T. H. SIMPSON.

METHOD OF FORMING RAILWAY CAR AXLES.

APPLICATION FILED JAN. 22, 1910.

981,697. Patented Jan. 17, 1911.

Fig. 1.

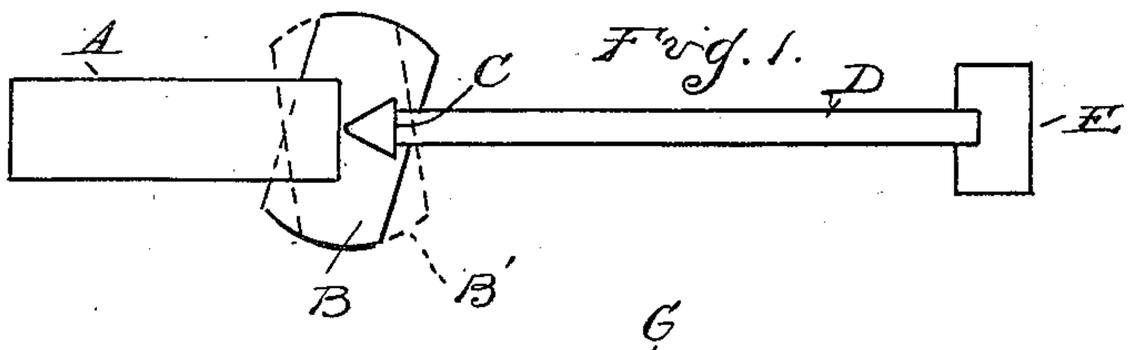


Fig. 2.

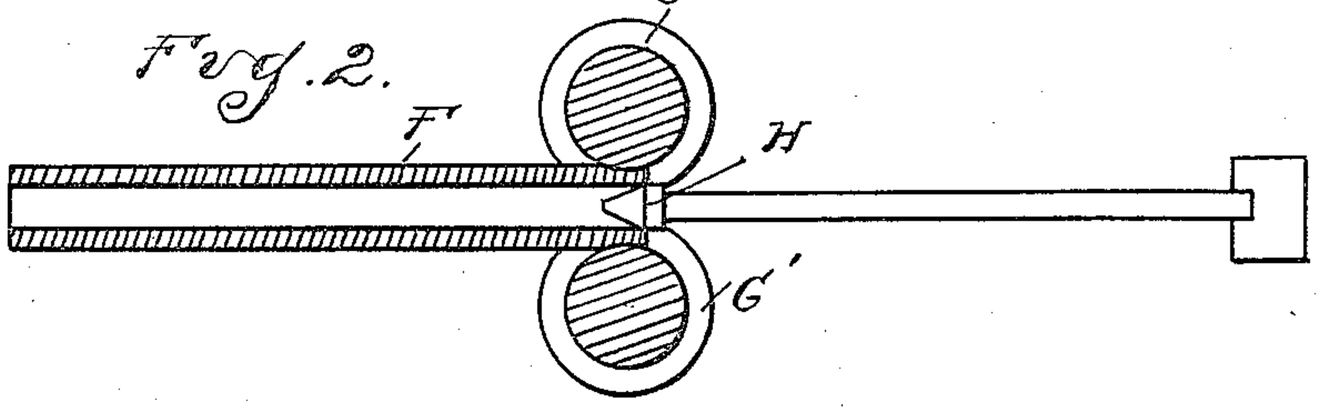


Fig. 3.

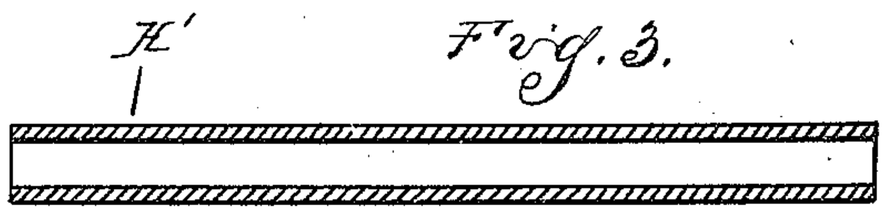


Fig. 4.

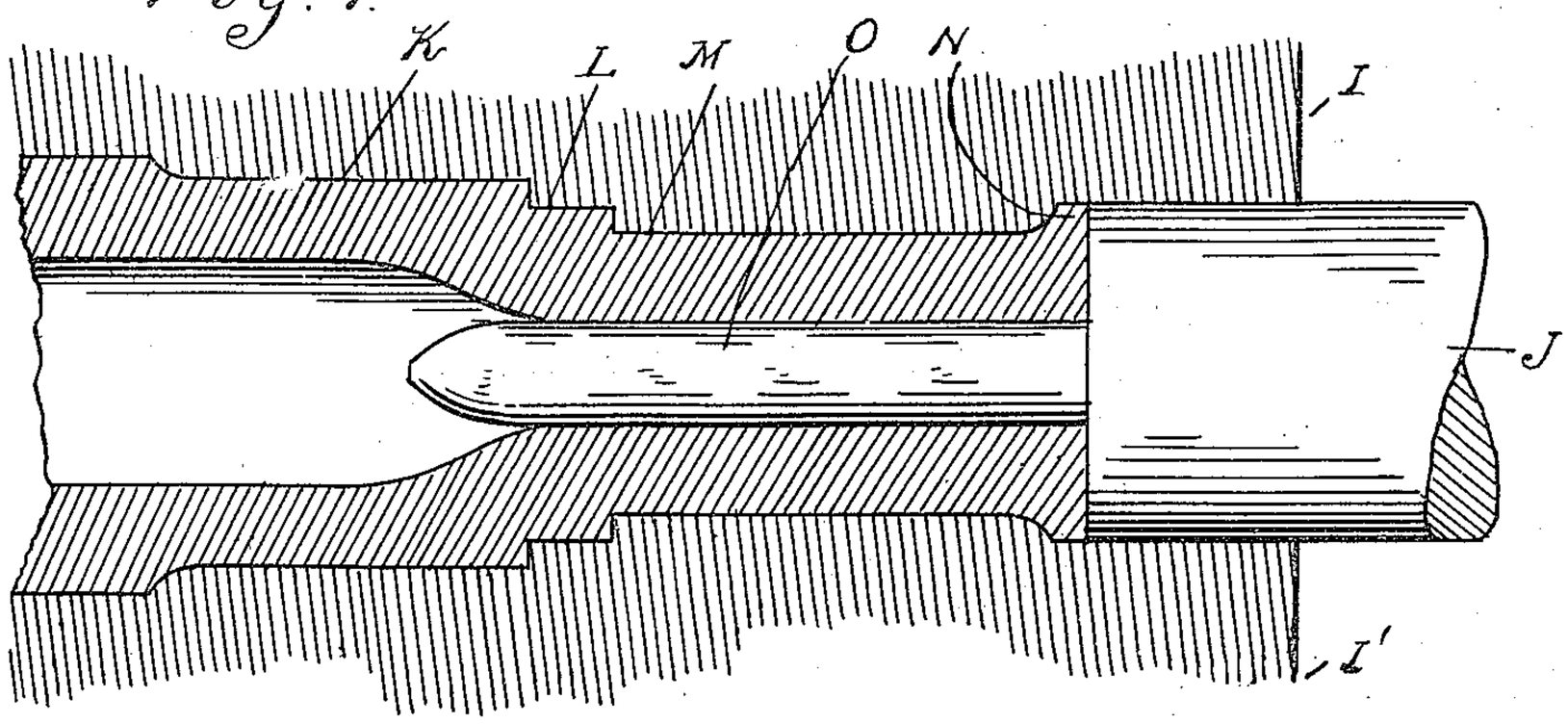


Fig. 5.

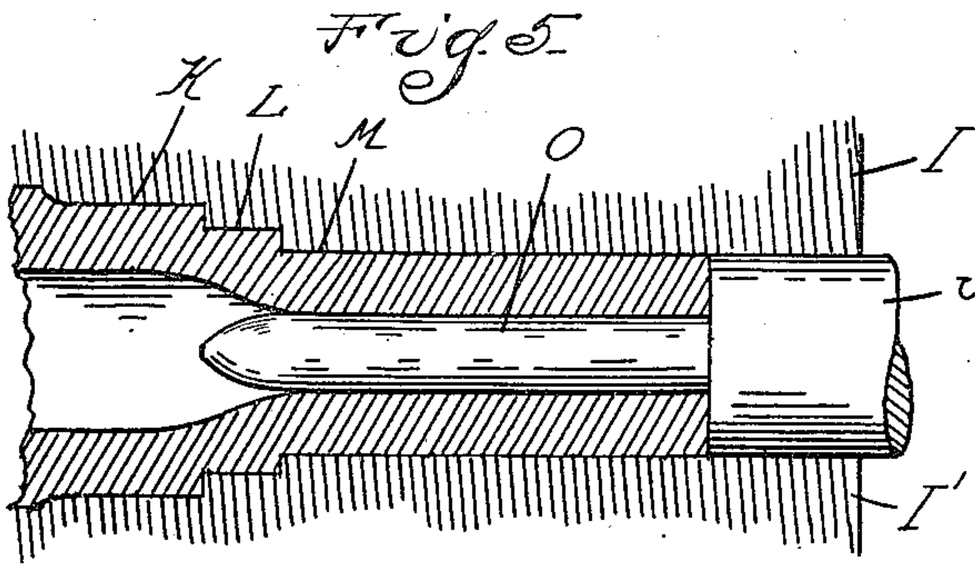
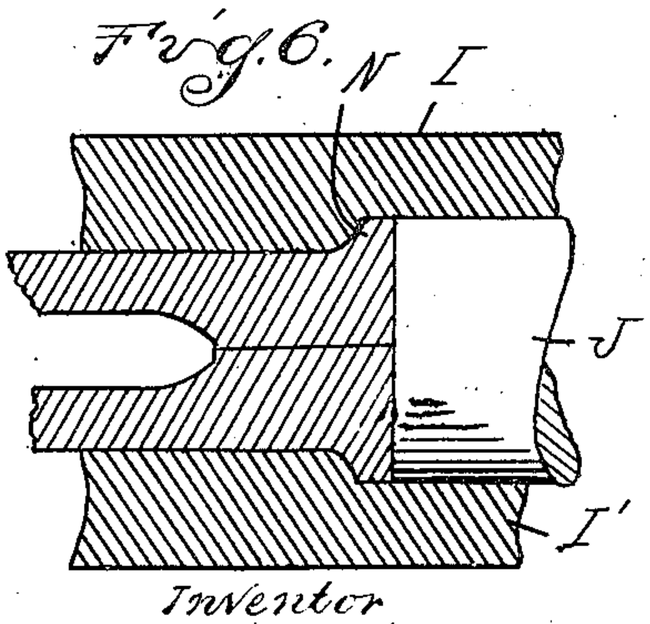


Fig. 6.



Witnesses

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METHOD OF FORMING RAILWAY-CAR AXLES.

981,697. Specification of Letters Patent. Patented Jan. 17, 1911.

Application filed January 22, 1910. Serial No. 539,557.

To all whom it may concern:

Be it known that I, THOMAS H. SIMPSON, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Methods of Forming Railway-Car Axles, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to the manufacture of railway car axles, and it is the object of the invention to avoid certain defects inherent in the usual construction produced by forging.

To this end, the invention consists in the method, as hereinafter described.

In the drawings,—Figure 1 is a diagrammatic plan view, showing the first step in the process; Fig. 2 is a longitudinal section showing the second step; Fig. 3 is a longitudinal section of the blank after the second step; Fig. 4 is an enlarged section, illustrating the manner of fashioning the journal and wheel bearing portion; and Figs. 5 and 6 are views showing a process of forming a slightly different construction.

In the usual process of manufacturing railway axles, they are forged from solid billets by hammer blows. This process, particularly where used in forming axles of relatively large diameter, results in what is known as "segregation," and which is the radial fracturing of the metal at the core. As a consequence, the strength of the axle is largely due to the peripheral portions thereof, and the segregated core, so far from increasing the strength, is an actual element of weakness. With my improved process, segregation is eliminated, and a homogeneous mass of the metal in the cross section is secured by working the metal both from the inside and the outside of a hollow or tubular blank. The resulting structure may either be tubular, or, if desired, the tube may be closed in to form a solid, or substantially solid, section, at least at the end portions, which are subjected to the greatest lateral or shearing stress. With both structures, the strength of the axle is greatly increased over that of a solid axle formed by forging.

In carrying out my improved process, a heated billet of metal A of suitable mass and dimension is first pierced to form a tubular blank. This is preferably accomplished as illustrated in Fig. 1 by passing the billet between the rolls B B′ having their axes at an angle to each other, and which produce a rotary and spiral advancement of the blank.

C is a piercing head, supported by a shank D, and locked preferably at substantially the center of the space between the rolls B B′.

E is an abutment for anchoring the rear end of the shank D.

The arrangement is such that in operation the billet A, during its spiral advancement, is forced over the piercing head C, producing a tubular blank and working the metal equally from the inside and outside thereof. The next step of the process is the elongation of the tubular blank F, resulting from the first operation. This is preferably accomplished by means of grooved rolls G G′, and a core member H arranged therebetween, so that the blank F is squeezed between the rolls and the core. This results in an elongation, and also an increase in the density of the metal, and the operation may be repeated as many times as necessary to produce a blank H′ of the required length. The next step is to increase the area of section in the end portions of the blank, which is produced by an upsetting operation, and a further step is to fashion the upset portion. These operations may if desired be performed simultaneously by the closing of dies I I′ about the end portion of the blank H′, and then upsetting by a blow from the end die or plunger J. As shown, the dies I I′ are fashioned to form a wheel seat portion K, a dust guard portion L, a journal portion M, and the end flange N and the plunger J is also provided with a forwardly extending shank O about which the upset metal is closed to produce the tubular axle shown in Fig. 4.

Where it is desired to form an axle with a solid end section, the blank H′ is placed in engagement with dies of the construction shown in Fig. 5 which differ from the dies illustrated in Fig. 4 merely in that the end flange N is not formed on the blank. The operations performed when the blank is in engagement with the dies shown in Fig. 5 are identical with those described in connection with Fig. 4. After the blank is operated on by the dies shown in Fig. 5 it is engaged with the dies shown in Fig. 6, and the upsetting operation is repeated by the plunger J′ to produce the solid end section shown in the latter figure.

An axle made by the process above given

may be formed with the metal distributed so as to secure the greatest strength at the points of greatest stress. Thus, the journal portion and the portion uniting the same with the wheel seat are preferably of greater cross sectional area than the central portion of the axle, and as has been stated if desired, the section may be increased to form a substantially solid axle at these points.

What I claim as my invention is,—

1. A method of producing railway car axles, which consists in piercing a heated billet, subjecting the pierced blank to opposed internal and external pressures to elongate the same to a greater length than the axle, upsetting the end portion to form a substantially solid section, and externally fashioning the same.

2. A method of producing railway car axles, which consists in piercing a heated billet, subjecting the pierced blank to opposed internal and external pressure to elongate the same, upsetting the end portion while the blank is in engagement with a core and external dies to decrease the length and increase the cross sectional area, and externally fashioning the axle during the upsetting operation.

3. A method of producing railway car axles, which consists in piercing a billet, subjecting the pierced blank to opposed internal and external pressure to elongate the same to a greater length than the axle, gripping the blank in forming dies, and upsetting the end portion to decrease the length and increase the cross sectional area, and then upsetting the end portion to form a substantially solid section and in externally fashioning the solid section.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS H. SIMPSON.

Witnesses:

ARMAND J. LADSUCEUR,

GEO. D. NOBLE.