

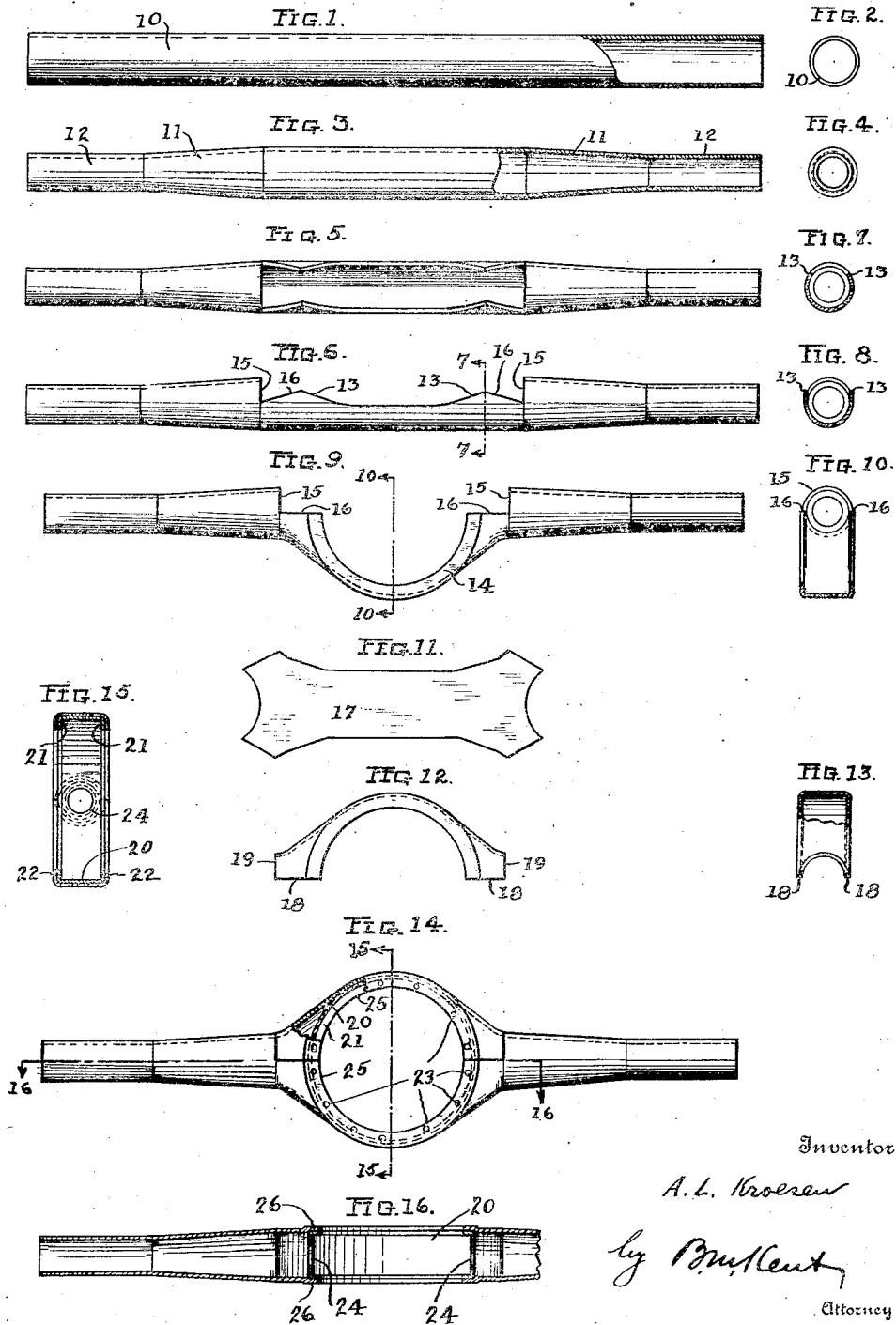
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AXLE.

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This invention relates to axle housings for motor vehicles and more particularly to certain improvements in the type of housing described in the Torbensen Patent No. 1,485,443, granted March 4, 1924.

It is one of the objects of this invention to improve the construction of the type of housing illustrated in Patent No. 1,485,443 so as to provide a stronger housing that may be more economically manufactured and that will be reinforced at the center. It is the purpose of this invention to lower the cost of manufacture by reducing the amount of raw material required and by simplifying the design of the inserted upper half of the center so as to have straight edges to be welded, thereby simplifying the welding operations and producing a smoother and better product.

Other objects of the invention and the features of novelty will be apparent from the following description taken in connection with the accompanying drawings, of which:

Figure 1 is an elevation of a length of tubing from which the housing is made, a portion of the figure being in section;

Figure 2 is an end view thereof;

Fig. 3 is an elevation, partly in section, of the tube shown in Fig. 1 after the end portions have been swaged to reduce their diameter and to shape these ends to the finished form;

Fig. 4 is an end view of the tube shown in Fig. 3;

Fig. 5 is an elevation of the tube shown in Fig. 3 after the operation of cutting away a portion of the center;

Fig. 6 is an elevation from a plane at right angles to Fig. 5;

Fig. 7 is a transverse section on the line 7-7 of Fig. 6;

Fig. 8 is a view similar to Fig. 7 after the next operation of spreading certain parts of the central portion of the tube;

Fig. 9 is a view similar to Fig. 6 but showing the form of the housing after the next operation in which the central portion is pressed into its final shape;

Fig. 10 is a transverse section on the line 10-10 of Fig. 9;

Fig. 11 is a plan view of the blank from which the part shown in Fig. 12 is formed;

Fig. 12 is a side elevation of the inserted piece which forms the upper half of the central portion of the housing;

Fig. 13 is an end view thereof, with certain parts shown in section;

Fig. 14 is a side elevation of the completed housing, with certain parts shown in section;

Fig. 15 is a transverse section on the line 15-15 of Fig. 14; and

Fig. 16 is a section on the line 16-16 of Fig. 14.

Referring to the drawings 10 indicates a length of tubing from which the major portion of the housing is formed, this tubing being preferably seamless and, in order to give stiffness and strength to the housing, may be made of 20-30 carbon steel. By the first operation the end portions of the tube 10 are swaged to provide the tapered sections 11 and the cylindrical end sections 12 that are of smaller diameter than the original tube and conform, in size, to the finished housing.

By the next operation a portion of the central section of the tube is cut away as shown in Figs. 5 and 6. This operation may be performed by a gas cutting-torch or in any other suitable manner. By this operation there are formed the pointed parts 13 along the longitudinal edges of the cut and these pointed parts are then straightened out, preferably by dies, as shown in Fig. 8. The next operation consists in forming the central portion 14, as shown in Fig. 9, this being done in a suitable forming press by means of dies. The housing, as it appears in Fig. 9, consists of the tubular end portions and the central portion 14 which is integral therewith and which constitutes substantially one-half of the enlarged center of the housing, the inner ends of the tubular portions being semi-circular as indicated at 15 and the upper edges 16, of the portion 14, being in the plane of the axis of the tubular ends.

A blank 17 is punched from a sheet, the thickness of which is the same as the tube 10, and this blank is then formed into the shape illustrated in Figs. 12 and 13, by means of a forming press. The piece thus formed is substantially a duplicate of the portion 14, which constitutes one-half of the enlarged center of the housing, and has straight edges 18, that are adapted to abut against the edges 16, and semi-circular ends 19, that are adapted to abut against the edges 15, when this piece is placed in posi-

tion in the housing, as it appears in Fig. 9. The abutting edges 15 and 19 and 16 and 18 are then welded together by means of an oxy-acetylene torch or by the electric arc-welding method. A channel shaped ring 20 is inserted in the central portion of the housing, before the parts are assembled, as shown in Fig. 14, and the flanges 21 of this ring are then spot-welded to the adjacent flanges 22, as indicated at the points 23, in Fig. 14. This spot-welding operating will succeed the operation of welding the edges 15, 16, 18 and 19. The ring 20 fits the interior of the arcuate top and bottom portions of the central portion of the housing and is provided with openings 24 on its opposite sides which are in alignment with the tubular ends of the housing and through which the axle shafts (not shown) extend.

The edges 25 of the enlarged center of the housing and the faces 26, thereon, may then be machined to receive the parts which are to be ultimately assembled with the housing.

The formation of the housing, as above described, with the edges 16 in the plane of the axis, results in simplifying the operation of welding-in the inserted upper half of the center and also reduces the size of the blank from which this inserted piece is formed, thereby reducing the amount of raw material required and utilizing more of the original tube 10, than was possible with the construction illustrated in Patent 1,485,443. The ring 20 serves to substantially reinforce the central portion of the housing which, in practice, is subjected to the most severe strains and, in this manner, a much stronger housing is provided.

Having thus described my invention, what I claim is:

1. An axle housing having seamless tubular end portions and an enlarged middle portion substantially one-half of which is integral with said end portions, the other half of the enlarged middle being a duplicate of the first-mentioned half and said halves having

abutting edges in a plane through the axis of said tubular ends, and said edges being welded together.

2. An axle housing having seamless tubular end portions and an enlarged middle portion, the inner ends of said tubular portions having semi-circular edges in planes normal to the axis of the tubular portions and substantially one-half of said middle portion being integral with said tubular portions, the other half of said middle portion being a duplicate of the first-mentioned half and said halves having abutting edges in a plane through said axis which are welded together, and the second-mentioned half having semi-circular ends which abut said inner ends of the tubular portions and are welded thereto.

3. An axle housing having seamless tubular end portions and an enlarged middle portion substantially one-half of which is integral with said end portions, the other half of said middle portion consisting of an inserted piece that is welded to the first-mentioned half and to said end portions, and a one-piece reinforcing ring of channel cross-section fitted between said halves and the flanges of which are welded to abutting surfaces of both of said halves.

4. An axle housing having seamless tubular end portions and an enlarged middle portion, the upper and lower parts of the latter being of arcuate form and the lower half of said middle portion being integral with said tubular ends and the upper half consisting of an inserted piece that is welded to said lower half and to said end portions, and a one-piece reinforcing ring arranged between said halves and fitting the interior of said arcuate parts, said ring being of channel cross-section and having its flanges welded to abutting surfaces of both of said halves.

In testimony whereof I affix my signature.

ARTHUR L. KROESSEN.