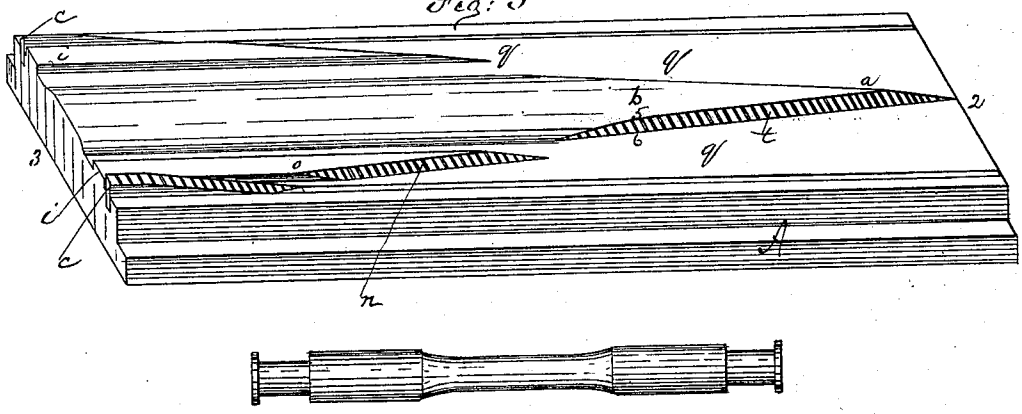
(No Model.) 2 Sheets—Sheet 2.

G. F. SIMONDS.

DIE FOR FORGING METAL ARTICLES CIRCULAR IN CROSS SECTION.

No. 319,754. Patented June 9, 1885.

Fig. 5



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(No Model.)

2 Sheets--Sheet 1.

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DIE FOR FORGING METAL ARTICLES CIRCULAR IN CROSS SECTION.

No. 319,754. Patented June 9, 1885.

Fig. 1.

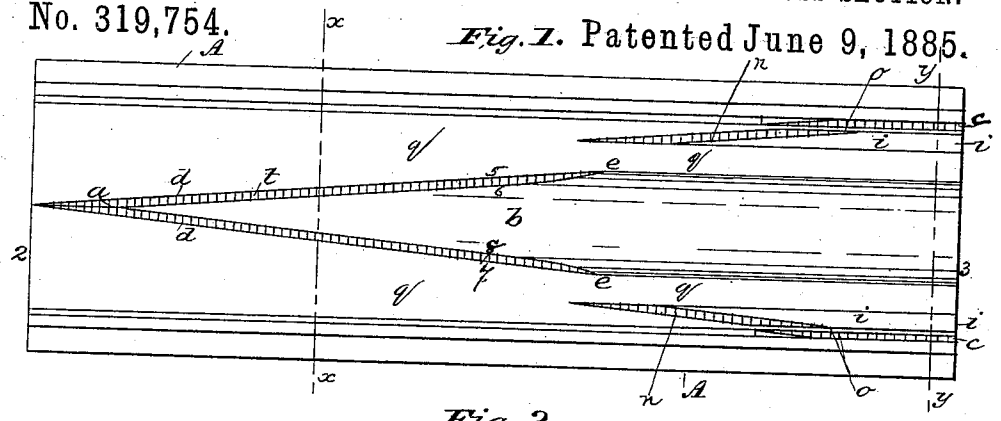


Fig. 2.

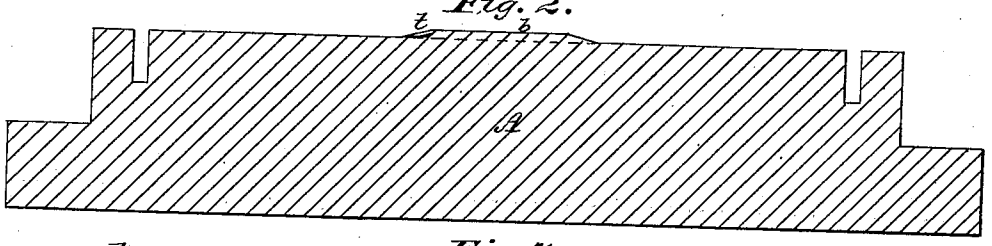


Fig. 3.

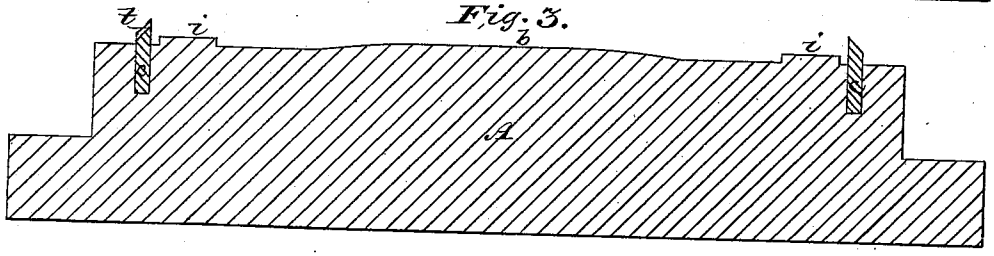
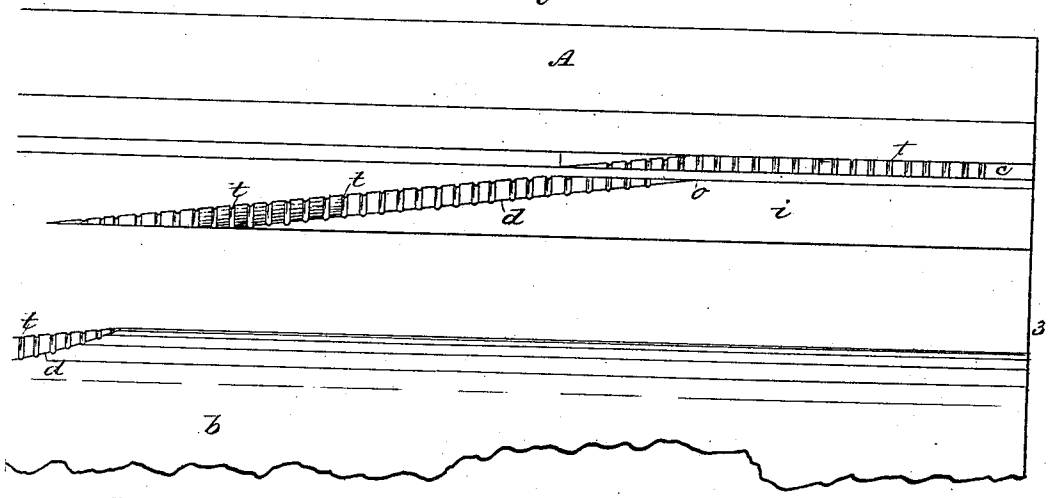


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE F. SIMONDS, OF FITCHBURG, MASSACHUSETTS.

DIE FOR FORGING METAL ARTICLES CIRCULAR IN CROSS-SECTION.

SPECIFICATION forming part of Letters Patent No. 319,754, dated June 9, 1885.

Application filed June 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. SIMONDS, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented certain Improvements in Faces for Car-Axle Dies Designed to be Used in Pairs; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a plan view of the die-face on a platen, showing my improvements. Fig. 2 is a vertical section on the line *x x* of Fig. 1. Fig. 3 is a vertical section on line *y y* of Fig. 1. Fig. 4 is an enlarged broken plan showing a portion of the forming-face where the operation of forming or shaping is completed. Fig. 5 is a perspective view of Fig. 1.

My invention relates to die-faces which are moved in opposite directions over the metal to be shaped, the blank rotating on its axis between them.

My invention consists in dies designed to be used in pairs, and provided with forming-surfaces raised upon the plane face of the die, and with reducing and spreading surfaces running diagonal to the line of movement of the die, and standing oblique to the plane of the die.

My invention further consists in providing the reducing and spreading surfaces above mentioned, when necessary, with corrugations or irregularities, to engage the metal and insure the rotation of the work.

In order that those skilled in the art may make and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A is the body of the platen, which, for purposes of illustration in this instance, I have shown as made for rolling railroad-car axles.

The dies have plane faces *q*, which lie parallel to each other when in position for work, and from these plane faces rise the forming and reducing and spreading surfaces, the planes *q* serving to support and steady the work and prevent it from rocking on the diverging forming and reducing and spreading surfaces. The reducing-faces commence to work on the metal at the end 2, and finish their work at the end 3. When the heated bar, ingot, or fagot is placed between the dies, the central reduction of the axle is commenced by the narrow end *a* of the tapering raised portion *b* of the die-face. The edges of the raised portion are beveled obliquely, with the plane surface *q* of the die toward the end *a*, where the lines merge, or substantially so. The approximately-vertical planes 5 6 *a* and 8 7 *a*, which I denominate the "reducing" and "spreading" surfaces, and the approximately-horizontal plane 6 8 *a*, which I call the "shaping" or "forming" surface, perform the work of spreading and shaping the metal, the surplus metal being crowded laterally, and leaving the work in the proper shape.

To cause the die-faces to work to the best advantage, the diverging angles of the raised surface 6 8 *a* should bear such a relation to the width and pitch of the faces 5 6 *a* and 8 7 *a* as to prevent the unworked part of the metal as it rotates from overlapping on the forming portion of the die-face, and making cold-shuts and similar inaccuracies.

When found necessary, I provide the reducing and spreading surfaces 5 6 *a* and 8 7 *a* with irregularities or grooves *t t*, so that such irregularities will engage in the plastic metal, and insure perfect regularity in the rotation of the ingot, fagot, or blank on axis, by means only of those portions of the blank in contact with the surfaces of the die-faces at the moment actively performing work. By placing the grooves or irregularities on the oblique diverging reducing and spreading surfaces as described, the marks made in the metal by said grooves or irregularities are obliterated in subsequent revolutions of the article treated, and the rate of the surface movement of blank where work is being performed is the same as the rate of the linear movements of the dies.

On each side of the raised portion *b*, and near the finishing end 3, are two raised ribs or portions, *i i*, designed to form the journals of the axle. In general configuration each of the raised portions is like one-half of the surface 6 8 *a*, and each has its outer edge beveled, as seen at *n n*, and provided with irregularities, like plane 5 6 *a* and 8 7 *a*, to point *o*, where the reduction of the journal is completed.

When the lateral extension of the metal has reached the required limit, it is necessary to

cut or shear off squarely the ends of the axle, and this is accomplished by two beveled-edge gradually-rising cutters, *c c*, the cutting-edges of which commence rear and extend to the end 3 of the die-face. The beveled faces of these cutters *c c* are also provided with irregularities, as faces 5 6 *a*, 8 7 *a*, and *n n*. Thus it will be seen that the operation of forcing and controlling the rotation is the same in the formation of the journals and the shearing of the axle as in the formation of the body.

In order to facilitate the manipulation of such dies and use the cutters *c c* to the best advantage, I make them separate and removable from the body of the die, the said die being provided with elongated sockets *c'*, into which the cutters are secured. (See Figs. 2 and 3.) These platens and dies are to be used in a machine described and shown in an application for a patent filed March 26, 1884, Serial No. 125,633, and the dies are to be an integral part of the platens, or attached to said platens, as may be most convenient.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Dies adapted to form metal articles circular in cross-sectional area, with the working parts raised upon a plane surface, and provided with forming-surfaces running in line with the movement of the die, to give the shape required, and diverging reducing and spreading surfaces to force the metal laterally, substantially as described.

2. Dies adapted to form metal articles circular in cross-sectional area, having forming-surfaces to give the shape required, and reducing and spreading surfaces to force the metal laterally, provided with corrugations or irregularities, to engage the mass of metal and insure its rotation, substantially as set forth.

GEO. F. SIMONDS.

Witnesses:
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