Nov. 27, 1928. 1,692,932

H. FORD

REAR AXLE HOUSING CONSTRUCTION

Filed Aug. 18, 1927

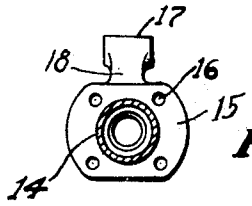

Fig. 3.

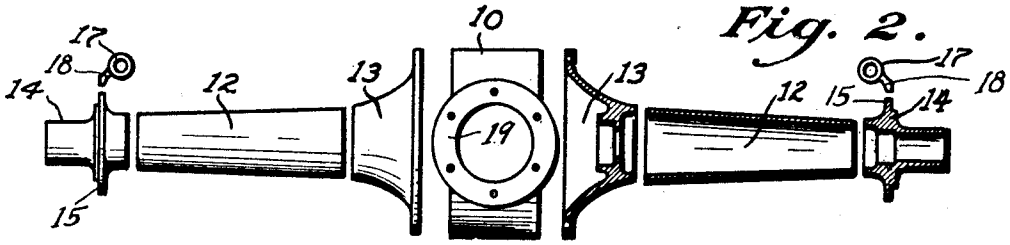

Fig. 2.

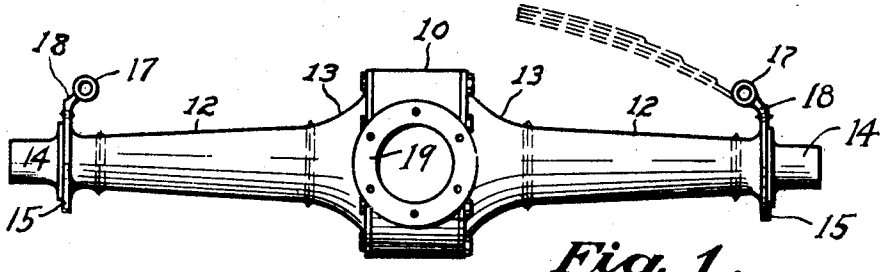

Fig. 1.

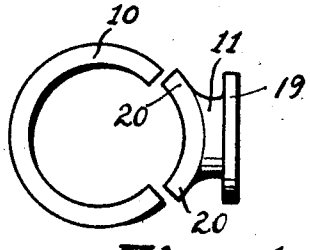

Fig. 4.

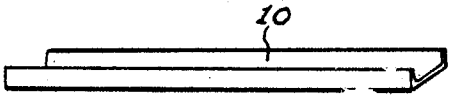

Fig. 6.

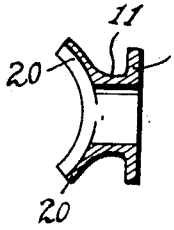

Fig. 5.

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UNITED STATES PATENT OFFICE.

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REAR-AXLE-HOUSING CONSTRUCTION.

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The object of my invention is to provide a rear axle construction of simple, durable and inexpensive construction.

Still a further object of my invention is to provide a rear axle which is especially adapted for production, so that it may be made cheaply in large quantities and still have the requisite strength.

Still a further object of my invention is to provide a rear axle of the drum type wherein the end or tube members of the axle are formed in four separate pieces which are subsequently welded together to form the end tube assembly, whereby the parts of the tube assembly may be manufactured from forgings requiring only simple forging dies, said forgings having a maximum strength due to the simplicity of the forging dies in which they are made.

Still a further object of my invention is to provide a special method of forming the drum member of the drum type axle wherein the body of the drum is rolled up from a channel section strip and then the sleeve which carries the drive shaft is formed from a separate forging and welded to the body of the drum.

Still a further object of my invention is to provide a rear axle housing wherein the ends of the tubular parts of the axle may be provided with flanges adapted to have a brake anchor plate secured thereto and this flanged member may have a spring perch welded thereto whereby the means for supporting the spring and the brake anchor plate may both be integral relative to the tubular portion of the axle and still have the high structural strength of relatively simple forgings.

With these and other objects in view my invention consists in the arrangement, combination, and construction, of the various parts of my improved device, as described in the specification, claimed in the claims and illustrated in the accompanying drawings, in which:

Figure 1 shows an elevation of a rear axle housing constructed in accordance with my invention.

Figure 2 shows the same housing, the parts being illustrated in their relative positions and before being welded.

Figure 3 shows an end view of the flange for supporting the brake anchor plate and the member which forms the spring perch for the rear spring.

Figure 4 shows a side elevation of the parts forming the drum proper, before said parts are welded together.

Figure 5 shows a vertical central longitudinal sectional view through the forging which forms the sleeve at the front end of the axle drum, and

Figure 6 shows a prospective view of the blank used for forming the body portion or main portion of the drum.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate generally an elongated strip of material of channel cross section which is rolled to form a broken ring as is illustrated at Figure 4, and which forms the main or body portion of the drum proper of a drum type axle.

The sleeve 11 extending from this drum is illustrated in detail in Figures 4 and 5. This sleeve 11 is a forging formed to provide a short central tube having a heavy bolting flange 19 at one end adapted to be secured to the rear end of the driveshaft housing and having channel section extensions 20 at the other end adapted to be welded to the body 10 of the drum by means of an electrical flash weld. In this connection it should be pointed out that the member 11 has considerable of the driving strain of the vehicle placed thereon and that it is very difficult to form this sleeve on the drum so that it will be readily formed and still withstand the large strains which are placed thereon. It will be noted that the channel of the body of the drum is of fairly heavy section in the transversed web but of relatively thin section in the sides, as these sides simply form bolting flanges for the tube assemblies. Referring especially to Figure 5 it will be seen that it would be substantially impossible to forge out satisfactorily the sleeve member 11 so that it would have the requisite strength and uniform structure from the ends of the body portion 10 of the drum. When the member 11 is forged separately, the forging operation is a fairly simple one and then the channeled ends 20 of this sleeve member 11 may be readily welded to the ends of the channeled body member 10 of the drum.

Following the welding of the member 11 to the member 10 to form the actual drum, the parts are of course finished off by dressing down the weld if necessary and by machining the contact faces of the drum and boring the necessary bolt or screw holes therein.

The tube assemblies in connection with my

improved axle construction are formed first from a tube member proper and then welding the bell at one end thereof and the brake anchor plate at the other end thereof.

The main portion of the tube member or the tube proper is formed from a piece of flat sheet metal which is blanked to the proper shape and then rolled up to form a tapered tube, and then the edges of this tube are welded by a line weld to form a seamless tapered tube of uniform gauge.

I consider this quite an important feature of my invention as the tube portion of the axle has not been forged or otherwise treated so that there will be substantially no stresses or differences in cross section with regard to the material of the tube 12 at any place throughout its length.

The bell or horn at the inner end of the tube is forged from a piece of steel in any of the usual ways in which forgings may be made. The outer end of the bell 13 is formed with the same diameter as the inner end of tube 12 so that these two ends may be flash welded together to form a unitary strong connection between the tube and bell. The piece 14 which forms the outer end of the axle is of generally cylindrical shape and has the annular securing flange 15 stuck up near one end thereof. It is formed by shearing bar stock to form blanks which are perforated in the direction of their length, forged to form a rough cylinder, and then upset to form the flange 15. This flange 15 is designed to have a plurality of openings 16 formed therein whereby a brake anchor plate (not shown) may be secured to the flange 15.

A spring perch member is formed from a forging in the usual manner with a sleeve 17 forming the bearing for the spring shackle bolt (not shown) and a shank 18 which is designed to be welded to the upper edge of the securing flange 15. It will be noted that by forming this welded joint between the securing flange 15 and the spring perch 17, I am enabled to make both forgings with a very uniform structure and consequently of great strength in proportion to the material used, and the weld between these pieces is relatively easily made. It will also be seen that if these parts were made from a single forging then it would be very hard to secure a good uniform structure and grain of the sleeve 17 of the spring perch if that relatively large section of material were forged from the blank which forms the flange 14 as all of the material for the sleeve 17 and shank 18 would have to be forced through the relatively narrow neck in the die which forms the shank of the spring perch.

This end member 14 of the axle is formed with its inner end of substantially the same diameter as the outer end of the tube 12 so that these two ends may be flash welded together to form a unitary strong structure. In this connection it will be noted that a large number of different schemes including brazing and riveting have been used for securing the brake anchor plate and spring perch to the end of the axle tubes and that all of these have been found to give weak joints at times and they are much more expensive and heavier than the device herein disclosed.

Among the many advantages resulting from the use of my improved method of forming an axle housing, it should be first pointed out that I have devised a method which enables me to form the various parts of my axle from sheet metal which does not have to be reforged or rerolled or else to form the parts from forgings which are formed by the most convenient and efficient method of forming the forgings so that the parts are all relatively strong for their weight and no excess weight need be provided to provide for ordinary imperfections formed in the ordinary axle housings or for the inefficiency of the forging methods which might otherwise be employed.

Still a further advantage results from the use of my improved method in that the parts of the axle are united by welding and are all of relatively small dimensions and easily handled, so that the expense for handling and for jigs or tools for handling is relatively small. Still a further advantage results from the fact that the stock used for the forging for the various parts may be all of standard type and no special quality stock which cannot be readily secured on the open market is required.

Some changes may be made in the arrangement, construction, and combination of the various parts of my improved device without departing from the spirit of my invention, and it is my intention to cover by my claims such changes as may be reasonably inverted within the scope thereof.

I claim as my invention:

1. In a method for forming drum axle housings, consisting of first forming the drum by rolling a channel section strip to form a broken ring, then forming a driveshaft sleeve having channel extensions from the edges thereof designed to complete the drum, then welding said driveshaft sleeve extension to the broken ring to complete the drum, then forming tube members by first forming tapered tubes, then forming bells then forming axle end members having a securing flange and spring perch thereon, then welding the tubes to the bells and end members to form the tube members.

2. The method of forming the drum for a drum type rear axle housing consisting of rolling a strip of channel section to form a broken ring and then welding thereto a drive

shaft sleeve having channel extensions therefrom designed when welded to complete the aforesaid ring of the drum.

3. The method of forming a tube section for an axle housing consisting of rolling flat sheet metal to form a tapered tube, forming a bell and flash welding the bell to one end of said tube, forming an axle end member with a securing flange thereon, welding a spring perch to said securing flange, and then welding the axle end member to the other end of the tube member.

4. The method of forming a rear axle housing tube comprising forming the tube proper by rolling rolled flat stock to form a tapered tube and then line welding the tube to unite its butting edges, then welding a forged bell to the larger of said tube by a flash weld, then welding a forged axle end member to the smaller end of said tube by a flash weld, the axle end member having a securing flange upset thereon and having an independently forged spring perch welded to said flange.

5. The method of forming a rear axle housing of the drum type consisting of forming a drum by welding a drive shaft connecting sleeve to a split ring of channel section, and forming tube members by flash welding a forged bell and a forged end piece having an upset securing flange thereon to a tapered welded tube formed from strip stock.

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