

(No Model.)

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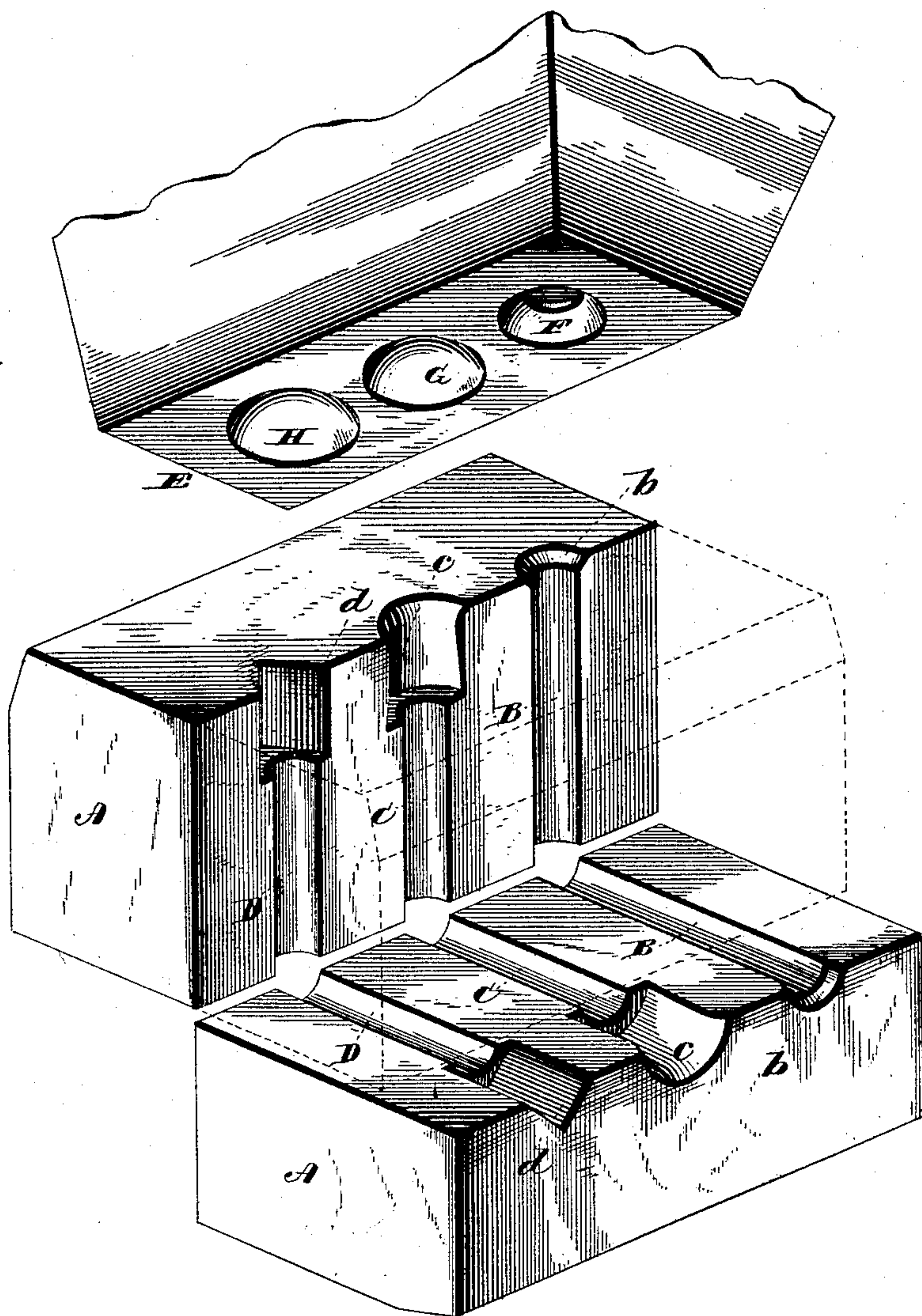
C. W. ROOT.

DIES FOR FORMING CARRIAGE BOLTS.

No. 327,454.

Patented Sept. 29, 1885.

*Fig. 1.*



*Witnesses:*  
*Chas. Williamson.*  
*Henry C. Hazard.*

*Inventor*  
*Chas. W. Root, by*  
*Crindle & Russell, his Attys.*

(No Model.)

2 Sheets—Sheet 2.

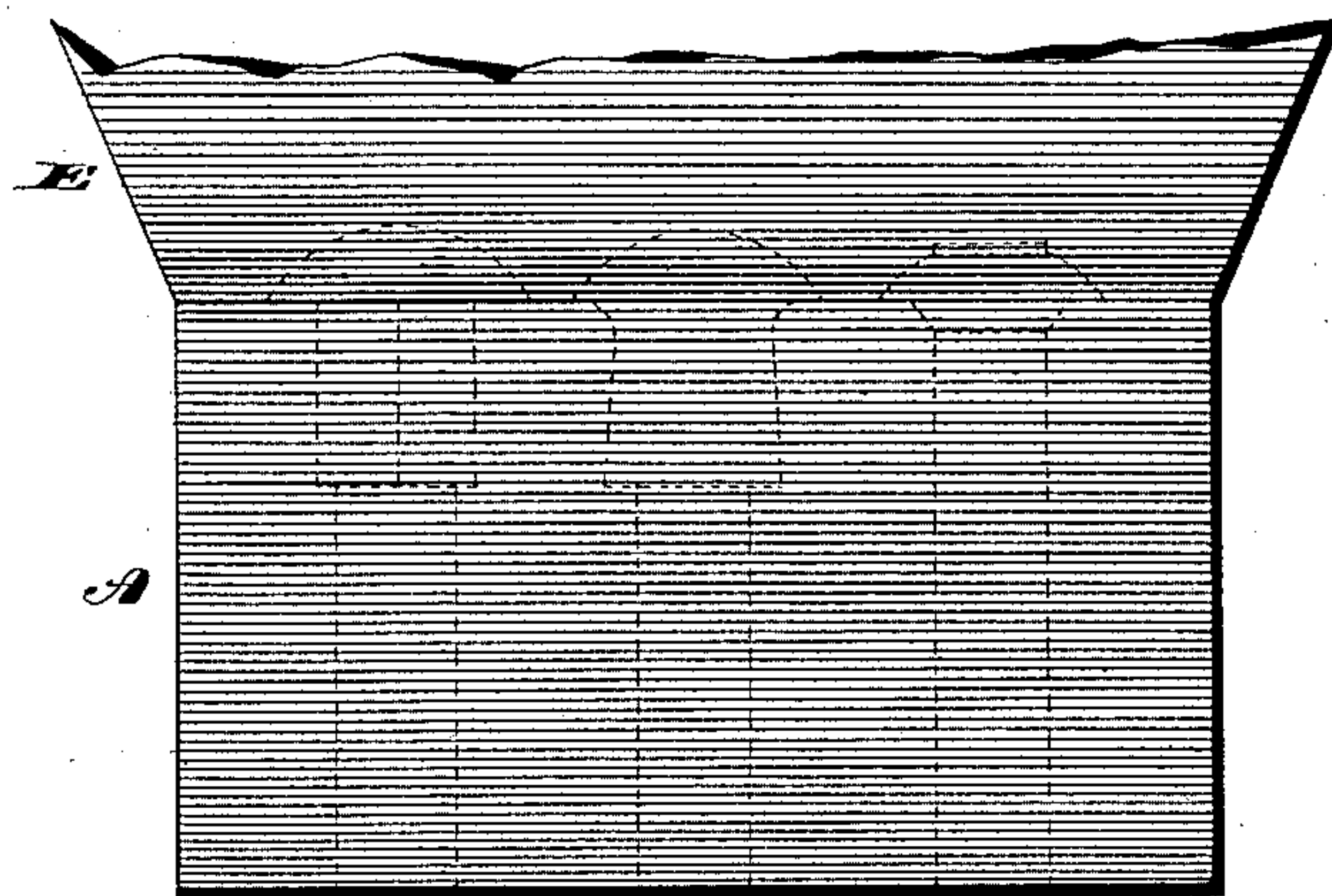
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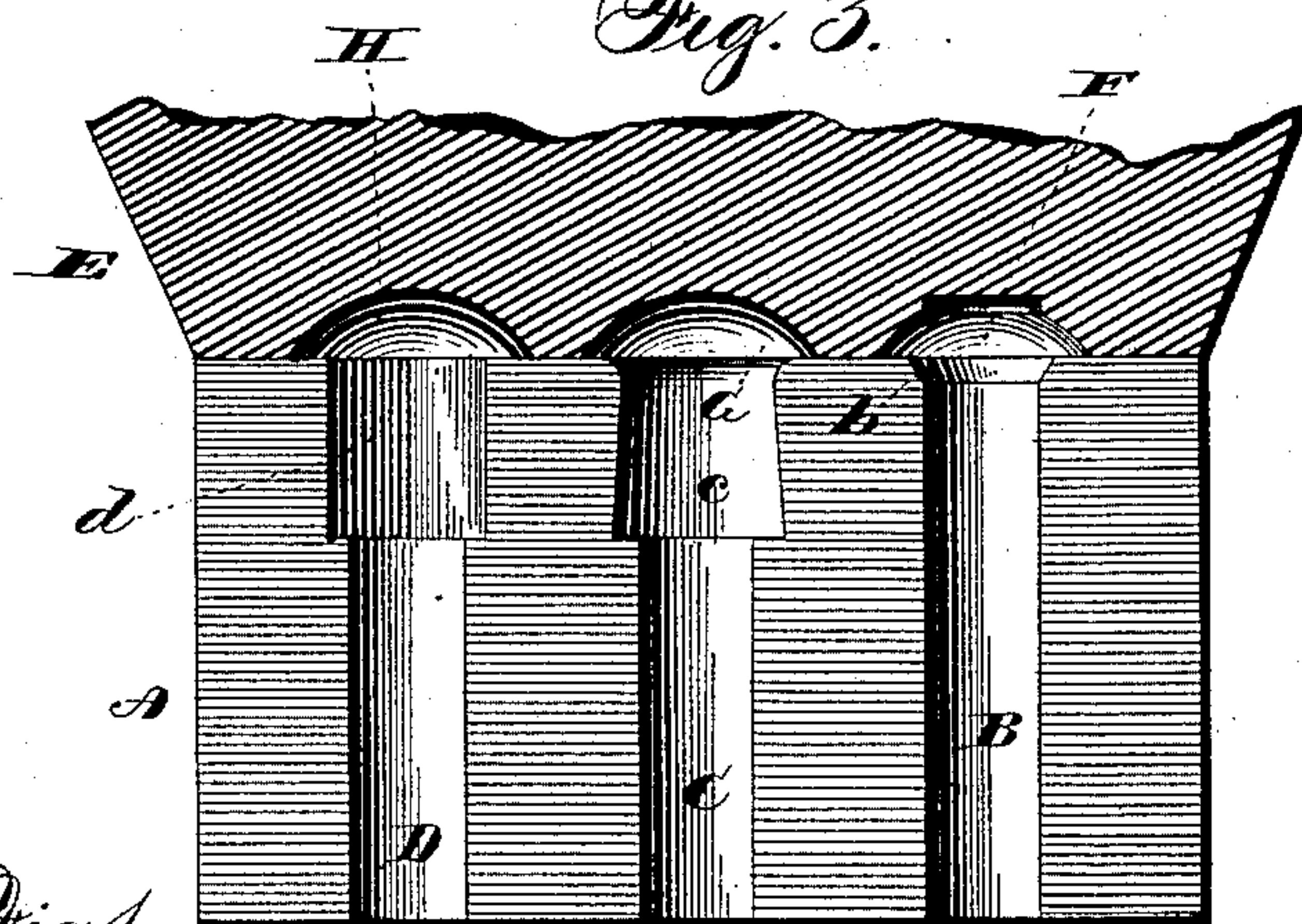
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*Fig. 2.*



*Fig. 3.*



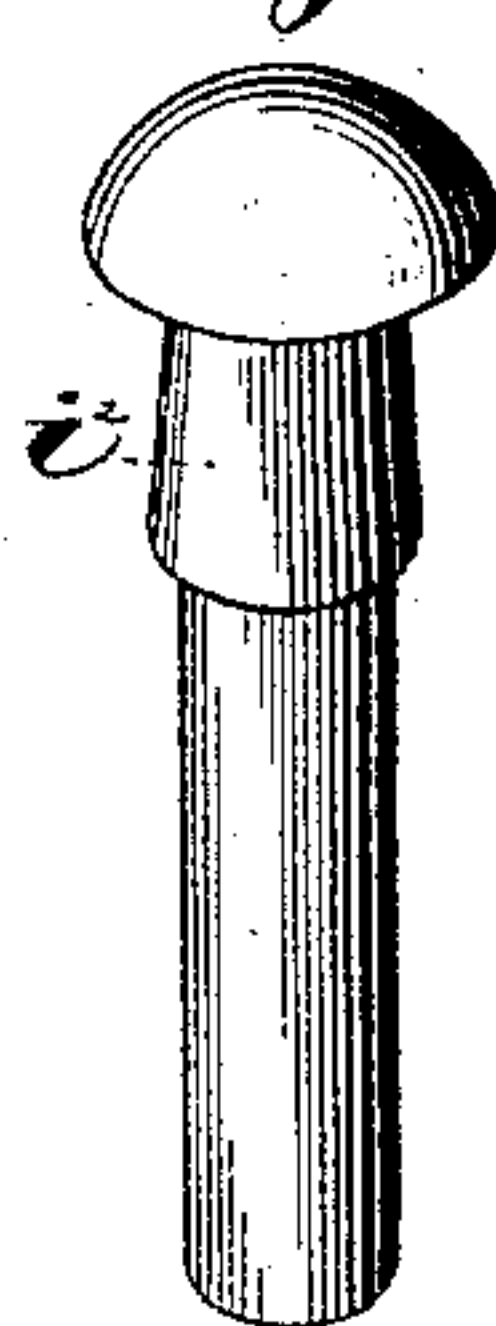
*Fig. 4.*



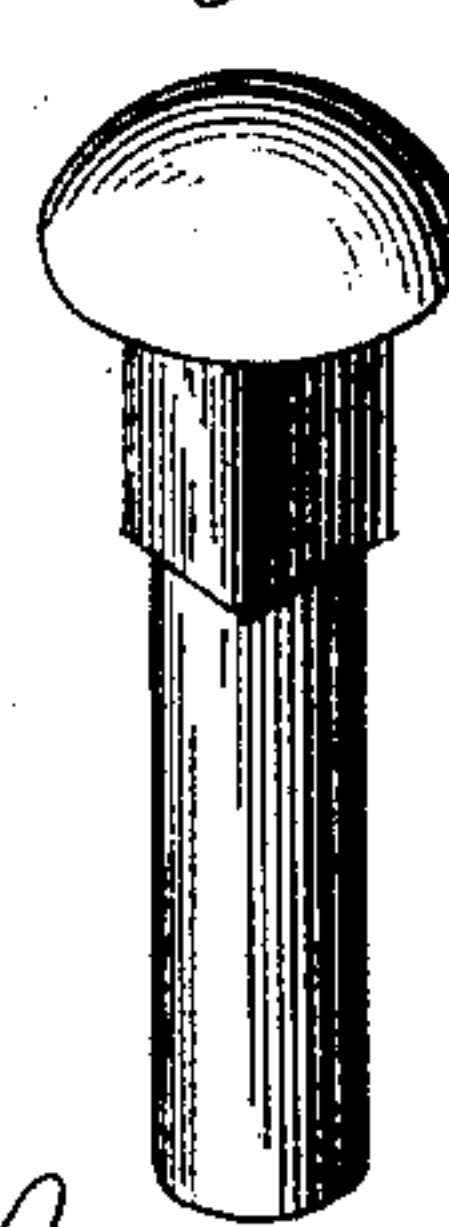
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



Witnesses:  
Chas. J. Williamson.  
Henry C. Hazard.

Inventor  
Chas. W. Root, by  
Prindle & Russell, his Attys



# UNITED STATES PATENT OFFICE.

CHARLES W. ROOT, OF SOUTHTON, ASSIGNOR TO HIMSELF, AND M. N. WOODRUFF, OF PLANTSVILLE, CONNECTICUT.

## DIE FOR FORMING CARRIAGE-BOLTS.

SPECIFICATION forming part of Letters Patent No. 327,454, dated September 29, 1885.

Application filed May 9, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. ROOT, of Southington, in the county of Hartford, and in the State of Connecticut, have invented certain new and useful Improvements in Dies for Forming Carriage-Bolts; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my dies and plunger separated from each other. Fig. 2 is a side elevation of the same closed together. Fig. 3 is a side elevation of one of the clamping-dies and a vertical central section of the plunger as closed together. Fig. 4 is a perspective view of the blank used; and Figs. 5, 6, and 7 are respectively like views of the same after having been operated by the successive pairs of dies.

Letters of like name and kind refer to like parts in each of the figures.

My invention relates to the forging of carriage-bolts by means of dies operated by any usual form of bolt-heading machine, a drop-press, or other like mechanism; and it consists in the dies used for heading and squaring the bolt, substantially as and for the purpose hereinafter specified.

In carrying my invention into effect I employ two die-blocks, A and A, which have a general rectangular form, and are arranged within a suitable support, so that one of said dies shall be stationary and the other die adapted to be moved against or from the same, their operation in such respect being similar to that of ordinary clamping-dies.

Within the contiguous faces of the dies A and A, near one end, are provided two coinciding half-round transverse grooves, B, which together have a diameter somewhat less than the diameter of the iron to be operated upon, so that when such iron is placed between said dies within said grooves and said dies closed together said iron will be firmly clamped between the same. The upper or outer ends, b, of said grooves B are rounded or chamfered outward, as shown.

Adjacent to and parallel with each groove B is a second groove, C, which from its lower or inner end to a point about three-fourths of an inch from its opposite end is half-round,

while within the limits last named said groove is enlarged, and such enlargement c, which is also half-round, made somewhat larger at its inner end. The outer or upper end of said groove is chamfered or rounded outward, as in case of said groove B.

A third groove, D, is formed within each die-block A, adjacent to and parallel with the groove C, and corresponds in shape to the same, except that at its upper end is an enlargement, d, which is one-half of a square, and has equal dimensions from its inner to its outer end.

With the die-blocks A and A, I use a plunger, E, which is arranged to impinge upon the upper or outer faces of the former, and is provided within its impinging-face with three circular concave recesses, F, G, and H, that correspond in shape to the head of the bolt to be made, and coincide with the grooves B, C, and D, respectively, when said block E is caused to impinge upon said blocks A and A.

In the use of the dies described a blank, I, preferably heated, is placed within the die-grooves B, and the blocks A closed together and caused to closely clamp the same, after which the plunger E is caused to impinge upon the projecting end of said blank and upset the same within the recess or die F, such operation producing a head, i, and a fillet, i', within, between the lower side of the same and the body of said blank, as shown in Fig. 5. The blank is now placed within the grooves C and clamped, as before, after which the plunger E is caused to impinge upon the projecting end, and by upsetting the same below the head i force the metal into the enlargement c, the result being shown by Fig. 6, in which said blank is seen to have below its said head a cylindrical enlargement, i<sup>2</sup>, that is somewhat larger in diameter at its lower end than adjacent to said head. The blank I, in the condition shown in Fig. 6, is placed within the grooves D and clamped therein, as before, after which, by the impingement of the plunger E, the head i is enlarged and caused to fill the recess H, and the enlargement i<sup>2</sup> below said head is caused to fill the square recess d, and to assume the shape of the same, the result being the completed bolt shown in Fig. 7.

The recesses F, G, and H have regularly-increasing dimensions, so that the head i of the

bolt I is formed by three operations, instead of one, and is solid, while the fillet *i'* beneath said head prevents any cold shut or flaw at such point, and causes the finished bolt to be  
5 solid and perfect when bolts of this class are usually defective. In consequence of the enlargement *i''* of the blank by the second pair of dies, and of the greater diameter of the lower end of such enlargement, the squared part *i''* of  
10 the finished bolt has sharp and perfect corners along its entire length.

While for convenience I construct the dies described within two die-blocks and a plunger, it will be obvious that they may be constructed  
15 separately and used in separate machines or at different times within the same machine.

Having thus fully set forth the nature and merits of my invention, what I claim is—

As a means for forming carriage-bolts, the clamping-dies A and A, provided with the 20 coinciding recesses B b C c D d, in combination with the plunger E, having the recesses F, G, and H, substantially as and for the purpose shown and described.

In testimony that I claim the foregoing I 25 have hereunto set my hand this 28th day of April, 1885.

CHARLES W. ROOT.

Witnesses:

MARCUS H. HOLCOMB,  
SHERMAN F. GUERNSEY.