

July 28, 1942.

A. B. PEARSON

2,291,408

METHOD OF MANUFACTURING RAILROAD CAR AXLES AND THE LIKE

Filed Feb. 15, 1940

2 Sheets-Sheet 1

FIG. 1.

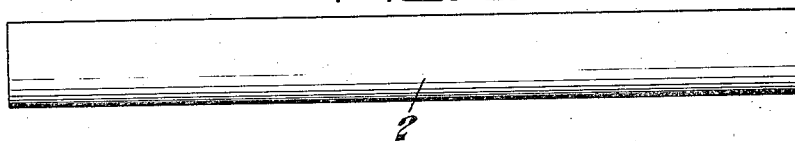


FIG. 2.

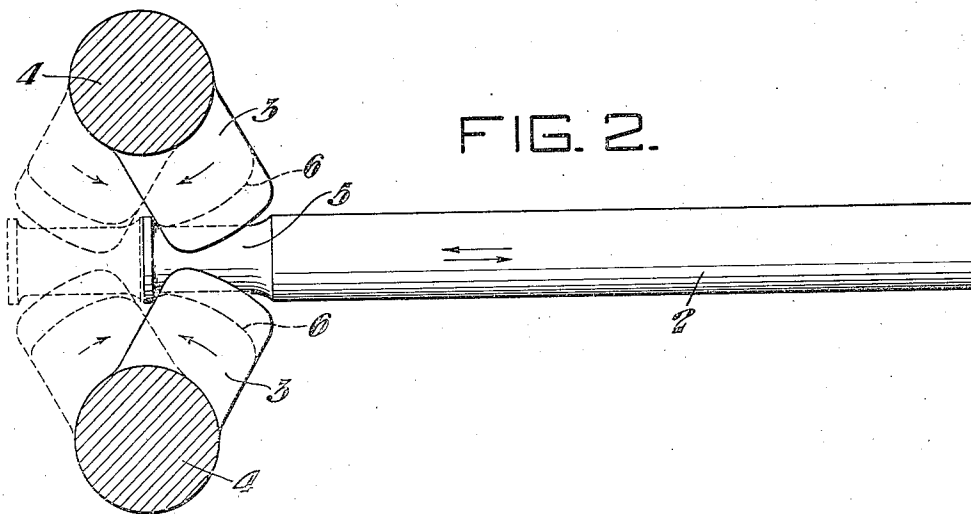


FIG. 3.

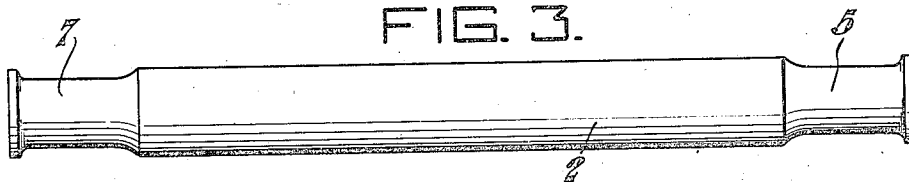
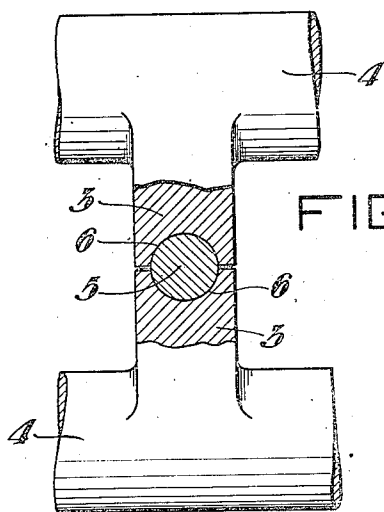


FIG. 4.



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2 Sheets-Sheet 2

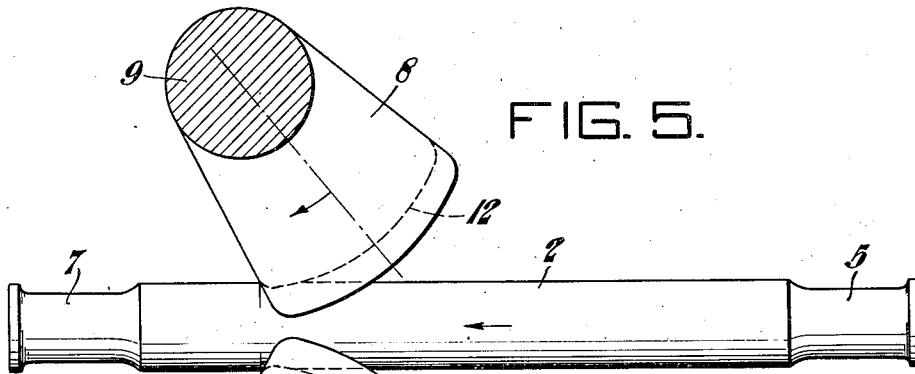


FIG. 5.

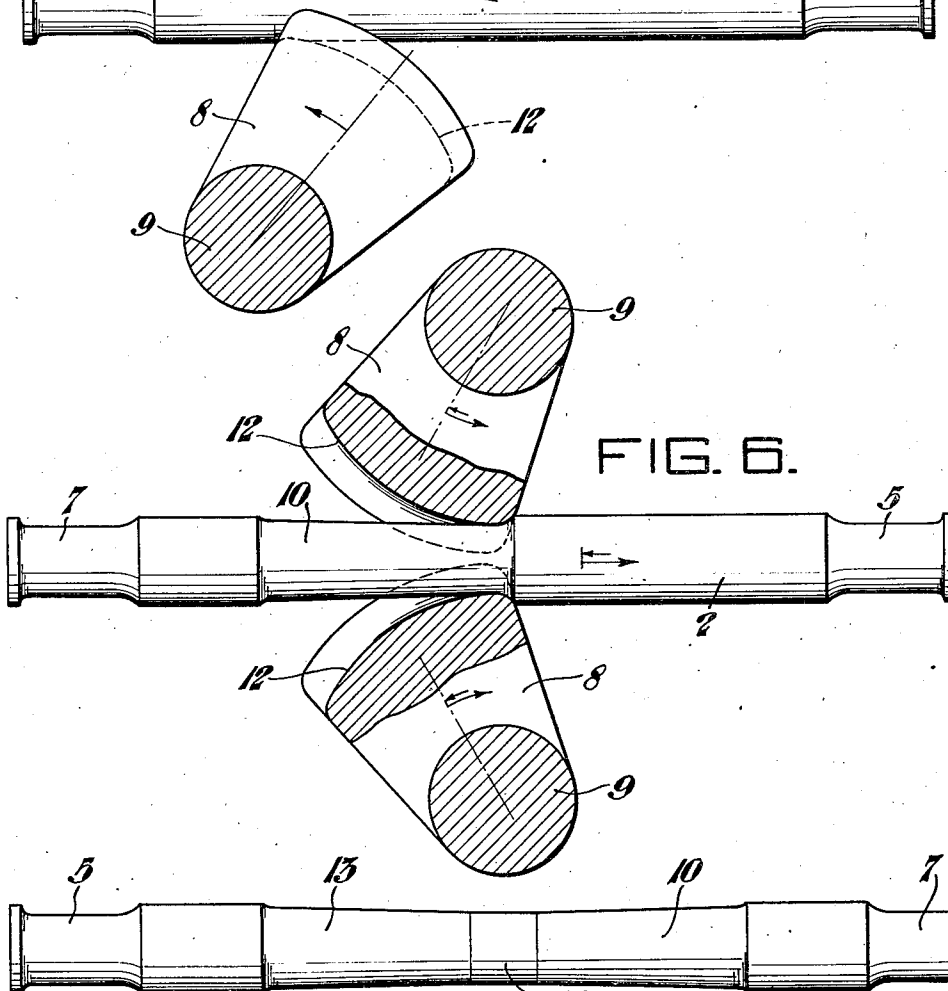


FIG. 6.

FIG. 7.

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UNITED STATES PATENT OFFICE

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METHOD OF MANUFACTURING RAILROAD
CAR AXLES AND THE LIKE

Axel B. Pearson, Munhall, Pa.

Application February 15, 1940, Serial No. 319,165

2 Claims. (Cl. 80-60)

This invention relates to railroad car axles and the like and particularly to an improved method of manufacturing the same.

Heretofore, it was the general practice, as is well known to those skilled in the art, to shape or forge heavy solid axles, such as are used on railroad cars, by means of a steam hammer. The axle bloom or blank was first rolled to the required outside diameter for receiving the wheels and then a portion adjacent each end thereof was reduced in diameter to provide journal portions thereon and the center portion of the blank was also usually reduced so as to provide an outwardly tapered center portion. The journal portions and the center tapered portion were usually formed by a heavy steam hammer with the aid of a forge screw usually consisting of from seven to nine workmen which held and manipulated the axle blank throughout the forging operation by the hammer.

The journal portion on one end of the axle blank was first forged by a forge screw of four of the workmen and the steam hammer driver and the axle blank was then turned around and the other four workmen relieved the first four and manipulated the axle blank while the journal portion was formed on the other end thereof. Thus it will be seen that the forging of such axles by means of a steam hammer not only required the services of an excessive number of workmen but also was tedious as well as extremely dangerous to the workmen. Furthermore, in steam hammer forging, it was difficult to properly reduce the axle blanks to the required diameter and length, and it was practically impossible to hold the same within very close tolerances which, of course, is unsatisfactory and inefficient. Also the portions forged in this manner were oftentimes uneven and not truly cylindrical in shape and out of alignment with each other and the true center of the axle thereby producing an inferior axle and one not possessing all of the requirements and characteristics of a good railroad car axle.

In the present invention, there is provided a simple and inexpensive method of forging railroad car axles and the like by means of a rolling action in which all of the above disadvantages have been eliminated and at the same time, producing an axle which has all the requirements of a good axle.

Accordingly, it is one of the objects of the present invention to provide an improved method of manufacturing railroad car axles and the like which is simple and inexpensive in its practice,

and one in which the number of workmen for practicing such method is reduced to a minimum.

It is another object of the invention to provide an improved method of manufacturing railroad car axles and the like which is efficient and one by which the dimension of the axles can be easily and conveniently controlled and held within a narrow range, thereby producing more accurate and better axles than by any method heretofore known.

It is a further object of this invention to provide an improved method of forging railroad car axles and the like which consists of forming the same by a smooth and even rolling action whereby straight and smooth axles are produced.

Various other objects and advantages of my invention will be more apparent in the course of the following specification and will be particularly pointed out in the appended claims.

In the accompanying drawings there is shown, for the purpose of illustration, one embodiment and several modifications thereof which my invention may assume in practice.

In these drawings:

Figure 1 is a plan view of an axle bloom or blank as used in the practice of the method of my invention;

Figure 2 is a side elevation showing the first step of forging the blank according to my invention;

Figure 3 is a plan view of an axle blank with the journal portions formed thereon after the first steps;

Figure 4 is a vertical section through the cam members and the axle blank as shown in Figure 2;

Figures 5 and 6 are side elevations showing the last steps in forming the axle according to the present invention; and

Figure 7 is a plan view showing the completely formed axle.

Referring more particularly to the drawings, the improved method of manufacturing railroad car axles and the like of the present invention comprises providing a metallic axle bloom or blank 2, as shown in Figure 1 of the drawings, having a predetermined length and outer diameter. The blank is then heated to a predetermined temperature and the journal portions and center portions of the blank are formed thereon in the following manner:

There is provided a pair of oppositely disposed concentric cam members 3 which are pivotally supported for oscillating movement as at 4 and which are driven by any suitable power means

(not shown). One end of the blank 2 is then positioned between the cam members 3 as shown in full lines in Figure 2 of the drawings and the axle blank, together with the cam members 3, is then moved to the left to the position shown in the broken lines thereof, that is, the cam members 3 are moved by the power means and the blank 2 is moved simultaneously by a separate power means to this position. After the blank, together with the cam members, has reached the position shown in the broken lines, the direction of movement of the cam members 3, together with the blank 2, is reversed and the blank again is moved to its original position as shown in the full lines of this figure. During the passage of the end of the blank 2 between the cam members 3, there is formed thereon adjacent the end thereof a reduced journal portion 5 through the action of the opposed arcuated surfaces 6 of the cam members 3 having a predetermined length and diameter. The axle blank 2 is then turned around and a similar journal portion 7 formed on the opposite end thereof in the same manner. It will be understood that the distance between the centers of the cam members 3 is adjusted for the particular size journal portions 5 and 7 to be formed on the axle blank so that the arcuated forming surfaces 6 are spaced the proper distance apart. There is now provided on each end of the axle blank 2 journal portions 5 and 7, as shown in Figure 3 of the drawings and the axle is partially completed, or it may be entirely completed for some uses.

There is provided also a pair of oppositely disposed eccentric cam members 8 which are pivotally supported as at 9. These cam members are also mounted for limited oscillating movement and driven by a suitable power means (not shown). The axle blank 2, together with the end portions 5 and 7 formed thereon, is then arranged between the eccentric cam members 8 as shown in Figure 5 of the drawings, and the cam members 8, together with the blank 2, are moved to the left to position as shown in Figure 6. After the cam members, together with the blank 2, have reached this position, the movement of the same is reversed and the cam members, together with the blank, assume their original position similar to that shown in Figure 5. During movement of the cam members 8 and the blank there is formed thereon by means of the arcuated surface 12 on each of the cam members 8 an outwardly tapered center portion 10 on that end of the blank. The axle blank 2 is then turned around and a similar tapered center portion 13 formed on the opposite end of the blank in the same manner. It will be understood that the distance between the centers of the cam members 8 is also adjusted for the particular size tapered center portions 10 and 13 to be formed on the axle so that the arcuated surfaces 12 are spaced the proper distance apart and

that the center of the radius of curvature of the arcuated surfaces 12 is eccentric relative to the pivoted centers of their respective cam members so as to obtain the tapered contour on the center portions of the axle. There is now provided, as shown in Figure 7 of the drawings, a completely formed axle having journal portions 5 and 7 on the ends thereof and center portions 10 and 13 which are tapered outwardly from the center portion 14 of the axle.

As a result of my invention, it will be seen that there is provided a method of forging railroad car axles and the like which produces axles having smooth and even journal portions of the exact size and also a center portion of the proper contour and dimensions. It will also be seen that the present method provides a completed axle thereby eliminating the need for any other forming or forging operations thereon.

While I have shown and described one specific embodiment of my invention and several modifications thereof, it will be understood that these embodiments are merely for the purpose of illustration and description and that various other forms may be devised within the scope of my invention, as defined in the appended claims.

I claim:

1. The method of manufacturing railroad car axles and the like which comprises providing a metallic axle blank of a predetermined size and includes the steps of heating the blank to a predetermined temperature, and forging by means of rolling in a lineal direction a portion of the axle blank adjacent first one end thereof and then adjacent the opposite end thereof so that the metal flows inwardly toward the center of said blank whereby the end portions are reduced to a predetermined length and outside diameter so as to provide a cylindrical journal portion on each end of said blank.

2. The method of manufacturing railroad car axles and the like which comprises providing a metallic axle blank of a predetermined size and includes the steps of heating the blank to a predetermined temperature, forging by means of rolling in a lineal direction a portion of the axle blank adjacent first one end thereof and then adjacent the opposite end thereof so that the metal flows inwardly toward the center of said blank whereby the end portion is reduced to a predetermined length and outside diameter so as to provide a cylindrical journal portion on each end of said blank, and finally forging by means of rolling in a lineal direction a portion first on one side and then on the other side of the center of the blank so that the metal flows away from the journal portions and toward the center of the blank whereby a central portion is provided between said journal portions of a predetermined size and shape, thereby providing a completed axle.

AXEL B. PEARSON.