

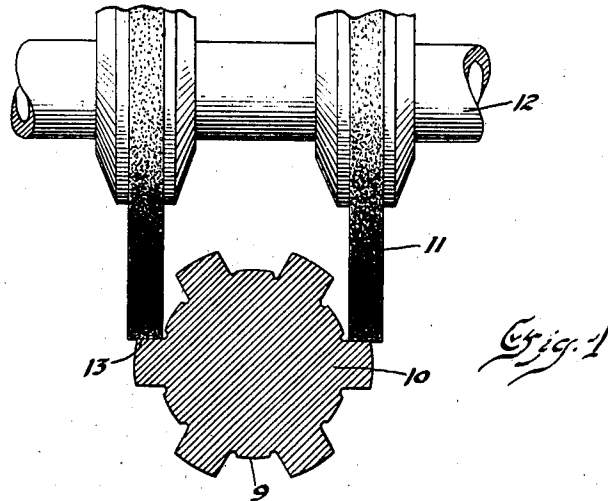
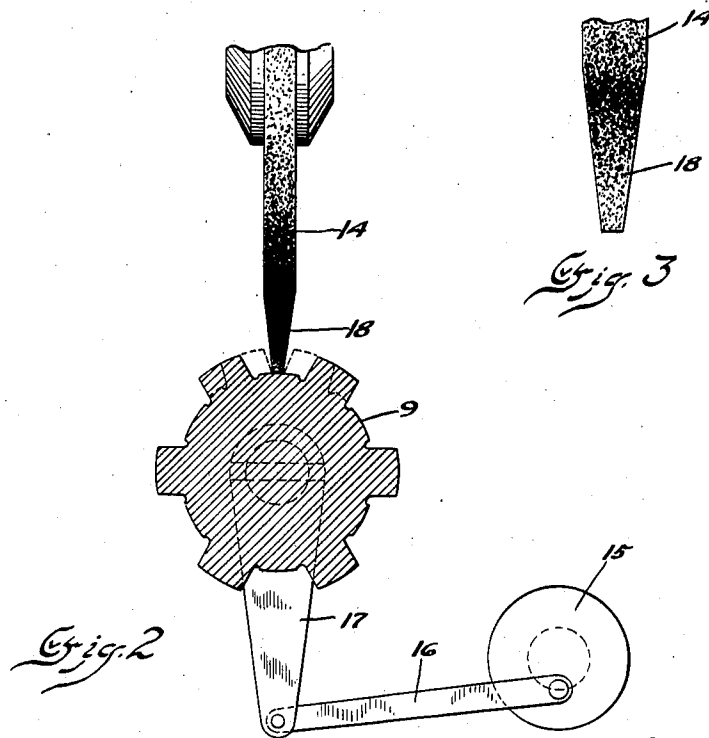
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FINISHING SPLINE SHAFTS

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FINISHING SPLINE SHAFTS

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This invention relates to new and useful improvements in the method of finishing spline shafts.

Hitherto a single grinding wheel having its periphery shaped to conform substantially to the sides and bottom of adjacent splines has been extensively employed to finish the surfaces of splined shafts. This method involved considerable expense, as it required the provision of a special grinding wheel having a perfectly shaped grinding face which, when worn down a small amount, required reshaping with special diamond set tools.

One of the objects of the present invention is to provide a novel method of utilizing ordinary flat faced grinding wheels in a simple manner to overcome the disadvantages attendant with the specially shaped wheels.

One feature of the invention comprises the simultaneous grinding of the two side faces of diametrically opposite splines, and then grinding the surface between the splines while the work is given a combined rocking and longitudinal movement.

With these and other objects in view, the invention consists essentially in the novel arrangement, construction and combination of various parts and of the various coordinated steps more particularly described in the following specification and pointed out in the annexed claims.

In the drawings,—

Fig. 1 is a fragmentary elevation view of the grinding wheels employed to finish the side faces of the splines, with the splined shaft undergoing the grinding operation shown in cross section;

Fig. 2 is a fragmentary end elevation of the grinding wheel employed to finish the surfaces between the splines, showing in cross section the splined shaft and diagrammatically the mechanism for rocking the shaft;

Fig. 3 is a detail view illustrating the preferred form of the grinding wheel for finishing the surfaces between the splines.

Like numerals of reference refer to corresponding parts.

Referring now to the drawings, a machined splined shaft 10 is, according to the invention, moved axially under a pair of grinding wheels 11, mounted upon the shaft 12. Diametrically opposite side faces 13 of the splined shaft are simultaneously given a smooth ground finish during this movement. The shaft is then rotated, and the opposite side faces of two other splines brought into position to be finished. This process is continued until all the said side faces have been ground.

Said splined shaft is next simultaneously oscillated and moved axially endwise under the grinding wheel 14 to finish the surface 9 between each of the splines.

The eccentric 15 operating through the pitman 16 and lever 17 is so arranged as to give the said shaft a rocking or oscillatory movement through an arc which is equivalent to the width of each surface 9.

The grinding wheel 14 is shown tapered as such a shape adds strength and this form will grind straight across the surface 9 without interfering with the side faces 13 of the splines, as will readily be understood with reference to the dotted lines of Fig. 2, indicating the position of each of the splines at the moment when the shaft has reached the end of its oscillatory movement. It will be obvious that instead of using a tapered grinding wheel for finishing the surfaces 9 a flat wheel is equally adaptable for this purpose.

As one surface 9 is ground, suitable mechanism (not shown) indexes the shaft to the next splines, and the wheel 14 grinds the next surface until all the shaft between the splines is ground. It is also evident that the tops of the splines may be ground in a similar manner.

From the foregoing it will readily be seen that there has been provided an efficient, practical and satisfactory method of finish grinding splined shafts or the like, which performs the operation uniformly and evenly, is independent of wear in the grinding wheels, results in a substantial economy in the finishing operation, and greatly lengthens the life of the grinding wheels.

Modification of the above may be made

within the spirit and scope of the invention.

I claim:

1. The method of finishing a spline shaft which consists in rocking to and fro and moving the shaft axially and simultaneously grinding the surface between two adjacent splines.
2. The method of finishing a toothed member which consists in moving the member axially and simultaneously grinding the side faces of a plurality of teeth, and thereafter rocking and moving the said member axially and simultaneously grinding the surface between adjacent teeth.
3. A method of finishing a splined shaft which consists in moving the shaft endwise, simultaneously grinding the side faces of two splines, then rotating the shaft intermittently and completing the grinding of each spline, and finally giving the said shaft a combined axial and circumferential movement and simultaneously grinding the surface between said splines.
4. A method of finishing a splined shaft which consists in imparting a relative movement between a rotary grinding wheel and the said shaft for simultaneously grinding the side faces of two diametrically opposite splines, rotatively adjusting the shaft with respect to the said grinding wheel to successively grind all side faces of the splines, and finally imparting to the shaft and a single grinding wheel a relative combined axial and circumferential movement and grinding the surface between each of said splines.
5. The method of grinding a splined shaft which consists in rotating and axially moving the shaft, applying a grinding wheel rotating about an axis at a right angle to the axis of said shaft and simultaneously grinding the surface between adjacent splines of said shaft.

In testimony whereof I affix my signature.
FORREST T. ELLIS.