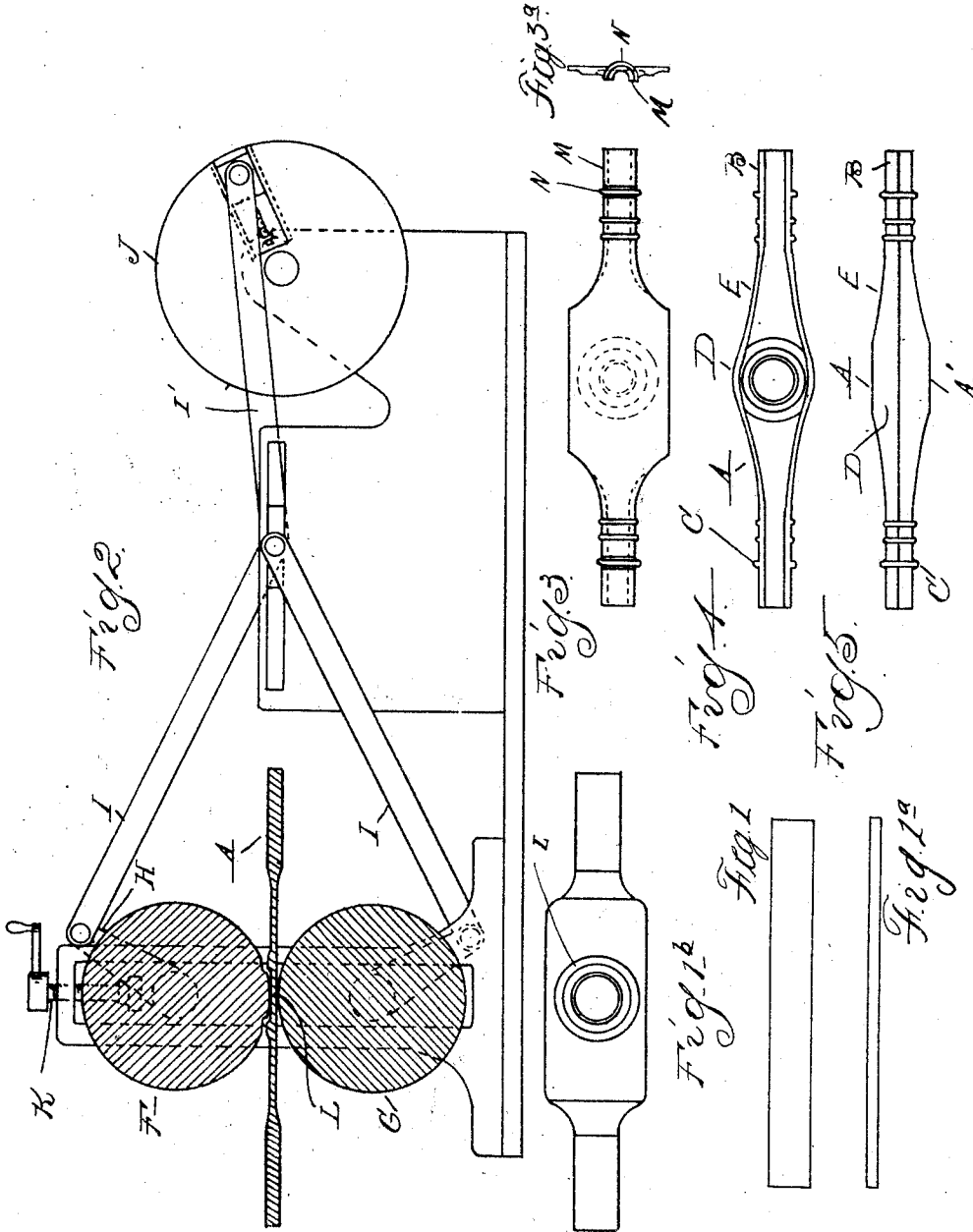


A. L. PUTNAM.
METHOD OF FORMING AXLE HOUSINGS.
APPLICATION FILED SEPT. 25, 1918.

1,384,485.

Patented July 12, 1921.



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UNITED STATES PATENT OFFICE.

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METHOD OF FORMING AXLE-HOUSINGS.

1,384,485.

Specification of Letters Patent. Patented July 12, 1921.

Application filed September 25, 1913. Serial No. 255,639.

To all whom it may concern:

Be it known that I, ALDEN L. PUTNAM, 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 Axle-Housings, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to axle housings and more particularly to that type employed for rear or driving axles. It is the object of the invention to obtain a construction which may be formed of pressed metal, combining the advantages of the cast metal and sheet metal constructions as heretofore manufactured, and also having additional advantages as hereinafter set forth.

In the present state of the art axle housings of one type are formed of pressed sheet metal of uniform gage, but to secure the necessary strength reinforcements are required; for instance, the outer ends which carry the wheel-supporting bearings require reinforcement and it is also desirable to reinforce the central portion which houses and supports the differential gearing. In another type of structure the housing is formed of cast metal with the reinforcements integral therewith, but this requires greater weight to secure the necessary strength and is otherwise less desirable in the pressed metal construction.

With the present invention the advantages of the two types are combined by forming the axle housing from a flat metal blank of varying thickness, the metal being distributed in a predetermined manner and then pressing this blank to the desired form. In this way the portions of the metal which are of greater thickness will form the desired reinforcements which are properly located and the whole construction will be integral with the increased strength of wrought metal over cast metal.

In the drawings:

Figures 1, 1^a and 1^b are respectively a plan view and side elevation of the original blank and a plan view after the first operation;

Fig. 2 is a longitudinal section through an apparatus for performing the first operation

on the blank to vary the thickness of different portions thereof;

Fig. 3 is a plan view after the second operation;

Fig. 3^a is an end elevation;

Fig. 4 is a side elevation of the pressed half section of the axle;

Fig. 5 is a plan view of the complete axle.

The housing embodying my invention comprises two similar sections which are joined to each other along the longitudinal plane, preferably by welding. These sections A and A' have end portions B which are substantially semi-cylindrical in form but are provided with reinforcing ribs C to increase the strength thereof. The central portion D of the housing is enlarged to receive the differential gearing and between the central portion and the end portions are tapering portions E. The gage of the metal is varied in the several portions, being of greatest thickness in the end portions and at the center where the differential gearing is housed and supported, while the tapering portions between the center and the ends are of less thickness, gradually merging into the portions of greater thickness.

To form this structure a flat blank is first prepared with the metal varied in gage and properly distributed to form the required reinforcements. This operation is illustrated in Fig. 2 in which a flat bar of metal, shown in Figs. 1 and 1^a, is rolled between the rollers F and G. These rollers have a limited oscillatory movement imparted thereto by suitable means, such as the crank arms H, links I, connecting rod I' and actuating crank J, the effect of such movement being to reciprocate the work between the rolls. The rolls are also variably pressed toward each other by suitable means, such as the adjusting screw K, for moving the journals of one of the rolls toward those of the others. The periphery of the rolls is also fashioned to produce in the blank an annular bead L or other reinforcement at the same time that the metal is being thinned in other portions. Thus, as shown in Fig. 1^b and Fig. 2, the blank after this rolling operation is elongated and widened in the portion rolled, leaving end portions of the original thickness and width. Between the center and thicker portions the gage of the

metal is gradually tapered, while at the center is formed the bead reinforcement L, before referred to.

5 The next operation upon the blank is illustrated in Figs. 3 and 3^a and consists in fashioning the end portions, preferably by drop forging, to produce semi-cylindrical portions M with beads N or other reinforcements. The blank is then pressed to fashion
10 the flat central portion thereof, forming the structure as illustrated in Fig. 4. Complementary half sections are then welded to each other as shown in Fig. 5.

What I claim as my invention is:—

15 1. The process of forming axle housings, comprising the forming of a blank of varying gage, drop forging the thicker portions of said blank to fashion the same, and pressing the thinner portions.

20 2. The process of forming axle housings, comprising the rolling of a flat bar to thin and widen the central portion thereof leaving end portions of original thickness and

width, fashioning said end portions by drop forging, and pressing the thinned portion. 25

3. The process of forming axle housings, comprising reciprocating a flat bar between a pair of rolls to thin and widen the central portion of said bar.

4. The process of forming axle housings, 30 comprising the reciprocation of flat bars between rolls to thin and widen the center portion thereof leaving the end portions of original thickness and width, and the formation by said rolls of integral reinforcements 35 upon said bar.

5. The process of forming axle housings, comprising the rolling of a flat bar to thin and widen the center portion thereof, leaving end portions of original thickness and 40 width, and the subsequent fashioning of said center portion and end portions to form respectively a housing for the differential gearing and axle housing.

In testimony whereof I affix my signature. 45
ALDEN L. PUTNAM.