May 2, 1944.  
A. R. PERKINS  
2,348,145  
METHOD OF FORMING STEEL POWER TRANSFER HOUSINGS  
Filed July 23, 1941  
2 Sheets-Sheet 1  

Inventor  
A.R. Perkins  

By Kimball Crowell  
Attorney
METHOD OF FORMING STEEL POWER TRANSFER HOUSINGS

Filed July 23, 1941

2 Sheets-Sheet 2
An object of this invention is to provide a method of making a power transfer housing which may be formed out of material sufficiently strong to withstand the torsional and other strains to which the housing may be subjected for providing a front drive power unit.

Another object of this invention is to provide a power transfer housing which may be built up from welded steel and which is adapted to house a flexible driving connection between the transmission and the drive shaft.

A further object of this invention is to provide a power transfer housing of this kind with an improved means for supporting the housing from the power plant frame.

A further object of this invention is to provide an improved method of forming a power transfer housing which includes bending an elongated flat strip of metal to form the side and end walls, welding the ends of the strip together, welding a flat front wall onto the formed strip, and removably attaching a rear wall onto the formed strip.

To the foregoing objects and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a detail top plan of a power transfer housing constructed according to an embodiment of this invention and which is adapted to be associated with the front drive mechanism and the power frame structure forming the subject matter of my copending applications, for a front drive mechanism and a power frame or chassis, filed of even date herewith.

Figure 2 is a detail side elevation of the transfer housing showing the housing in applied position with parts broken away.

Figure 3 is a detail rear elevation of the housing with the rear plate removed.

Figure 4 is a longitudinal section of the housing with the driving mechanism removed therefrom.

Figure 5 is a detail rear elevation partly in section of the housing structure.

Figure 6 is a section view taken on the line 6—6 of Figure 5, and

Figure 7 is a fragmentary sectional view taken on the line 7—7 of Figure 1.

Referring to the drawings the numeral 10 designates generally a front drive frame structure, the details of which are set forth in my copending application. The frame structure 10 includes a pair of inwardly projecting brackets or supporting members, generally designated as 11. A power transfer housing structure generally designated as 12 is adapted to be secured as by fastening devices 13 to the bracket members 11. The housing structure 12 is adapted to be formed out of sheet steel having parts thereof welded firmly together so that this housing will be able to withstand the torsional strains incident to the connection of a drive shaft 14 with a driven shaft 15, the latter shaft being offset downwardly and laterally from the drive shaft 14. The housing 12 comprises a front wall 16 which has welded thereto a rearwardly projecting wall structure generally designated as 17.

The wall structure 17 includes a pair of side wall members 18 and 19, an arcuate top 20 and a bottom wall 21. The top wall 20 is of arcuate configuration as shown in Figure 3 and the side wall 19 is also of longitudinally arcuate configuration and is connected at its lower end with the bottom wall 21 by means of an arcuate wall portion 22. The side wall 19 is also of longitudinally arcuate configuration, merging at its upper end in the top wall 20 and also merging at its lower end in a lower side wall structure 23, which at its lower portion is formed with an arcuate wall portion 24 merging with the horizontal lower or bottom wall 21. In practice, the wall structure 17 is formed from a single elongated strip of sheet steel which is bent in the configuration shown in Figure 3 and the ends thereof are welded together as at 25 at the lower portion of the housing.

The side wall structure 17 has welded to the rear portion thereof and to the outer side thereof a plurality of spaced apart outwardly extending lugs 26 which are formed with threaded openings 27. The openings 27 open through the rear ends of the lugs or blocks 26 and fastening devices 28 in the form of cap screws or the like are adapted to threadably engage in the openings 27, so as to tightly hold a rear plate 29 on the rear open side of the housing structure 12. The rear plate 29 is formed along the outer edge thereof with a plurality of outwardly extending ears 30, formed with openings 31 therethrough for passage of the bolts or cap screws 28.

The housing structure 12 is adapted to be sus-
pended between the two spaced apart bracket members 11 by means of supporting members 32 and 33. The supporting member 32 comprises a flat bar 46, which is formed at one end thereof with an arcuate inner end portion 47 which is welded as at 45 to the outer side of the arcuate top wall 20. The bar 46 is also provided at its outer end portion with a horizontally disposed extension 45 formed with an opening 50. A second supporting or bracing member 66 is constructed in the form of a flat bar 61 conects with the bar 46 in supporting the adjacent side of the housing 12. The bar 51 is inclined downwardly as shown in Figure 3 and provided at its lower end with an obtusely disposed extension 52 which is welded as at 53 to the outer side of the side wall 19. The upper end portion of the bar 51 is formed with a horizontally disposed extension 54, which confronts the extension 49 and is welded to the extension 45 as at 55. The extension 54 is formed with an opening 56 aligning with the opening 50 for receiving an attaching bolt 57.

The supporting members 32 and 33 are so constructed as to support the housing 12 at an inclination to the vertical as viewed from the rear, so that the driven shaft 15 will be positioned laterally from the vertical axis of the drive shaft 14. The rear plate 28 is adapted to have removable secured thereto a pair of upper and lower bearing caps generally designated as 58 and 59 respectively. The bearing cap 55 comprises a plate-like body 60 which is adapted to be secured as by fastening devices 61 to the outer side of the rear wall or plate 23. A cylindrical bearing sleeve 62 is formed integral with the body 60 and is of a diameter substantially smaller than the diameter of the body 60 and is adapted to be removably engaged through an opening 63 formed in the rear wall 23 adjacent the upper portion thereof. The bearing sleeve 62 is adapted to have mounted therein the outer race of an anti-friction bearing structure, which supports the rear end portion of the drive shaft 14 and which is shown in greater detail in my copending application for a front drive power unit.

The lower bearing cap structure 50 comprises a plate-like body 64, which is adapted to be secured as by fastening devices 65 to the rear wall 29 adjacent the lower end portion thereof. The body 64 has formed integral therewith a cylindrical bearing sleeve 66, which removably engages through the opening 67 formed in the rear wall 29 coaxial with the axis of the driven shaft 15. The sleeve 66 is adapted to have mounted therein the outer race of an anti-friction bearing which supports the rear end portion of the driven shaft 15.

The front wall 18 of the housing 12 is formed with an opening 68 within which a bearing sleeve 69 is secured as by welding 70. The bearing sleeve 69 is substantially longer than the thickness of the front wall 18 so that the sleeve 69 will project partly forwardly from the front face of the wall 18 and will also project inwardly or rearwardly from the front wall 18. The sleeve 69 is adapted to have positioned therein the outer race of an anti-friction bearing which supports the forward portion of the driven shaft 15.

The front wall 18 adjacent the upper portion thereof and in a position coaxial with the bearing sleeve 69 has fixed thereto a cylindrical sleeve of bushing 71 through which the drive shaft 14 is adapted to rotatably engage. The bushing sleeve 71 is adapted to engage in an opening 72 formed in the rear wall 13 of a conventional transmission housing and constitutes one means for determining the correct position of the housing 12 relative to the transmission housing structure 14.

The front wall 18 is fixedly secured to the rear wall 13 of the transmission 74 by means of a plurality of countersunk bolts or screws 76, which are threaded into the rear wall 74. In order to provide a means whereby the angular position of the housing 12 may be properly set and that the axes of the screws or bolts 75 may align with the threaded openings 71 in the wall 73, I have provided one or more dowel pins 78, which may be threaded, as at 78, or otherwise fixedly secured to the front wall 16. The pin or dowel 78 projects forwardly from the front wall 16 and engages in an opening 80 formed in the transmission wall 73.

In mounting the housing structure 12 on the frame structure 19 the outer end portion of the supporting member 32 is adapted to rest on an apertured cushioning member 81 and a lower cushioning member 82 engages between the head of the bolt 63 and the lower side of the bracket 11. Preferably a small rubber sleeve 83 is inserted in the opening 84 formed in the bracket 11 and, if desired, the sleeve 83 may be formed as an integral part of the cushioning washer 82 or the cushioning washer 81. The outer end portion of the supporting member 33 is adapted to rest on a cushioning washer 85 which engages on the upper side of the bracket 11 and a lower cushioning washer 86 is interposed between the under side of the bracket 11 and the head of the bolt 57. A rubber sleeve similar to the sleeve 83 may also be positioned about the shank of the bolt 57 where this bolt passes through the plate of the bracket 11.

This transfer housing structure has been placed in actual use in connection with a front drive mechanism and subjected to exceedingly hard usage and has been found to be capable of withstanding any stresses to which it may be subjected. This is due in great part to the fact that the transfer housing is formed of welded steel rather than cast steel or cast iron. The drive shaft 14 has secured thereto a driving gear 51 and the driven shaft 15 has secured thereto a driven gear 58. A flexible driving element 50 in the form of a chain or the like is adapted to be trained about the two gears 57 and 58. The housing 12 is adapted to be at least partly filled with lubricant so that the flexible driving member 59 will be properly lubricated at all times. By providing the removable rear wall 29 the gears 57 and 58 and the driving element 59 may be readily applied or removed or inspected.
What I claim is:

1. The method of forming a steel power transfer housing having a substantially elliptical configuration, flat front and rear walls, an endless wall, bolt lugs on the outer sides of the endless wall and outwardly convergent hanger members adjacent the upper portion of the endless wall; said method including initially bending an elongated flat steel strip into substantially elliptical form, welding the ends of the strip together, positioning the front wall inside the bent strip with the outer side of the front wall parallel with the forward edge of the bent strip, welding the inner and outer edges of the circumference of said front wall to the bent strip, welding the bolt lugs to the outer sides of the endless wall, welding the divergent ends of two pairs of flat strips to the outer sides of the endless wall, and finally welding the convergent ends of the pairs of strips together.

2. The method of forming a steel power transfer housing having a substantially elliptical configuration, flat front and rear walls, an endless wall, bolt lugs on the outer sides of the endless wall and outwardly convergent hanger members adjacent the upper portion of the endless wall; said method including initially bending an elongated flat steel strip into substantially elliptical form, welding the ends of the strip together, positioning the front wall inside the bent strip with the outer side of the front wall parallel with the forward edge of the bent strip, welding the inner and outer edges of the circumference of said front wall to the bent strip, welding the bolt lugs to the outer sides of the endless wall, welding the divergent ends of two pairs of flat strips to the outer sides of the endless wall, and extending the outer ends of the flat strips outwardly with the extended ends of one pair of strips coplanar with the extended ends of the other pair of strips and said extended ends of said pairs of strips being horizontal and supporting the housing at an angle to the vertical.

ARTHUR R. PERKINS.