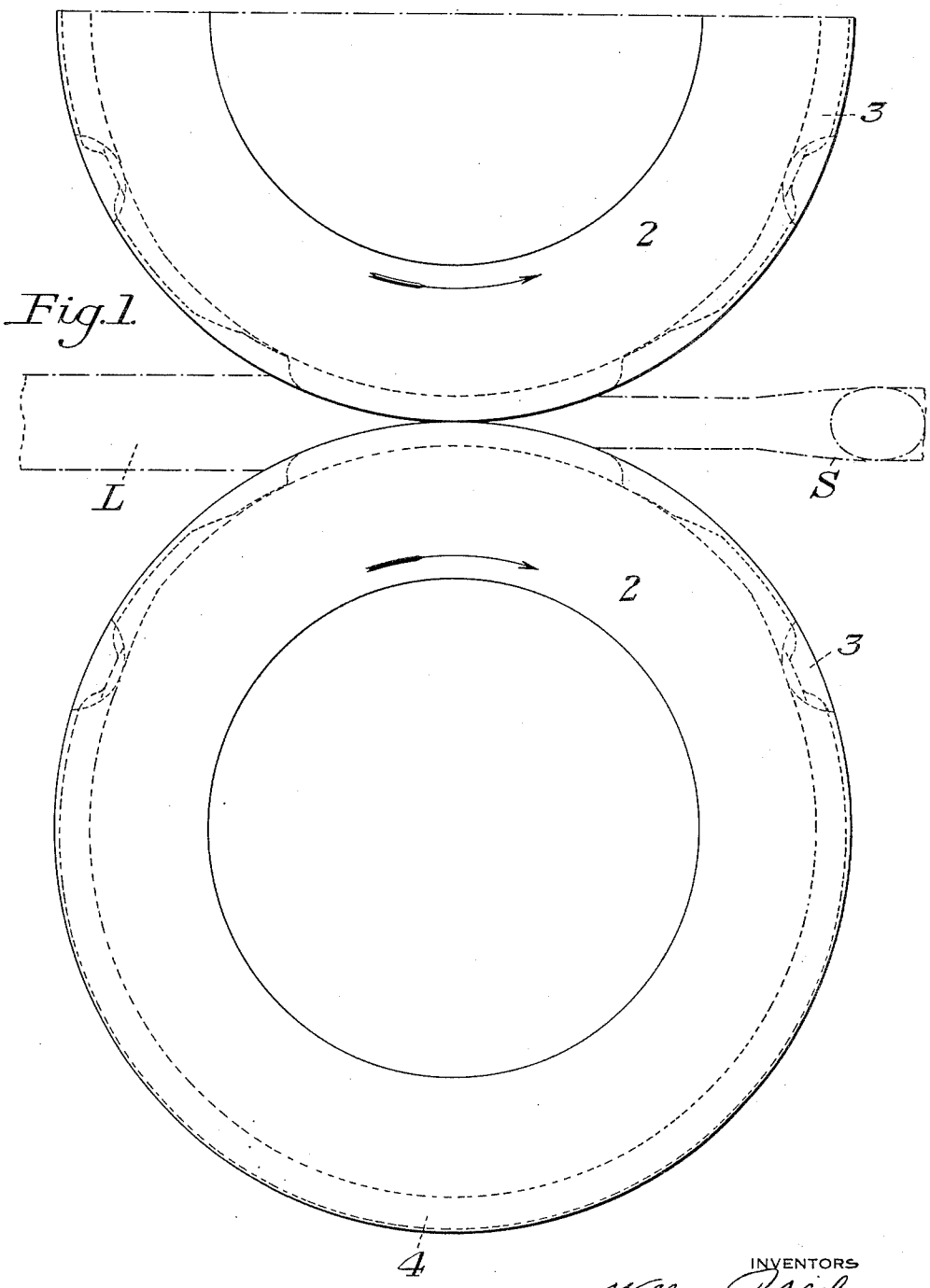
May 7, 1929. W. P. WITHEROW ET AL 1,712,286

DIE ROLLED ARTICLE AND METHOD OF MAKING THE SAME

Filed May 11, 1926 2 Sheets-Sheet 1

Fig. 1.



INVENTORS

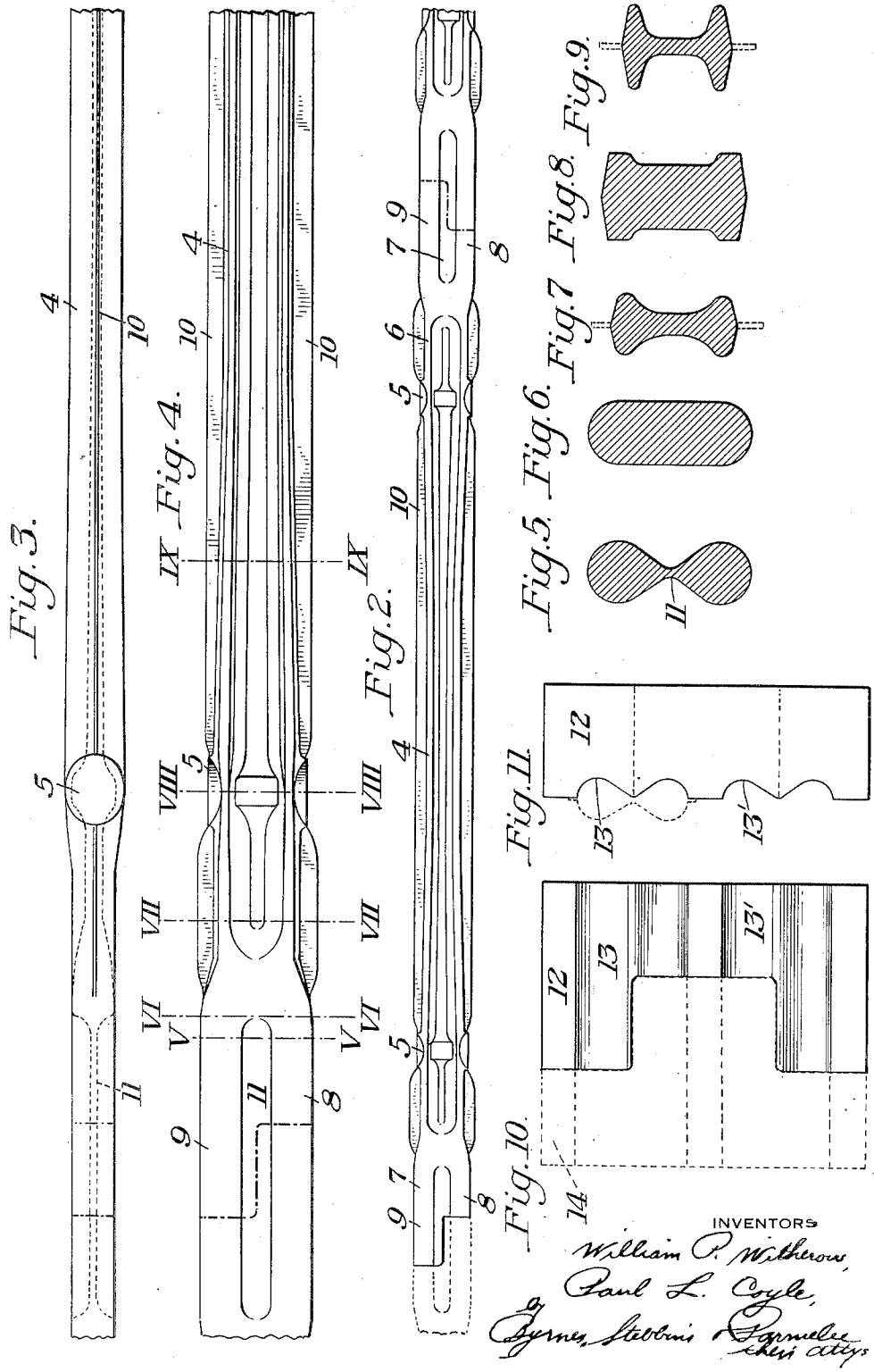
William P. Witherow,
Paul L. Coyle,

By Byrnes, Kellogg & Carmelee
Their Attys

May 7, 1929. W. P. WITHEROW ET AL 1,712,286

DIE ROLLED ARTICLE AND METHOD OF MAKING THE SAME

Filed May 11, 1926 2 Sheets-Sheet 2



Patented May 7, 1929. 1,712,286

UNITED STATES PATENT OFFICE.

WILLIAM P. WITHEROW AND PAUL L. COYLE, OF PITTSBURGH, PENNSYLVANIA, ASSIGNORS, BY MESNE ASSIGNMENTS, TO COLONIAL TRUST COMPANY, TRUSTEE, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

DIE-ROLLED ARTICLE AND METHOD OF MAKING THE SAME.

Application filed May 11, 1926. Serial No. 108,302.

This invention relates to the making of metal articles, particularly by die-rolling, and is herein illustrated and described as applied to the manufacture of automotive front axles, although it will be understood that the invention has numerous other applications.

It has heretofore been proposed to die-roll a string of connected blanks lying end to end and generally connected by a gating which is sheared away in the formation of the separated blanks. Usually the end portions of the blanks must be formed with portions only of the blank projecting somewhat so as to provide a suitable disposition of metal for a subsequent forging operation. The shearing of the end of the blank to this form, together with the removal of the gate, necessitates rehandling of the blanks and also results in the production of a material amount of scrap. We provide for forming a string of connected blanks whose end portions lie side by side and then for severing these blanks, as for example, by shearing them on a staggered line.

Stated in other words, the projecting fingers on the ends of the blanks are placed in a side by side relation while the blanks are rolled in a connected string. The blanks are severed by making what may be termed a "Z cut" and the desired blanks are thus secured with a minimum of operations and without the production of the scrap which was incident to the old method.

For the efficient practice of our method, it is desirable that the blanks shall be symmetrical about a longitudinal axis as will be hereinafter apparent, but it will be understood that the invention may be applied to the production of more than one style of blank in a single string, in which case the necessity for a symmetrical blank is no longer present.

We further provide an improved method and apparatus for making the staggered cut whereby the expense of this operation is materially reduced and the possibility of spoiling blanks by improper cutting is substantially eliminated.

In the accompanying drawings which illustrate a present preferred embodiment of our invention as applied to the production of blanks for the front axles of automotive vehicles, Fig. 1 is a side elevation, partly broken away, of a pair of die-rolls for forming a string of connected blanks.

Fig. 2 is a top plan view of a portion of the string of blanks as rolled.

Figs. 3 and 4 are respectively side and top plan views, to enlarged scale, of a portion of a blank in the string shown in Fig. 2.

Figs. 5 to 9 inclusive are sections taken on the lines V—V, VI—VI, VII—VII, VIII—VIII and IX—IX of Fig. 4.

Fig. 10 is a top plan view of a die used for severing blanks from the string, and

Fig. 11 is an end elevation of the die shown in Fig. 10.

In the illustrated embodiment of the invention, there is shown a pair of die rolls 2, having matrix portions 3 therein for the production of a string of connected blanks. A leader L is supplied to the rolls and the string of blanks S is thereby produced.

This string of blanks is shown in more detail in Fig. 2. As will be apparent from that view, each of the blanks in the string consists of a central or body portion 4 at each end of which are provided spring attaching portions 5. Beyond these spring attaching portions is an extension 6 of generally I-beam section, beyond which lies the portion indicated generally by the reference character 7, from which the wheel spindle attaching portion is to be forged. The portion 7 for each blank consists of a short finger 8 and a long finger 9, which fingers are adapted to be spread apart and reforged to form a spindle attaching portion of the usual shape.

Fig. 2 shows one complete axle blank with the adjacent blanks shown in part. As will be apparent from this view, these adjacent blanks may be said to be "upside down" with respect to the axle blank 4. It will be understood, however, that the body portion for each of the blanks in the string is produced from the same matrix portion 4' in the rolls and it will, therefore, be seen that in order to produce identical blanks in the manner above described, the blanks should be axially symmetrical.

It will be noted that during the rolling operation, the excess metal is permitted to go into flash as indicated at 10 on the drawings.

The finger portions 8 and 9 are connected by an intermediate web 11 as best shown in

Fig. 5. However, it is desirable that there shall be no flash adjacent these finger portions as the absence of flash at this point is decidedly helpful in the subsequent shearing operation.

The blanks are severed from the string by cutting on a staggered line as best shown in Fig. 2. This is preferably accomplished by the use of a die such as shown in Figs. 10 and 11. The die consists of a block 12 having grooves 13 and 13′ formed therein to accommodate the finger portion 7 of the string of blanks. Assume first that we are cutting the left-hand end of the complete axle blank shown in Figure 2. In order to accomplish this, the blank will be placed in the groove 13 and properly positioned so as to get the cut at the proper point.

A punch 14 is then moved downwardly and the string of blanks is severed as indicated by solid lines at the left-hand end of Figure 2. The string of blanks is then fed forward to make the cut at the right hand end of the complete blank shown in Figure 2. It will be noted that the cut at this point is the reversal of the cut previously made and the groove 13′ is therefore utilized. It is only necessary to shift the blank sidewise slightly so as to lay the finger portion 7 in the groove 13 and again lower the punch 14 to completely sever the blank shown in Figure 2.

It will be noted from Figures 2 and 4 that the corners on the line of cut between blanks are filleted or rounded and that such fillet lies substantially entirely within the web portion between the bar-like or finger-like portions which supplies the metal from which the completed axle end is made. This arrangement is highly desirable in practice as it lengthens the life of the dies.

It is found that this cutting die is of great value in practice as it entirely eliminates the necessity of turning the string of blanks over as would otherwise be required. It is also found that the workmen soon get into the habit of shifting the string from the groove 13 to the groove 13′ and, therefore, do not cut the blanks wrongly, as often occurs when a single die has been utilized and the string turned over.

We have illustrated a preferred embodiment of our invention, but it will be understood that it is not limited to such embodiment as it may be otherwise practiced or embodied within the scope of the following claims.

We claim:—

1. The method of making metal articles which includes forming a string of connected blanks having axially symmetrical body portions and having end portions lying side by side, and severing the blanks.

2. The method of making axles which includes forming a string of connected axle blanks. and severing the blanks on a staggered line to form a projecting finger on the end of the blank adapted for reworking.

3. The method of forming antero-posteriorly symmetrical articles which includes forming a string of blanks having spaced apart body portions, the body portions being axially symmetrical, and intermediate portions which are axially symmetrical and comprise parts of adjacent blanks lying side by side, and severing said intermediate portions.

4. The method of forming antero-posteriorly symmetrical articles which includes forming a string of blanks having spaced apart body portions and intermediate portions which are axially symmetrical and comprise parts of adjacent blanks lying side by side, and severing said intermediate portions.

5. The method of forming antero-posteriorly symmetrical articles which includes forming a string of blanks having spaced apart body portions and intermediate portions which are axially symmetrical and comprise parts of adjacent blanks lying side by side, and severing said intermediate portions on a staggered line.

6. The method of making axles which includes forming a string of blanks having spaced apart body portions connected by a pair of bar-like portions, and severing the string in such manner that the end of a blank will be provided with bar-like portions of different length.

7. The method of making axles which includes forming a string of blanks having spaced apart body portions connected by a pair of bar-like portions, severing the string in such manner that the end of a blank will be provided with bar-like portions of different length, and reworking the bar-like portions to form a wheel spindle connecting portion on the axle.

8. As a new article of manufacture, a string of blanks with portions of different thickness and having spaced apart body portions and intermediate connecting portions which are axially symmetrical and comprise parts of adjacent blanks lying side by side.

9. As a new article of manufacture, a string of connected axle blanks having spaced apart body portions, and intermediate connecting portions comprising a pair of substantially continuous bar-like portions lying side by side.

10. The method of making metal articles, which includes forming a string of connected blanks having end portions lying side by side and having intermediate portions which are axially symmetrical and constitute substantially the entire width of the string of articles, and severing the blanks.

In testimony whereof we have hereunto set our hands.

WILLIAM P. WITHEROW.
PAUL L. COYLE.