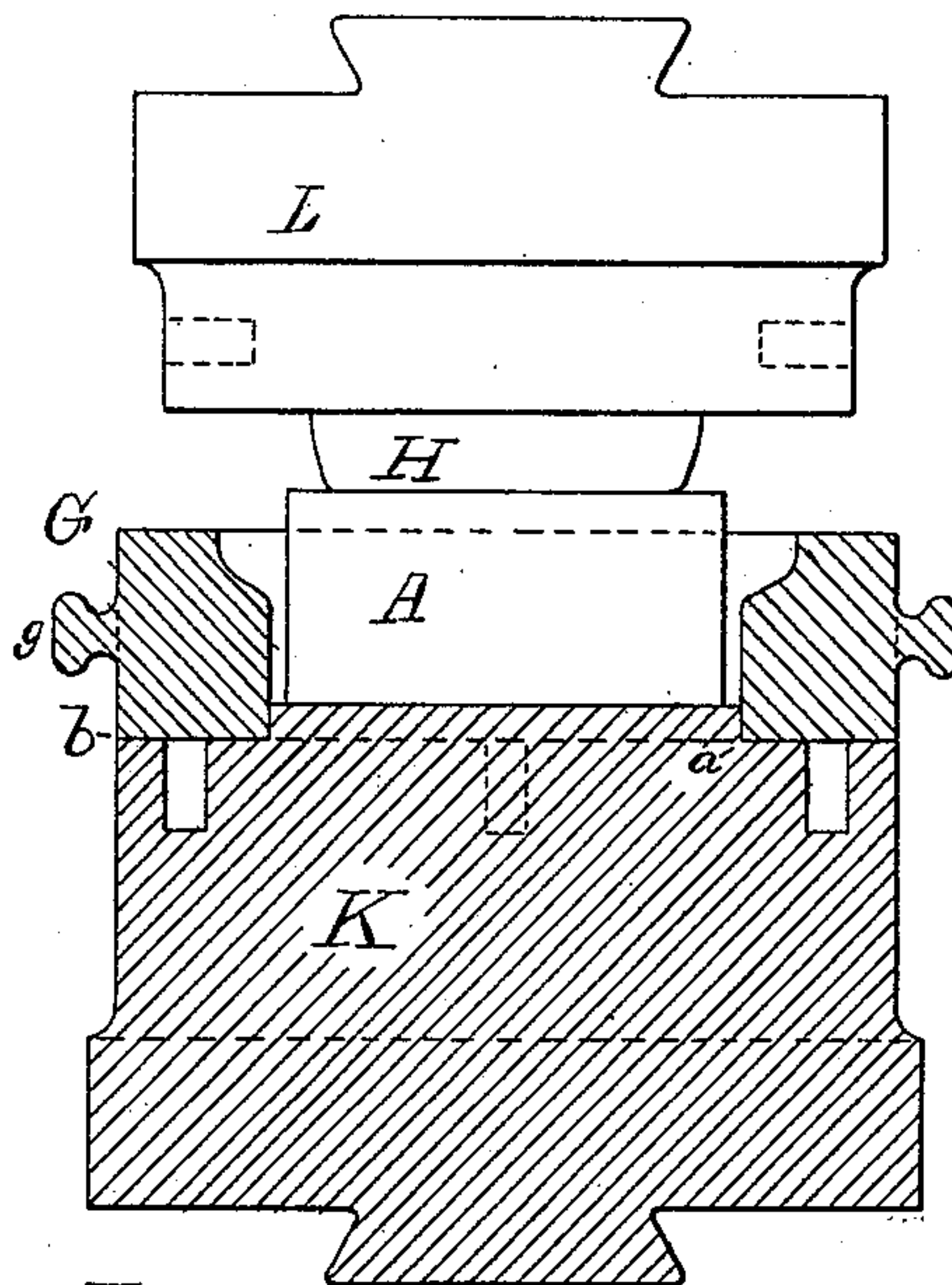


Fig. 2

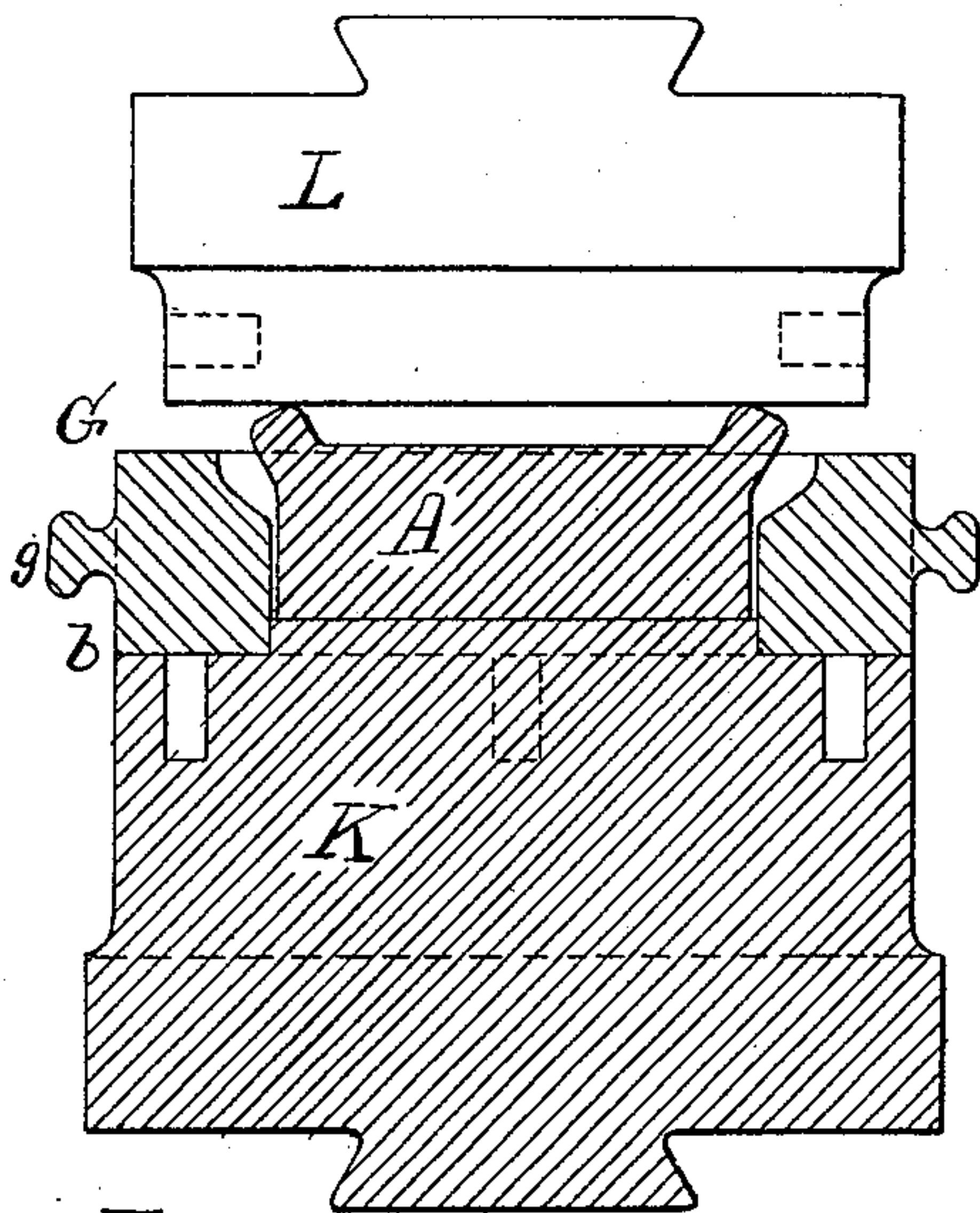


Fig. 3

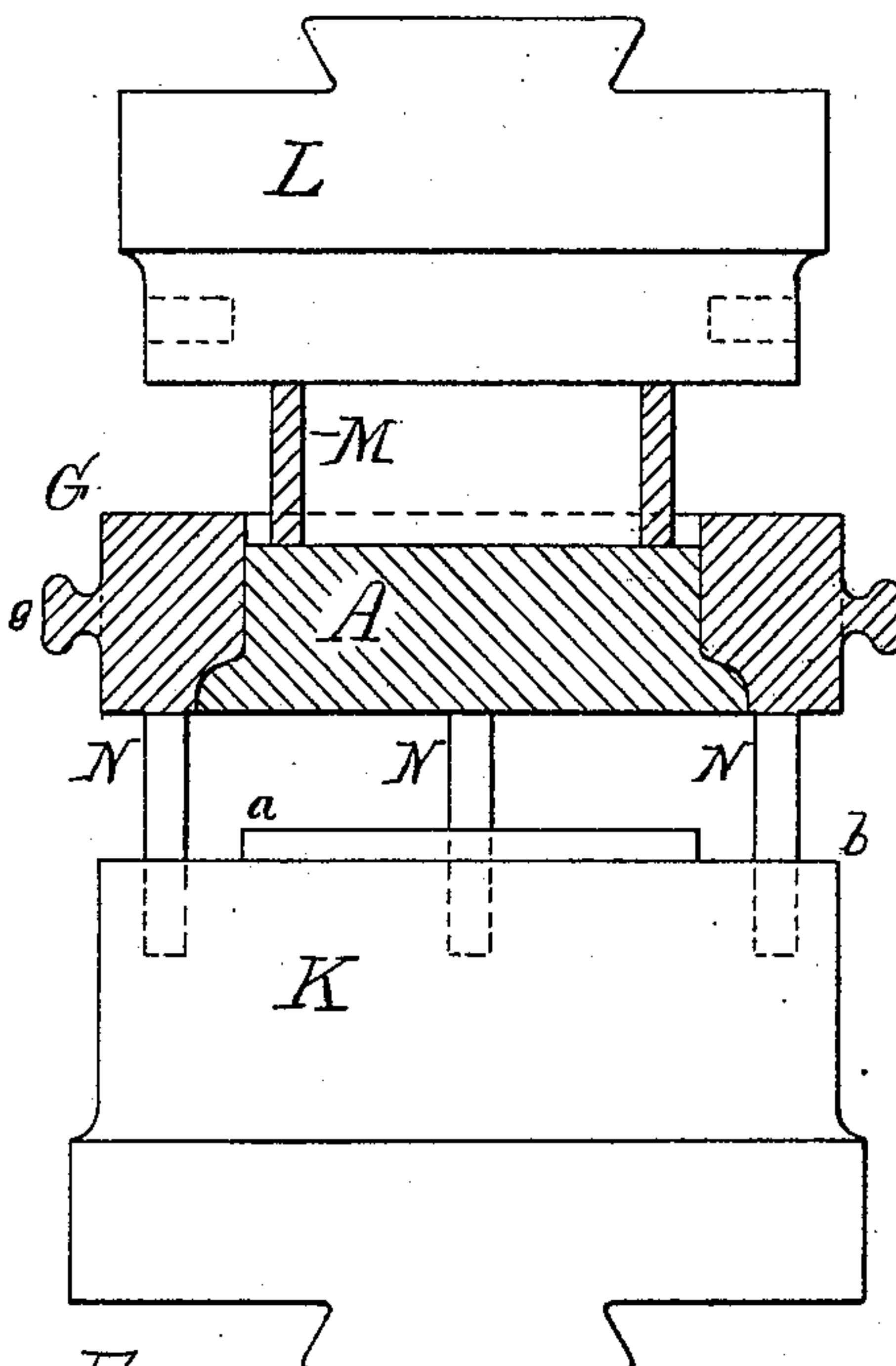


Fig. 4

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Attorney.



(No Model.)

2 Sheets—Sheet 2.

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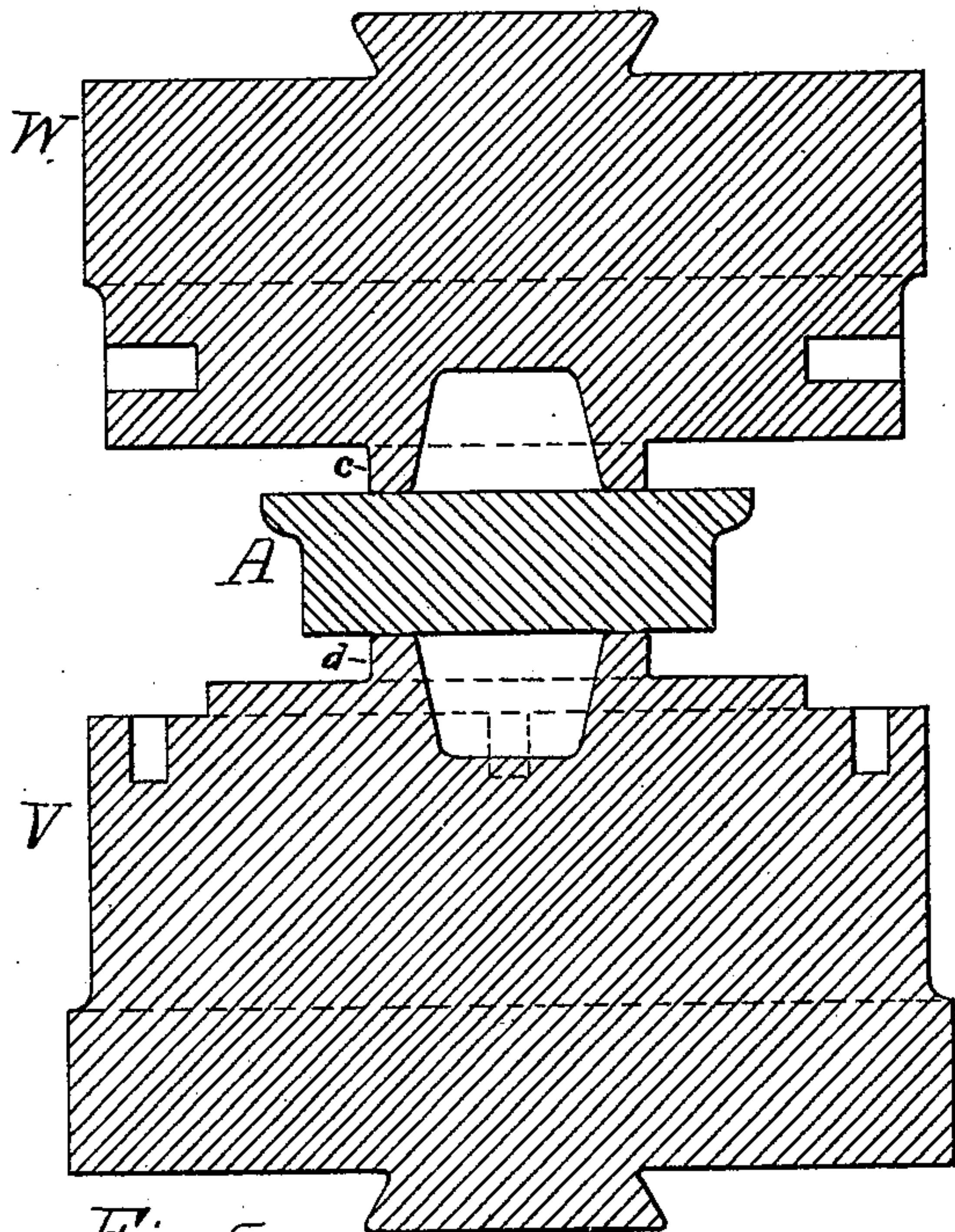


Fig. 5

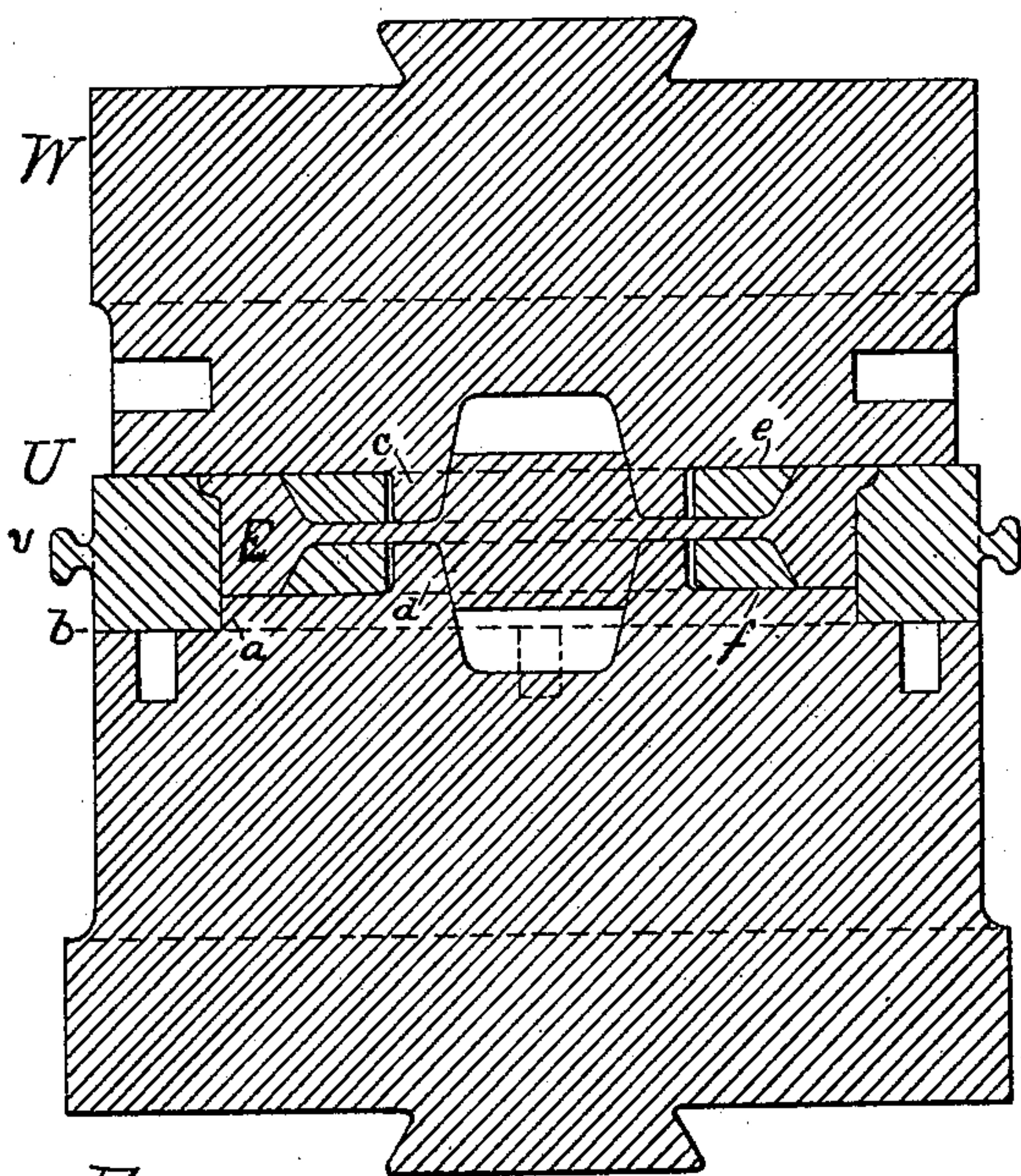


Fig. 6

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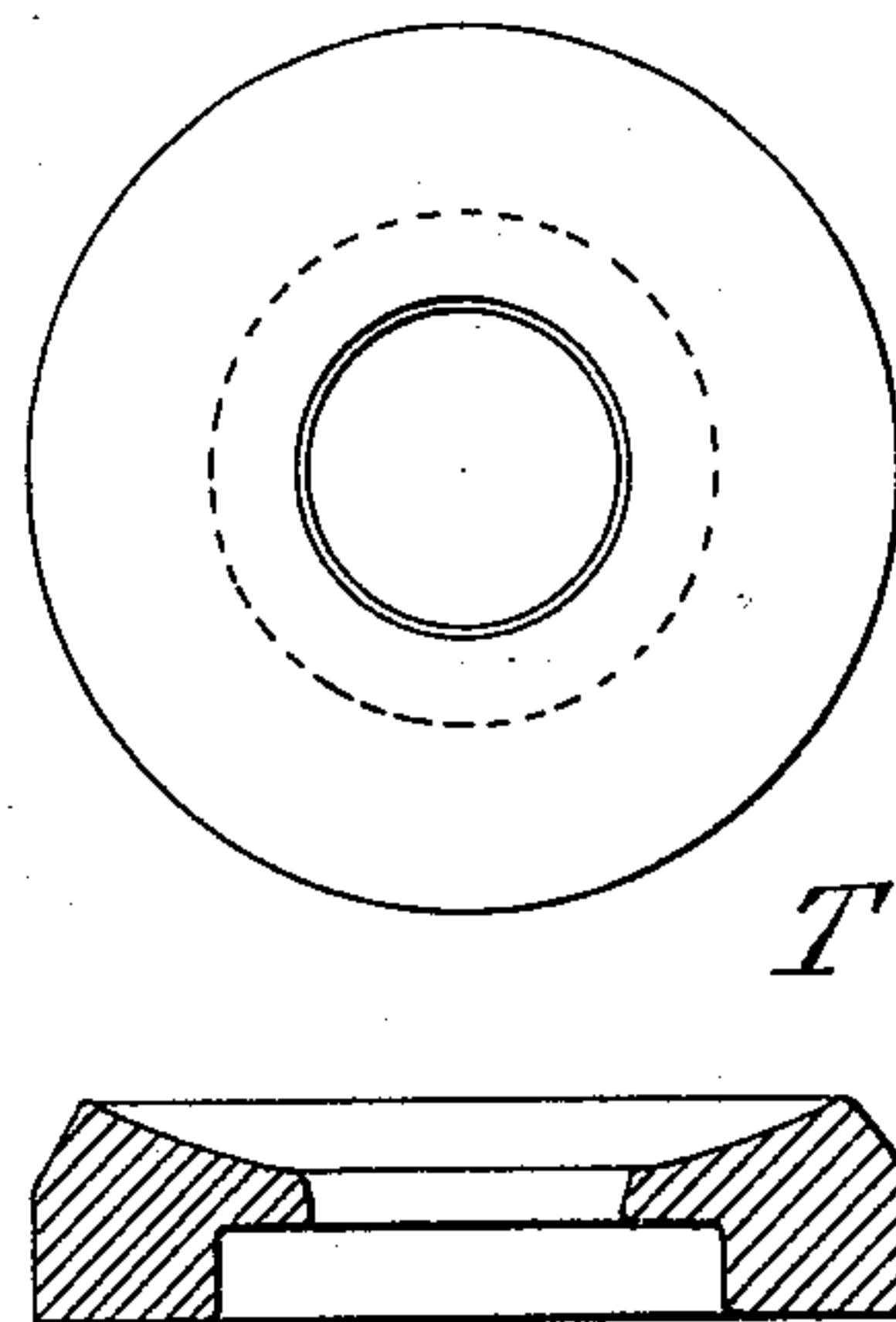
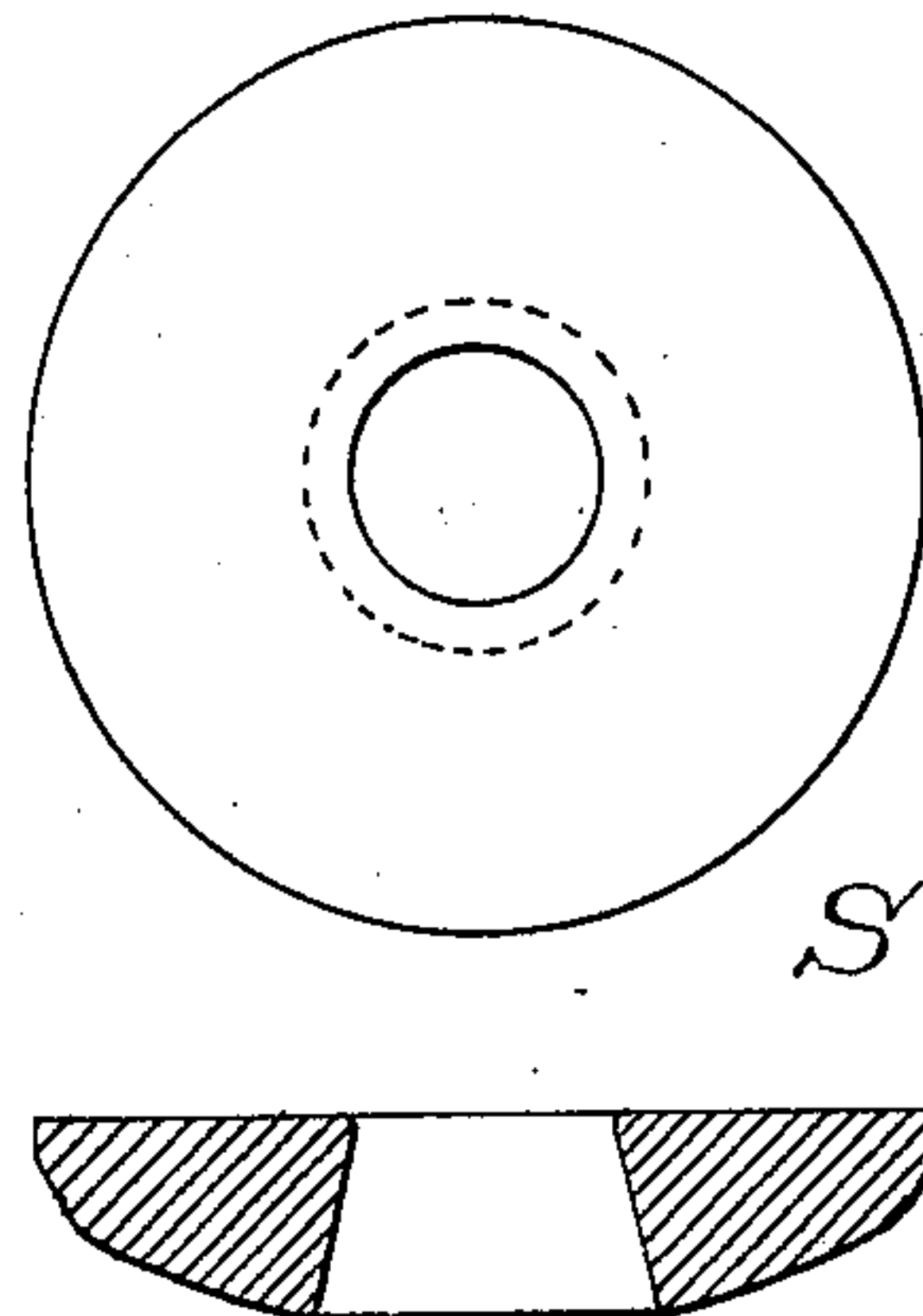


Fig. 7



# UNITED STATES PATENT OFFICE.

SAMUEL H. RALSTON, OF PERTH, CANADA.

## METHOD OF FORGING SOLID-METAL CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 587,401, dated August 3, 1897.

Application filed October 23, 1896. Serial No. 609,811. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL H. RALSTON, a citizen of the United States, formerly of Norristown, county of Montgomery, and State of Pennsylvania, now residing at Perth, Ontario, Canada, have invented certain new and useful Improvements in the Method of Forging Solid-Metal Car-Wheels; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the method of producing forged-metal wheels, which consists in taking an ingot of metal of suitable size and form, preferably round or octagonal, Figure 1<sup>A</sup>, and placing it with its axis perpendicular to the faces of plain flat dies and by vertical blows, which are all central with and normal to the center line, bringing it to a diameter slightly less than the diameter of the blank and of somewhat greater thickness, Fig. 2<sup>A</sup>. Then I place successively upon the upper flattened face of the blank one or more flat or convex forming plates or punches, (or I may use a forming die or dies suitably shaped,) which under the action of the hammer, Fig. 2, displaces sufficient metal and forms the rudimentary flange. This being done the lower die, with its centering-plug and shoulder, is changed into a forming-die by placing upon the shoulder a wall-ring G, (which has trunnions to assist in lifting it.) This wall-ring G is bored to the form which the tread and flange is to take. The ring fits closely to the centering-plug, but is free enough to be readily lifted off and replaced. Into this forming-die the blank with its rudimentary flange is placed, Fig. 3, and the upper die being lowered the blank is driven home into the wall-ring G, so that when the onset of the dies is complete the flange is turned downward and outward. The flanged blank is then turned upside down, Fig. 4, and by blows or pressure is pressed out of the wall-ring G. Then it is placed between dies, Fig. 5, having raised collars on their working faces of similar section and size, surrounding and concentric with the hub-pocket. The lower die is so formed that besides the collars its top forms a centering-plug and shoulder for the wall-

ring. By the onset of the dies the metal

around the hub is displaced and forced radially outward into the rudimentary rim, leaving part of the plate between the collars. The rim and web are enlarged by means of loose plating rings or collars used in pairs between the dies and forging. Each pair of these rings is larger in diameter than the preceding pair, and a sufficient number must be driven to enlarge the forging to almost equal the diameter of the finished wheel. The forging is then removed and upon the shoulder of the lower die is placed a wall-ring U, which is so made that when in position it alters the die to a finishing-die. The upper die and the lower die with the wall-ring U and a final pair of loose collars form a matrix for the finished wheel, Fig. 6. The forging is then placed therein, resting upon one of the loose collars *f*, Fig. 6. The mate of this collar, *e*, Fig. 6, is then put in position on top of the forging. The upper die is lowered, driving the collar home, thus forming the finished wheel.

The wheel may have a straight plate, or it may be dished at pleasure by using collars of suitable shape.

In the operation the lower die has a hub-pocket and concentric with it a raised collar. The upper outer edge of the die is turned so as to form a concentric centering-plug and shoulder. The wall-ring has trunnions to secure easy removal. The shoulder has a number of bosses to contain holes for supports. The upper face of the wall-ring U is provided with several depressions extending across it from the flange-groove to the outside of the ring to form relief-ports for the escape of surplus metal. By this method the finished wheel can be produced by the use of one hammer with two heatings of the metal, but when two hammers are used only one heating of the metal is necessary.

My invention enables the formation of a finished wheel in a short time and with very few blows, which are all central with and normal to the center line, of a very much improved quality, inasmuch as the operation causes the metal to flow outward from the center or hub, thus conforming to the laws governing the flow of metals.

My whole invention of reducing, forming, plating, and finishing the wheel can be accomplished on one set of dies by the use on



the dies of several pairs of differently sized and shaped plating rings or collars.

While the foregoing description sets forth the use of steam-hammers, the same result  
5 can be produced by the use of a hydraulic press.

Referring to the drawings, like letters designate like parts.

Fig. 1 shows a pair of plain dies L K with  
10 the ingot A between them at commencement of operations.

Fig. 2 shows the dies L K, the forming or wall ring G with its trunnions *g*, the partially-forged ingot A, and the punch H.

15 Fig. 3 shows the dies L K, the ring G, and trunnions *g*, and the ingot A after the formation of the rudimentary flange.

Fig. 4 shows the dies L K, the ring G, the ingot A turned upside down (after the onset  
20 of the dies, as shown in Fig. 3) in position, supported by posts N N, preparatory to being removed from the ring G. M is a ring placed upon the ingot, by which the ingot A is removed by means of pressure from above. A  
25 punch may also be used to remove the ingot.

Fig. 5 shows dies W V, the flanged blank A, and the first plating rings or collars *c d*.

Fig. 6 shows dies W V, the wall-ring U, the finished wheel with straight plate or web E,  
30 and a pair of loose plating rings or collars *e f*.

Fig. 7 shows a pair of plates or collars S and T by means of which the plate or web of the wheel may be dished. The shape of the plate or web of the wheel may be varied at pleasure by varying the shape of the collars  
35 S and T.

I claim as my invention—

1. The method of producing car-wheels from suitable blooms, ingots, or billets, consisting essentially, first, in forging a rudimentary flange on a wheel-blank, and second, shaping and finishing, by forging the wheel-blank to flow radially outward from the hub to the tread and flange under an operative force, substantially as set forth.  
40 45

2. The method of producing car-wheels from suitable blooms, ingots, or billets, consisting essentially, first in forging a rudimentary flange on a wheel-blank, by means of blows or pressure at right angles to the  
50 side of the blank; and second, shaping and finishing by forging the wheel-blank causing the metal to flow radially outward from the hub to the tread and flange under an operative force.

SAMUEL H. RALSTON.

Witnesses:

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M. B. HOSSIE.