

(No Model.)

3 Sheets—Sheet 1.

L. D. HILL.

MACHINE FOR FORMING FAN TAIL AXLES.

No. 455,593.

Patented July 7, 1891.

Fig. 1.

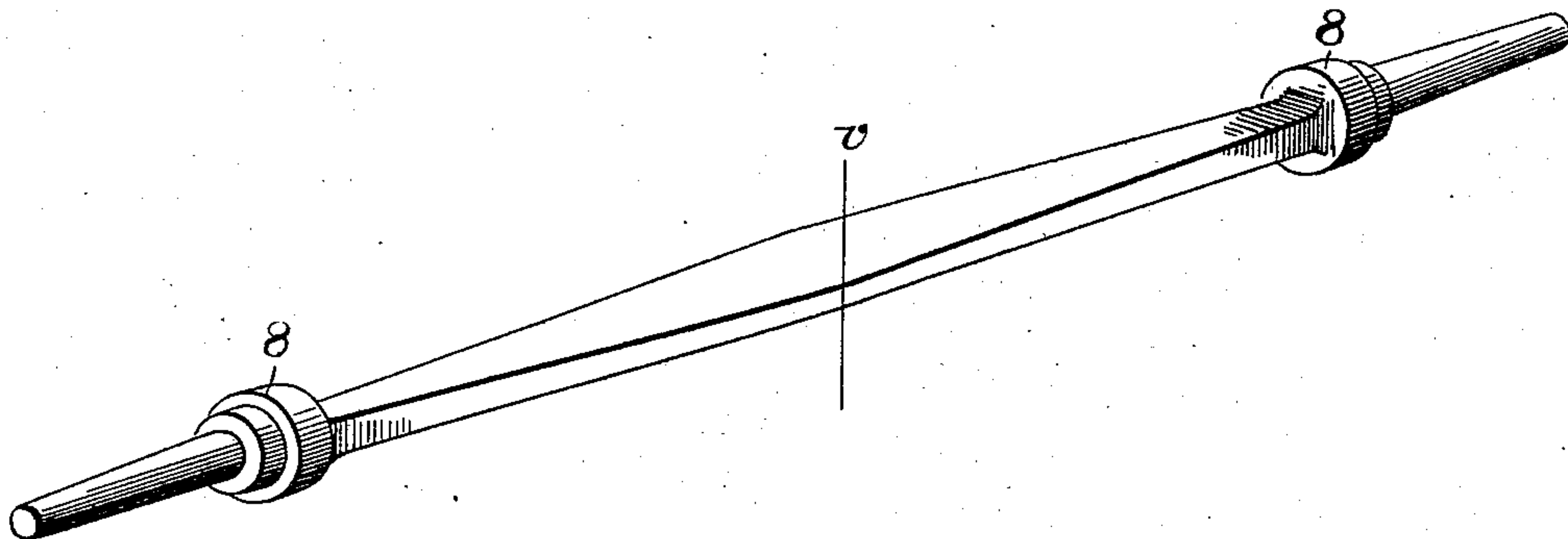
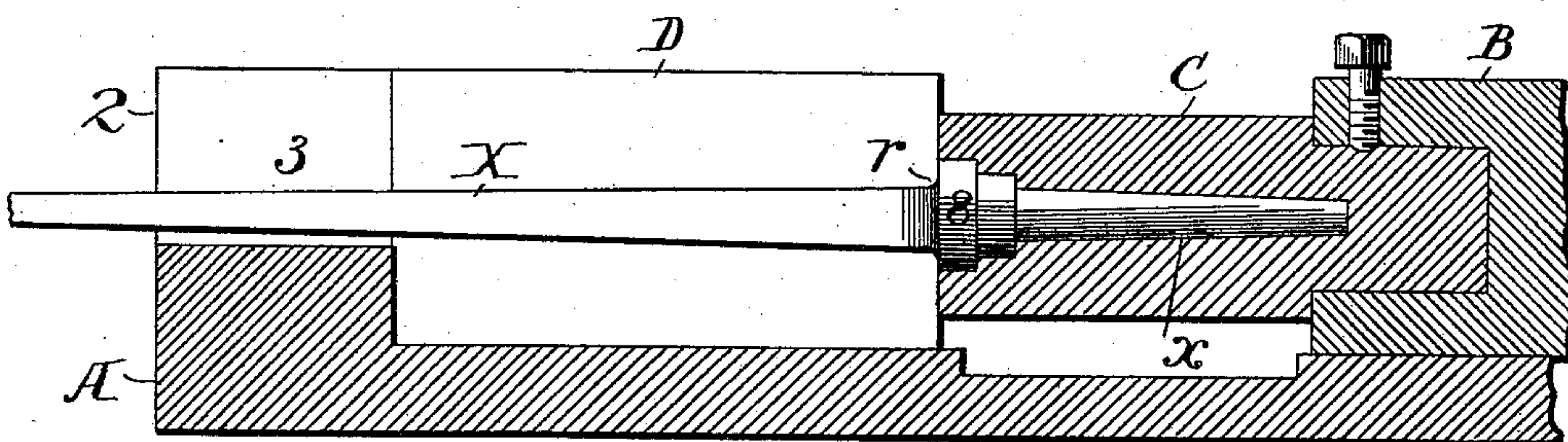


Fig. 2.



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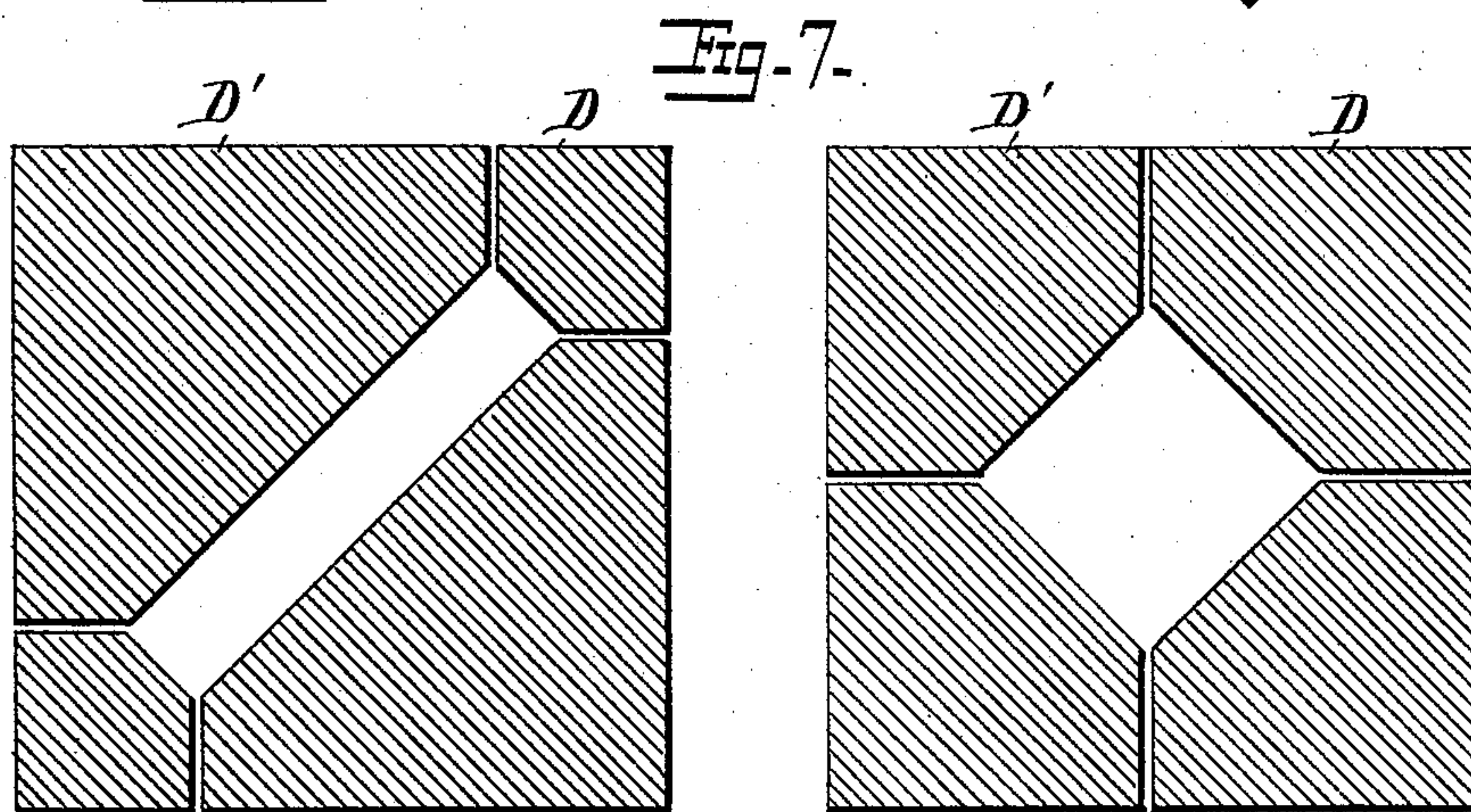
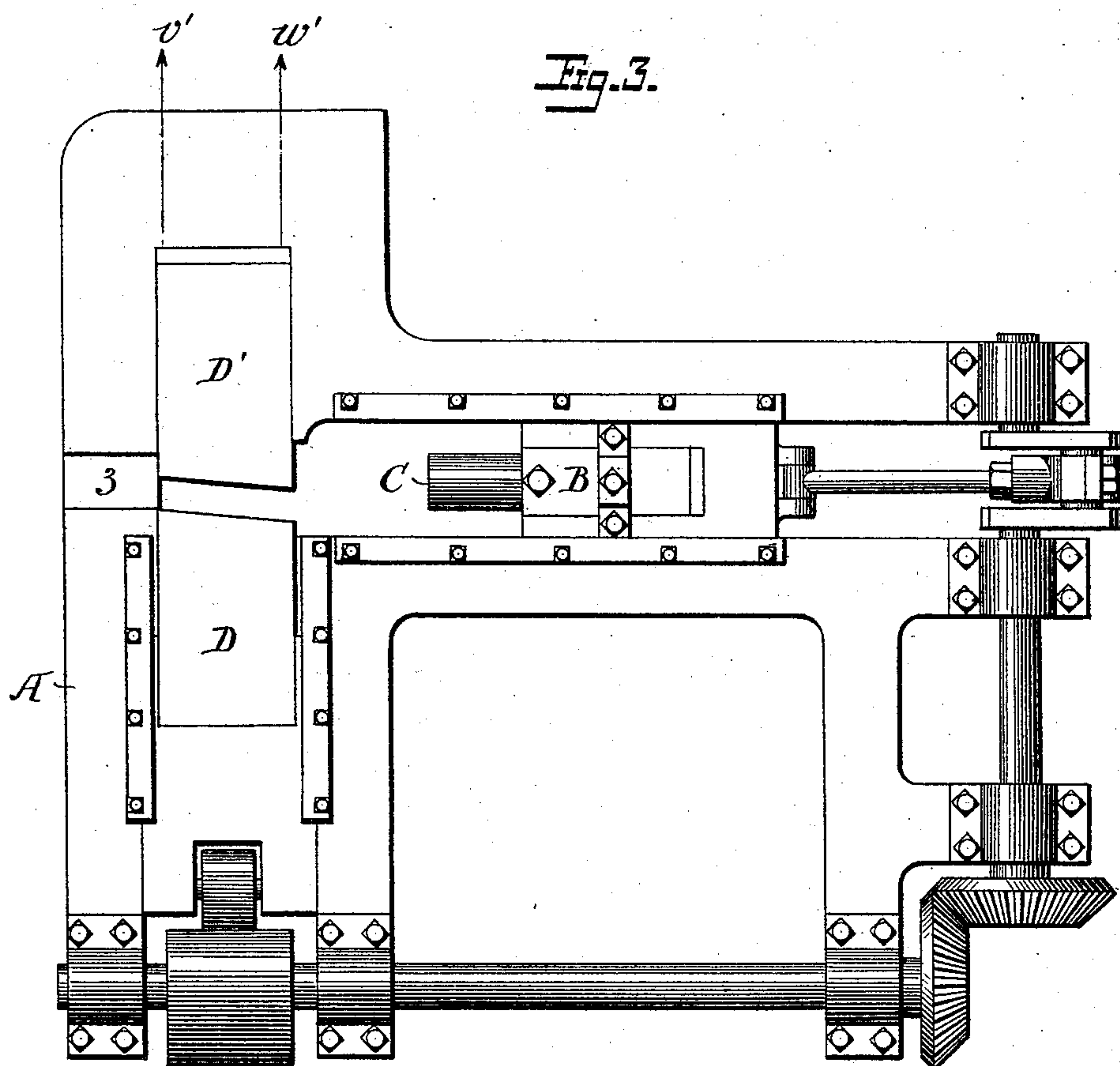
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3 Sheets—Sheet 3.

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Fig. 4.

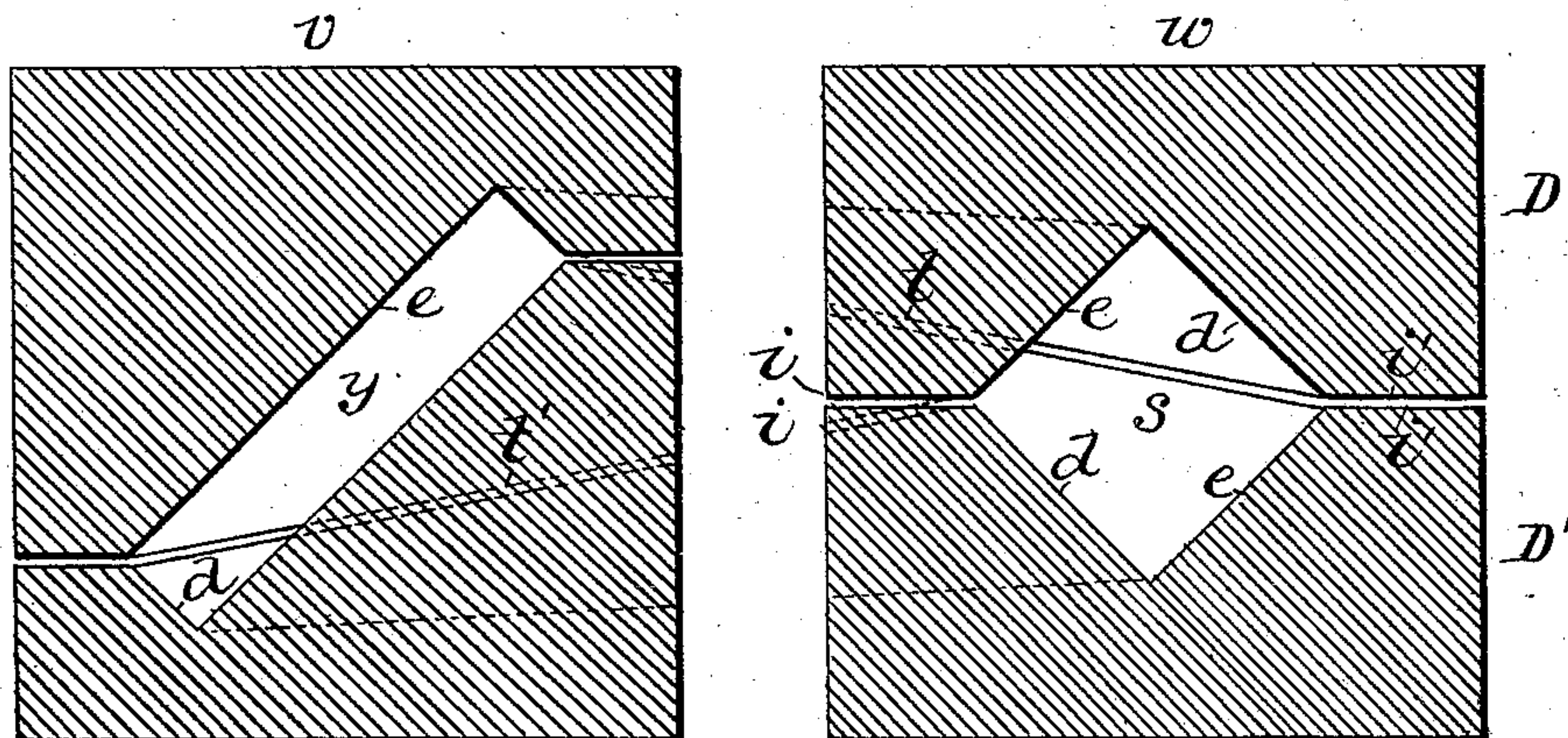


Fig. 5.

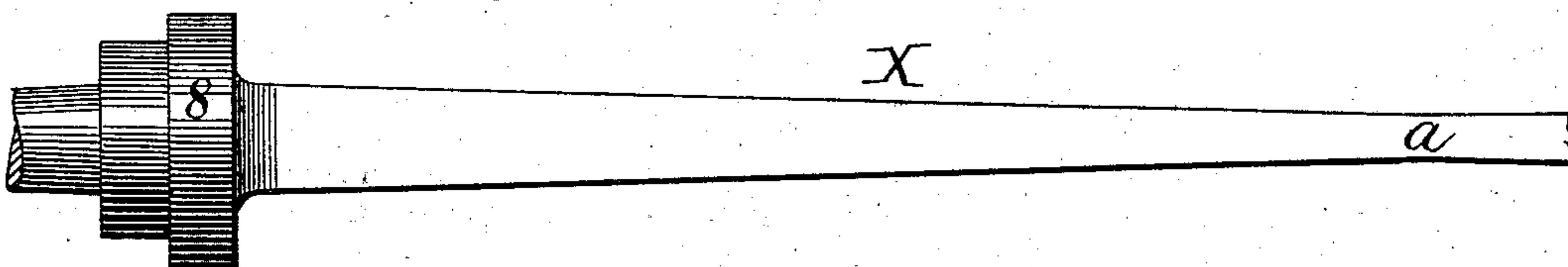
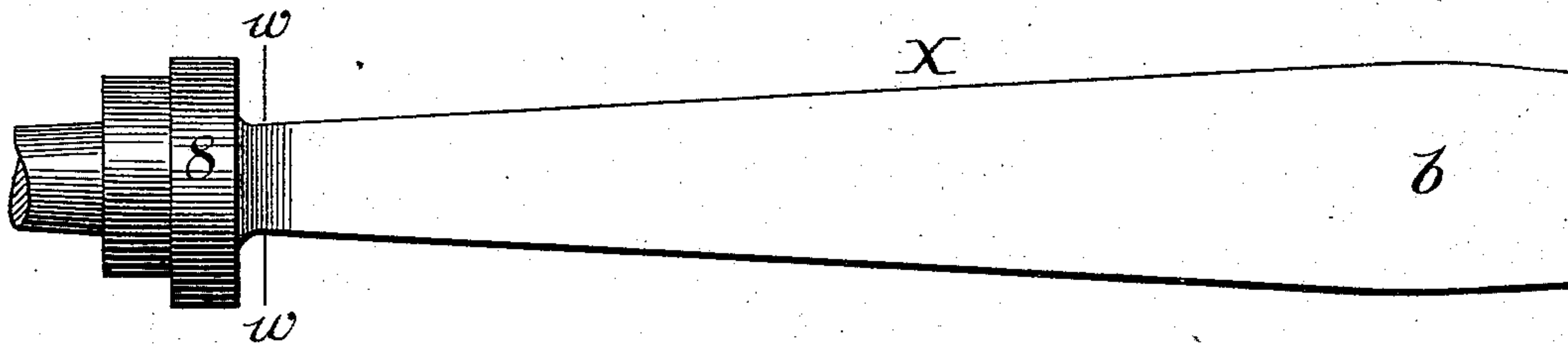


Fig. 6.



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# UNITED STATES PATENT OFFICE.

LEROY D. HILL, OF WILKES-BARRÉ, PENNSYLVANIA, ASSIGNOR TO THE  
SHELDON AXLE COMPANY, OF SAME PLACE.

## MACHINE FOR FORMING FAN-TAIL AXLES.

SPECIFICATION forming part of Letters Patent No. 455,593, dated July 7, 1891.

Application filed April 22, 1891. Serial No. 390,011. (No model.)

*To all whom it may concern:*

Be it known that I, LEROY D. HILL, a citizen of the United States, residing at Wilkes-Barré, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Forming Fan-Tail Axles, of which the following is a specification.

In the manufacture of that class of axles in which the collars are formed integral with the body by compressing or upsetting the bar it is common to grip the bar back of the point where the collar is to be formed and then apply a socketed die to the outer end and force the same against such end with heavy pressure, the opposite end of the bar being against an immovable bearing. When the bar is of uniform shape in cross-section, as round or square, there is no difficulty in gripping the same; but when a "fan-tail" axle is to be made—that is, one which the body decreases in thickness but increases in width toward the center—the usual appliances for holding the bar cannot be employed, and so far as I am aware no attempt has been made to support this class of axle-blanks for the purpose of forming the collars integral therewith by upsetting.

The object of my invention is to secure the proper support for this class of blanks and to hold the same in position without the necessity of employing end bearings, and to this end I make use of the appliances set forth hereinafter, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view illustrating the form of an ordinary fan-tail axle. Fig. 2 is a longitudinal section showing the machine for operating upon a fan-tail blank and provided with my improvements. Fig. 3 is a plan of the machine shown in Fig. 2. Fig. 4 is a diagrammatic view illustrating the peculiar form of the clamping-jaws; Fig. 5, a view of part of the blank, looking from the side; Fig. 6, a plan of the part shown in Fig. 5; Fig. 7, a view showing opposite ends of the gripping-jaws when divided into two sections each.

A represents part of the frame of the machine in which reciprocates a plunger B, carrying the upsetting-die C, and having a socket

$x$ , adapted to the journal end of the bar and to form the face of the outer portion of the collar H of the axle-blank.

D D' are the clamping-jaws, one of which D' may be fixed, while the opposite jaw D is supported in guides to move laterally to permit the axle-blank X to be inserted in and withdrawn from between the jaws, but each jaw has a bearing against an abutment 2 of the frame, which has an opening 3 for the passage of the blank.

The blank X (see Figs. 1 and 5) is generally square in cross-section upon the line  $w$ , adjacent to the collar, and decreases in thickness, as at  $a$ , Fig. 5, and increases in width, as at  $b$ , Fig. 6, toward the center  $v$ , Fig. 1. Owing to this irregularity in the form of the body portion of the bar the sectional area at the center  $v$  is an oblong, narrower and wider than the square section at  $w$ , and it is difficult to hold the bar under the pressure to which it must be subjected during the action of the upsetting-die section C, and at the same time secure the proper form of the rear face of the collar 8.

In order to secure the desired result, I construct each of the clamping-dies D D' with a recess  $s$ , the two sides  $d e$  of which, at the end of the die that is nearest the collar 8, are of about equal length and at right angles, as shown in Fig. 4, so that when the two dies D D' are together the opening between them on the plane  $w$ , Fig. 3, will be square; but the recess  $s$  in each die becomes gradually shallower upon the side  $d$ , Fig. 4, and gradually wider upon the side  $e$  of each die, so that the opening between the dies upon the plane  $f f$ , Fig. 3, is an oblong, as indicated at  $y$ , Fig. 4, the shaded lines or portions  $w$  and  $v$ , Fig. 4, indicating the cross-sectional forms of the dies upon the planes  $w' v'$ , Fig. 3, whereby the dies are adapted to clasp firmly the blank of the contracting thickness toward  $a$  and contracting width toward  $d$ , Figs. 5 and 6. It will be seen on reference to the shaded portion  $w$ , Fig. 4, that while the contiguous faces  $i i'$  of the dies at this portion correspond very nearly to one horizontal plane the face  $i'$  of the die D', adjacent to the side  $e$ , rises toward the opposite end on the line  $t$ , while the face  $i$  of the die D', adjacent to the side



$d$ , descends toward the opposite end, as indicated by the line  $t'$ , the corresponding faces of the die  $D$  being parallel to the faces  $i-i'$  of the die  $D'$ , and it will be seen in Fig. 1 that the edges of the dies  $D D'$  are recessed at  $r$ , so as to properly shape the inner face of the collar 8.

When the bar is to be upset, the dies  $D D'$  are separated, and the plunger  $B$  is drawn away from the die, the bar is put in its position between the dies, and the latter are brought together, as shown in Fig. 2, and the plunger  $B$  is then carried to the position shown in Figs. 2 and 3, upsetting the bar and forming the collar.

It will be seen that the clamp-dies above described take secure hold upon the irregular bar or blank without wounding the same, and that inasmuch as said bar or blank is tapering in one direction, as shown in Fig. 2, and said jaws have their bearing against the fixed abutment 2 the bar cannot be forced back between their bearing-faces by the action of the upsetting-die, and the said bar is therefore firmly held in position without the necessity of a bearing for the opposite free end.

Although I have referred to the jaws  $D D'$  as being made each of one piece, each jaw may be in two sections, as illustrated in Fig. 7, showing the opposite ends of the jaws thus divided.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim—

1. A machine for making fan-tail axles, provided with gripping-jaws, each having a groove or recess  $s$ , one face  $d$  of which contracts in width from one end toward the other, while the other  $e$  increases in width, the said faces being at right angles to each other, substantially as set forth.

2. The combination, with the upsetting-die of a machine for forming collars upon axles, of gripping-dies having faces arranged to form together a recess that is square at the end adjacent to the upsetting-die and oblong at the opposite end, substantially as described.

3. The combination of the upsetting-die, gripping-dies  $D D'$ , each having a recess with two faces, one contracting and the other expanding in width, and an abutment 2, having a recess 3, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEROY D. HILL.

Witnesses:

CHARLES E. FOSTER,  
GEORGIA P. KRAMER.