June 1, 1926. 1,586,990

H. P. HARRISON

SPLINE SHAFT

Filed April 22, 1924

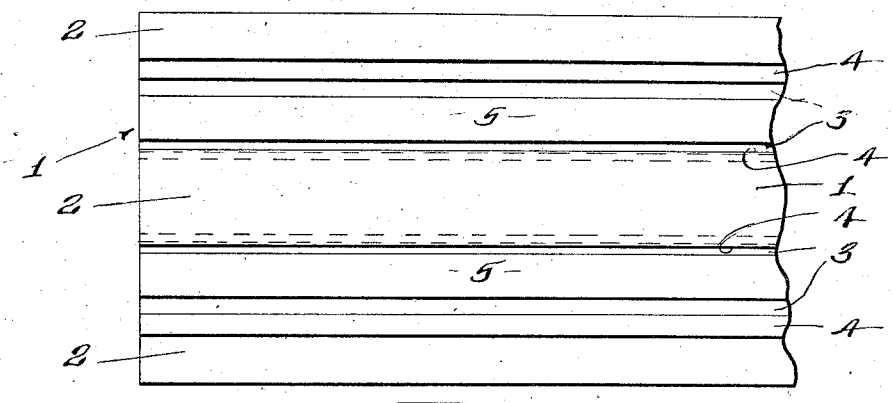

Fig. 1.

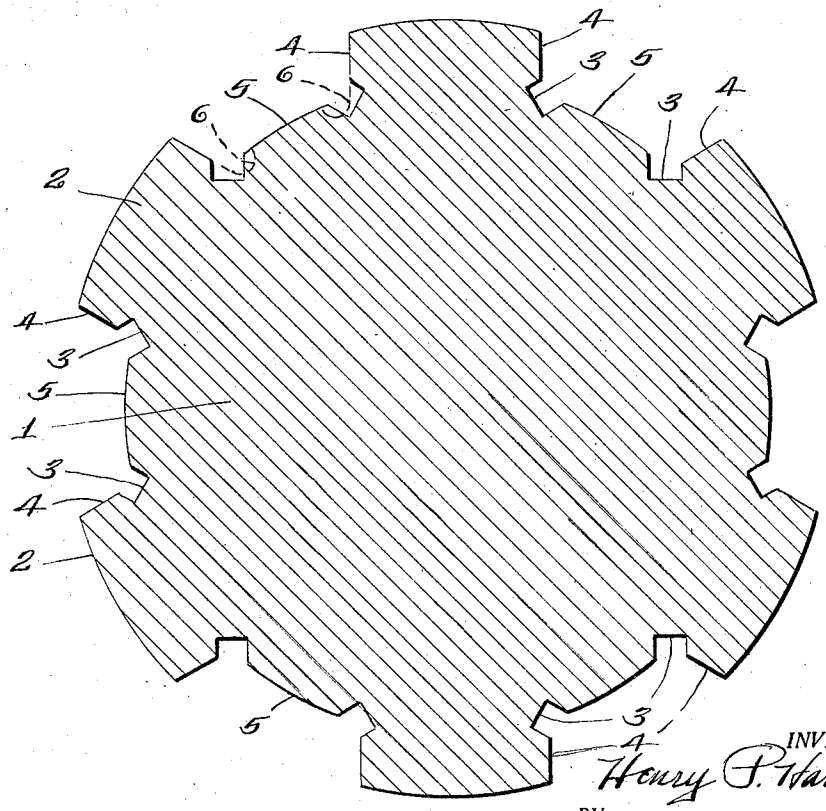

Fig. 2.

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UNITED STATES PATENT OFFICE.

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SPLINE SHAFT.

Application filed April 22, 1924. Serial No. 708,281.

This invention relates to spline shafts and the like and has for its object a spline shaft and method of forming same or method of relieving the sides of the splines whereby grinding of the spline shaft is eliminated.

The invention consists in the method and in the novel features and the constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding views in all the parts.

Figure 1 is an elevation of the spline shaft embodying my invention.

Figure 2 is a large cross sectional view of such spline shaft.

In forming spline shafts for mechanism in which extreme accuracy is required so as to avoid looseness between the spline shaft and the wheel, gear, clutch section, etc., mounted on the spline shaft, such as spline shafts used in the transmission gears, rear axles of automobiles, etc., the shafts have been cut with the splines thereon and the sides of the splines relieved with a suitable tool as a hob and thereafter the shafts ground. The grinding of the splines, in order to accurately fit the bore of the wheel or hub is a comparatively expensive precision operation.

In this spline shaft and by this method, the grinding operation is dispensed with and the splines accurately formed and hence the liability of developing inaccuracy by unskilled or lack of extreme attention during the grinding operation is avoided.

In the drawings, 1 designates the spline shaft which is shown as formed with a plurality of splines 2 which are cut from the shaft in the usual manner. The shaft is formed with a groove 3 at the corner of each side 4 of the spline and the bottom 5 of the space between the splines, this groove extending diagonally inwardly at the corner of each side 4 and bottom 5, that is, at the base of the spline and inwardly toward the central plane of the spline. The groove is usually rectangular in cross section, and the sides thereof are arranged at an inclined angle to the sides 4 of the splines and the bottom 5 of the space between the splines, although the groove is not necessarily rectangular.

Usually the median plane of the groove in the direction of its depth substantially bisects the angle formed by the bottom 5 of the space between the spline and the side 4 of the splines.

The method of forming the groove consists in cutting at the base of the spline, a groove 3 extending in the direction of its depth laterally and usually obliquely, inwardly, so that, one side thereof opens through the side 4 of the spline and the other side of the groove opens through the bottom of the space between the splines, although it is not necessary that the groove open through the bottom of the space between the splines, in order to relieve the side of the splines.

Heretofore, the splines have been relieved by a hobbing operation which cuts the splines and the bottom of the space between the splines, as indicated by the dotted lines 6, Fig. 2, and thereafter the splines are accurately ground by a grinding wheel.

This spline shaft construction, as described, requires no grinding, the cost of production is considerably less than the spline shafts which are ground, and accuracy is obtained without grinding and the liability of developing inaccuracy is avoided during the grinding operation due to variations developing in the grinder and variations due to unskilled grinding or lapses on the part of the workman.

What I claim is:

1. A splined shaft formed with grooves at the corners of the sides of the spline and the bottom of the space between the splines of such groove.

2. A splined shaft formed with an inwardly and laterally extending groove along the base of each side of the spline.

3. A splined shaft formed with laterally and obliquely extending grooves at the bases of the splines, such grooves opening through the sides of the splines and the bottom of the space between the splines.

In testimony whereof, I have hereunto signed my name, at Syracuse, in the county of Onondaga, and State of New York, this 16th day of January 1924.

HENRY P. HARRISON.