

April 17, 1934.

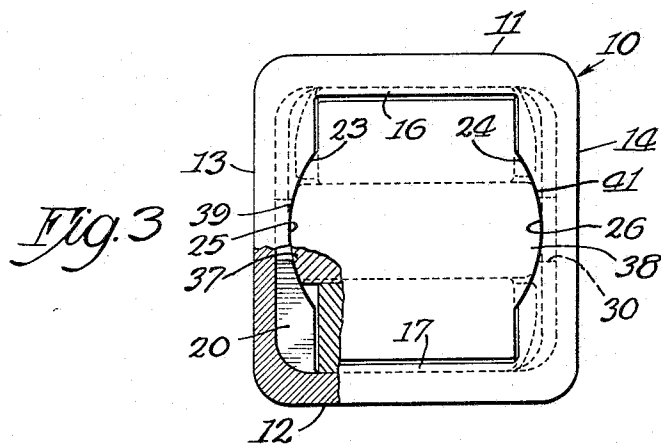
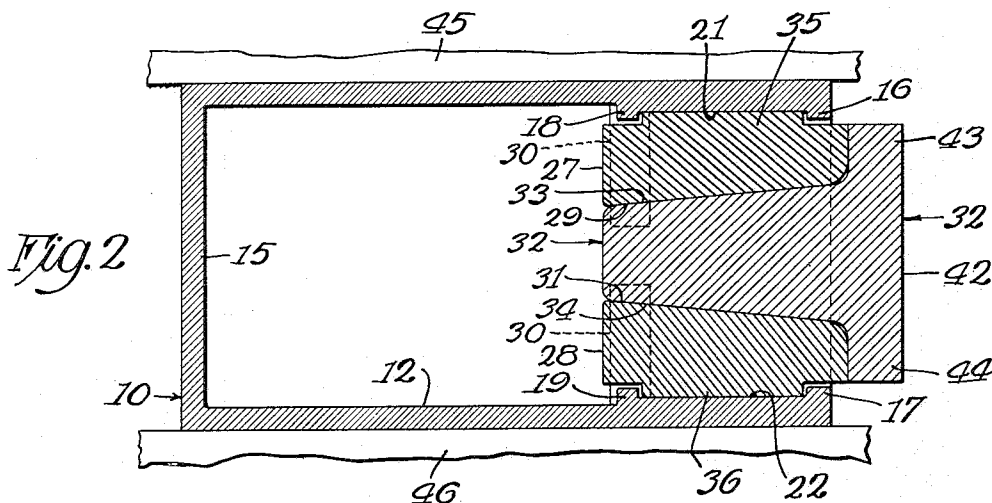
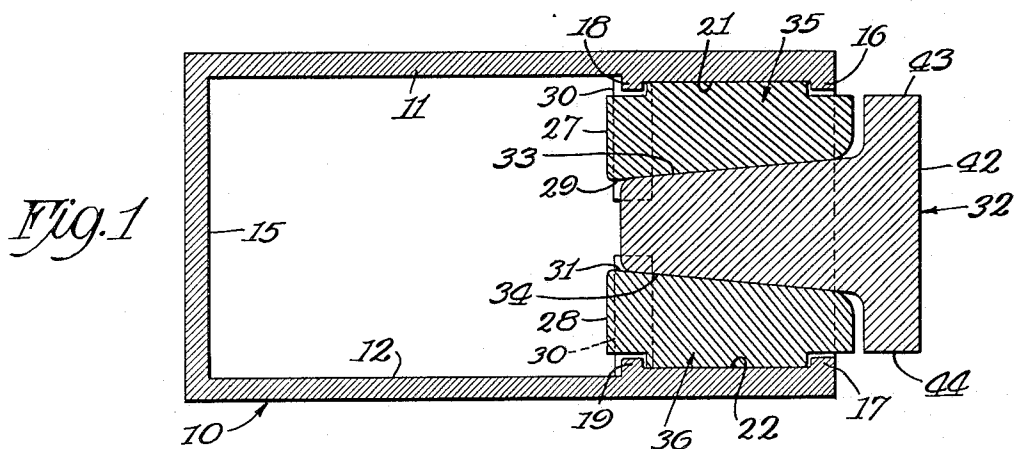
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1,955,367

METHOD OF SIZING AND SURFACING DRAFT GEAR HOUSINGS

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2 Sheets-Sheet 1



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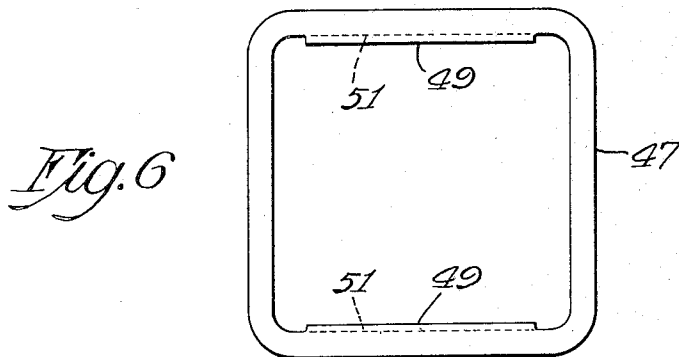
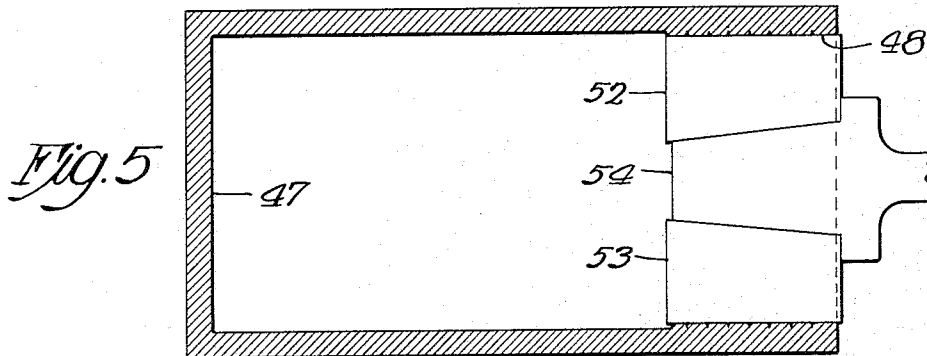
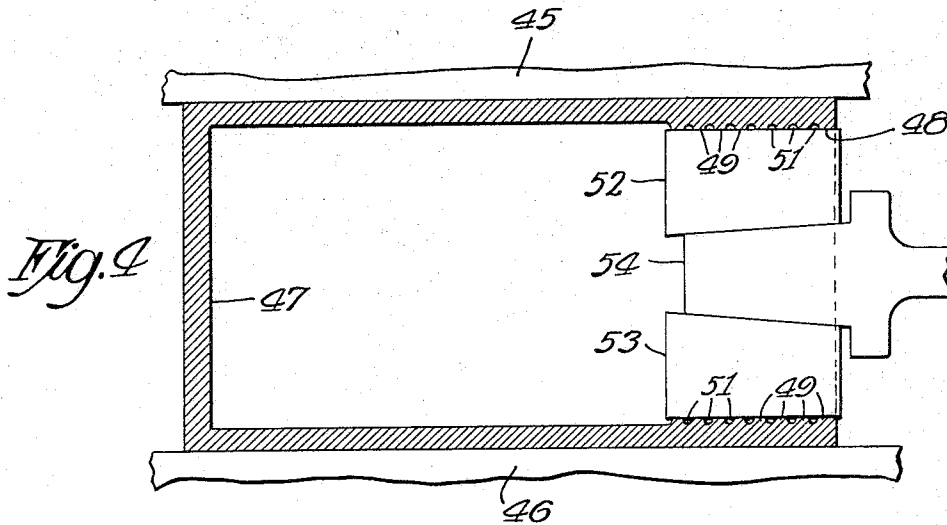
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METHOD OF SIZING AND SURFACING DRAFT GEAR HOUSINGS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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METHOD OF SIZING AND SURFACING
DRAFT GEAR HOUSINGSJoseph M. Hall, Chicago, Ill., assignor to Cardwell
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Application October 17, 1931, Serial No. 569,469

5 Claims. (Cl. 29-167)

This invention relates to draft gears, and more particularly to the housings therefor and the method of making the same.

3 An object of the invention is the provision of a new and improved method for treating or finishing the inner surfaces of draft gear housings to form suitable frictional surfaces against which the frictional members of the gear may engage.

10 Another object of the invention is the provision of a new and improved method of surfacing the interior walls of cast metallic housings and of shaping said housings to proper form.

15 A still further object of the invention is the provision of a new and improved method for sizing and finishing a draft gear housing by forcing the casing to the desired contour by tensioning the metal and then causing the walls to become smooth and permanently set by pressure.

20 Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

25 Fig. 1 is a longitudinal section of a follower casing of a draft gear with a mandrel therein and showing the first step in the process of finishing the inside surface of the follower;

Fig. 2 is a similar view showing the casing and mandrel in position in a press;

30 Fig. 3 is an end elevation of Fig. 2 with parts broken away and parts in section;

35 Fig. 4 is a vertical section of a follower casing of a draft gear shown in position in a press, with a mandrel therein, with parts in section and parts broken away, showing the first step in the process of finishing the inside surface of the follower;

Fig. 5 is a similar view showing the final step, but omitting the press; and

40 Fig. 6 is an end elevation of the casing before it has been operated upon by the press.

In the manufacture of draft gear housings, especially of the type wherein frictional plates are employed, it is necessary to true up and standardize the housing and to surface the inside frictional portions thereof. The truing and standardizing is done in a press. That is, the casing if slightly warped or a little oversize is brought to proper or required cross-sectional shape and dimensions by subjecting the same to the action of a powerful press.

50 In the frictional plate type of draft gear where there is relative movement between the inner surface of the casing and the adjacent plates, it is necessary that the inner walls of the rough casings be smoothed to form an even friction sur-

face, as otherwise friction would not be equally distributed over the surface of the plates. If the friction is not equally distributed over the surface of the plates, undue wear and scoring of the plates results. In that type of construction where there is but little relative movement between the inner surface of the casing and the adjacent plates, any inequalities will cause more or less bending or tilting of the plates with the result that they will, in use, become broken or distorted. The surfacing of the frictional surfaces of the housings has heretofore been accomplished by machining those surfaces. This is an expensive and time-consuming operation and is more or less difficult to accomplish.

70 The present invention seeks to accomplish the smoothing or surfacing of the interior frictional surfaces of the casing by pressure alone. This operation may be performed on the press and in performing the operation the casing is trued and standardized at the same time.

The housings for draft gears are preferably of malleable iron or steel and are cast in the usual manner. The inner surfaces of the casing will be rough—that is, there will be surface projections and depressions. These projections are then subjected to pressure which will cause the metal to flow into the depressions and form a smooth surface.

85 Referring now to the drawings, the reference character 10 designates a draft gear casing of a conventional type of gear, comprising what, for convenience of description, will be termed a top wall 11, a lower or bottom wall 12, side walls 13 and 14 and an end wall 15. Since the specific features of the casing constitute no part of the present invention, the casing is shown more or less diagrammatically with parts omitted in the interest of clearness.

95 The casing has its upper and lower walls at its open end provided with the inwardly extending flanges 16 and 17 and spaced inwardly from these flanges are ribs 18 and 19. The surfaces 21 and 22 between these ribs and flanges are adapted to be engaged by the adjacent friction plates when the gear is assembled.

100 The side walls 13 and 14 of the casing are also provided with flanges 23 and 24 the edges of which have curved recesses 25 and 26 arranged on the arc of a circle for providing an opening into the casing through which the large helical spring of the spring resistance may be inserted and removed. Each of the side walls 13 and 14 of the casing is provided also with a plurality of inwardly extending reinforcing ribs 20 and 30 which have

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their inner surfaces arranged to conform to the curvatures 23 and 24 for permitting the large helical spring of the spring resistance to be inserted into position within the casing.

The casing is first cast and then, in order to provide smooth surfaces for engaging the adjacent friction plates and to insure the proper shape and dimensions for the casing, suitable means are provided for pressing the surfaces 21 and 22 and for sizing and truing the casing.

As an illustration of one method of accomplishing this result, a sectional mandrel having wedge shaped sections is inserted in the end of the casing by means of a press which will force the casing to the desired shape with metal under tension. The casing is then turned down and the press applied which will cause the surface projections on the rough inner surfaces of the casing to flow into the adjacent interstices or surface depressions and produce an even, smooth surface. The mandrel is made to conform to the interior of a casing of the required shape and dimensions, hence usually after this latter operation the casing will be of the proper size and shape. If for any reason it is not of the proper shape, it may be rotated through 90° and the press again applied.

In the mechanism shown, the sectional mandrel comprises the two side wedge members 27 and 28 having their adjacent faces 29 and 31 tapered inwardly. A central wedge member 32 having converging wedge faces 33 and 34 is adapted to be inserted between the side wedge members 27 and 28.

When the mandrel is employed on a casing of the type shown, the side wedges are provided with projections 35 and 36 which are adapted to engage the surfaces 21 and 22 of the casing that are to be made smooth, and the central wedge is extended in width to form the projections 37 and 38 having the curved outer surfaces 39 and 41. The curvature of the surfaces 39 and 41 is slightly greater than the curvature of the large spring of the spring resistance whereby these surfaces will prevent the contraction of the opening provided for this spring during the pressing operation. The external diameter of the large spring being less than the distance between the two curved surfaces 25 and 26 measured along a transverse line, the spring may be very easily inserted upon removal of the mandrel after the pressing operation.

The central wedge member is provided with a cap 42 having lateral projections or extensions 43 and 44 that overlap the outer ends of the wedge members 27 and 28, respectively, and limit the inward movement of the wedge during the pressing operation. The wedge members 27 and 28 are limited in their inward movement by the engagement of the projections 35 and 36 with the ribs 18 and 19.

In practice, if a vertical press is to be employed, the casing 10 after it has been cast and annealed is stood on end and the wedge members 27, 28 and 32 inserted.

The central wedge is then forced home by a suitable power press which forces the casing to shape with the metal of the casing under tension. The casing with the mandrel therein is then turned down between the ram 45 and base 46 of a power press, as shown in Fig. 2, and the power applied. The pressure will cause the surface projections or excrescences on the wedge contacting faces 21 and 22 of the casing 10 to flow into the surface depressions, thereby making the surface flat and smooth. Since the metal has been placed under tension by the mandrel, the surface will be

more easily smoothed and the casing more easily made to assume a permanent set having the proper shape and dimensions.

Should the casing be warped to such an extent that pressure on the walls 11 and 12 is not sufficient to cause it to set or to assume the proper permanent shape or form, the casing may be turned through 90° and pressure applied to the walls 13 and 14. The reinforcing ribs 18 and 19 will engage the curved surfaces 39 and 41 and prevent collapse of these walls during the pressing operation.

The pressing operation will tend to loosen the mandrel and after said operation the wedge member 32 may be readily removed, after which the wedges 27 and 28 may be lifted out of the casing.

The form of construction shown in Figs. 4, 5 and 6 differs from that just described in that the inner face 48 at the open end of the casing is cast with small projections 49 and adjacent grooves 51. In order to form a smooth surface in the outer end of the housing for frictionally engaging the plates, not shown, suitable means are provided for causing the metal forming the projections 49 to flow laterally into the adjacent grooves 51. A convenient mechanism for pressing these projections is the use of a sectional mandrel in a press as disclosed in Figs. 1, 2 and 3 of the drawings. Since the inner face of the lower casing 47 is to constitute friction surfaces, the wedge members 52 and 53 of the mandrel have plain outer faces for engaging the surfaces 48. The central wedge member 54 may be forced home at one pressing operation, but preferably the inner wedge 54 is forced partly in by the press after which the casing may be turned down and inserted on the base 46 of the press beneath the ram 45 and the casing pressed to cause the projections 49 to flow laterally into the recess 51. These operations are then repeated until the surfaces 48 have the desired smoothness. During these operations, the surfaces 48 will not only be made smooth, but the casing 47 will be made to take the proper size, shape and dimensions.

The projections 49 preferably extend transversely of the casing in order to reinforce the casing and materially assist in resisting the spreading action of the wedge elements when the device is in use, although it is understood they may, if desired, extend longitudinally or otherwise of the casing. Furthermore, the projections may be otherwise than in the form of ribs or corrugations, it being only necessary that there be projections or surface irregularities in order that the metal may be caused to flow laterally. A smooth surface may be obtained by pressure even though no specially shaped projections be provided, inasmuch as the inner surface of the walls of the casing will be more or less rough having innumerable small and more or less irregular projections due to the casting operation and these projections may be made to flow laterally by pressure.

It is thought from the foregoing taken in connection with the accompanying drawings that the construction and operation of my device will be apparent to those skilled in the art, and that changes in size, shape, proportion and details of construction may be made without departing from the spirit and scope of the appended claims.

What I claim, therefore, is:

1. The method of making a draft gear follower casing which consists in casting the casing, annealing the same, placing the metal of the cas-

ing under tension, and while maintaining the metal under tension, smoothing the inner walls of the casing by pressure applied to the outer walls.

4. The method of finishing friction surfaces on the opposite interior walls of a cast draft gear casing which consists in inserting an expandible mandrel between the walls, expanding the mandrel for placing the metal of the walls of said casing under tension, and subjecting the exterior faces of the walls to a series of pressure applications while under tension, the mandrel being enlarged for tensioning the walls of said casing between successive pressure applications. 80

5 2. The method of correcting for warping and irregularity in the casing of a friction draft gear and simultaneously producing a finished friction working surface within the casing which comprises stretching the walls of the casing, simultaneously squeezing said walls by the application of external pressure sufficient to cause the metal to flow, and continuing the application of pressure until the metal has assumed the desired shape. 85

5. The method of straightening and sizing a friction draft gear casing which consists in placing the rough cast casing in a press, inserting an expandible mandrel in the casing, expanding the mandrel to place the metal of the casing under tension, and then operating the press to apply pressure to the opposite exterior faces of the casing until the metal of the casing is caused to flow, whereby the casing is forced to assume its desired size and shape. 90

15 3. The method of producing a finished internal friction surface in a cast draft gear casing having surface irregularities resulting from the casting operation which comprises placing the metal under tension by expanding a mandrel within the casing, and while maintaining the metal under tension applying pressure to the exterior of the casing until the metal of the casing flows and all portions of the internal friction surfaces lie substantially in the same plane. 95

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