June 5, 1934. R. THOMSON 1,961,257

THREAD ROLLING DIE

Filed Feb. 12, 1932

Fig. 1.

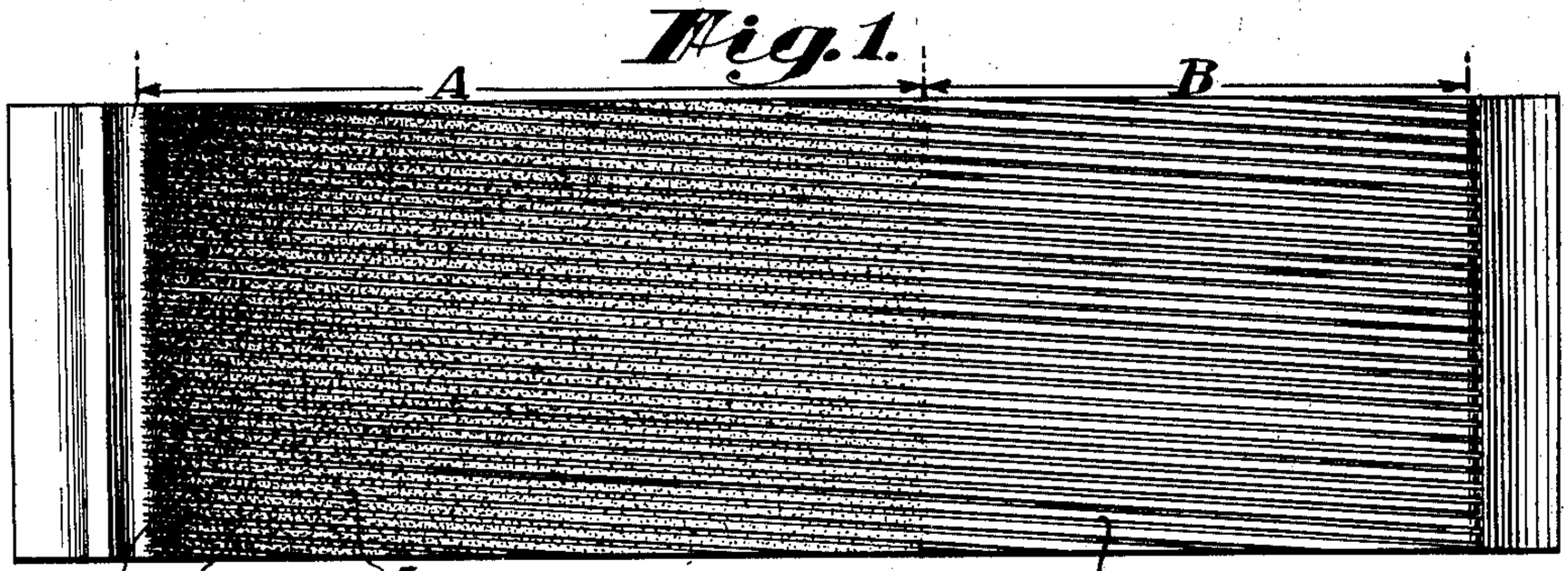


Fig. 2.

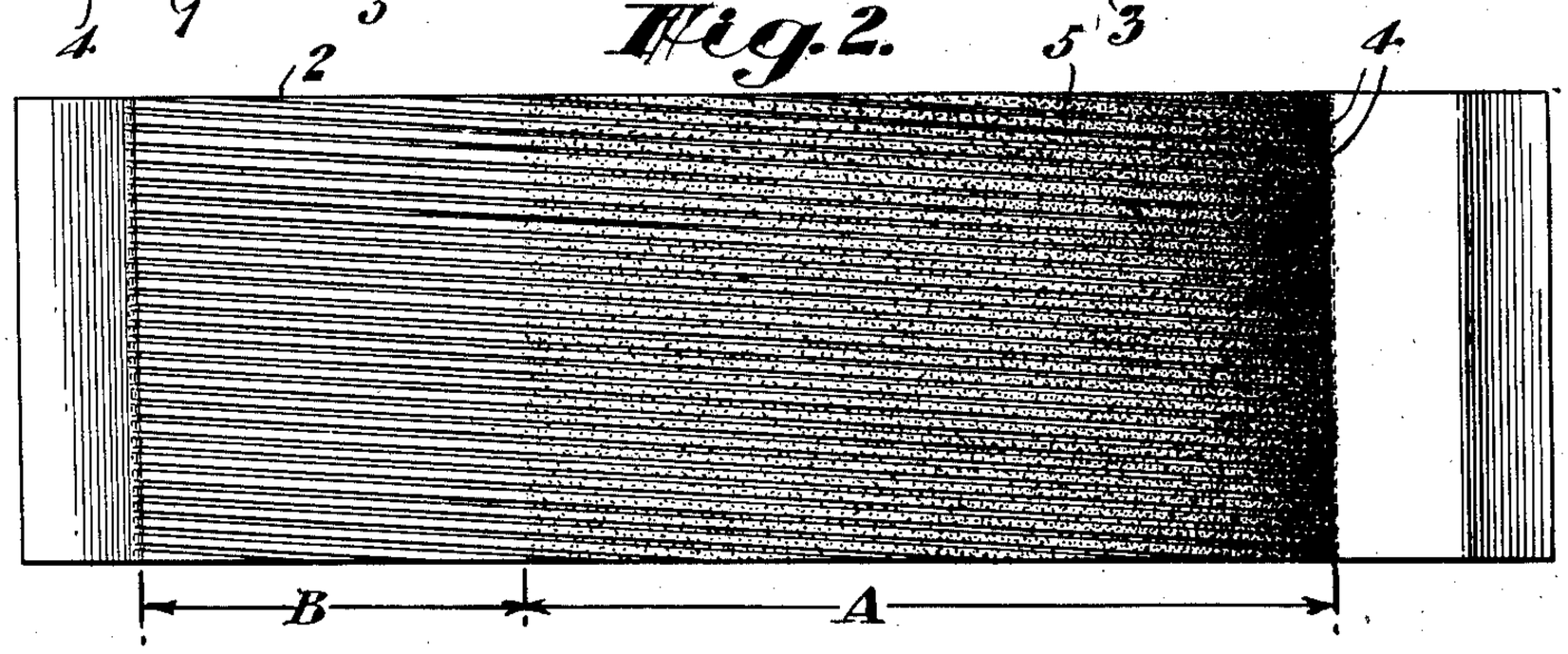


Fig. 3.

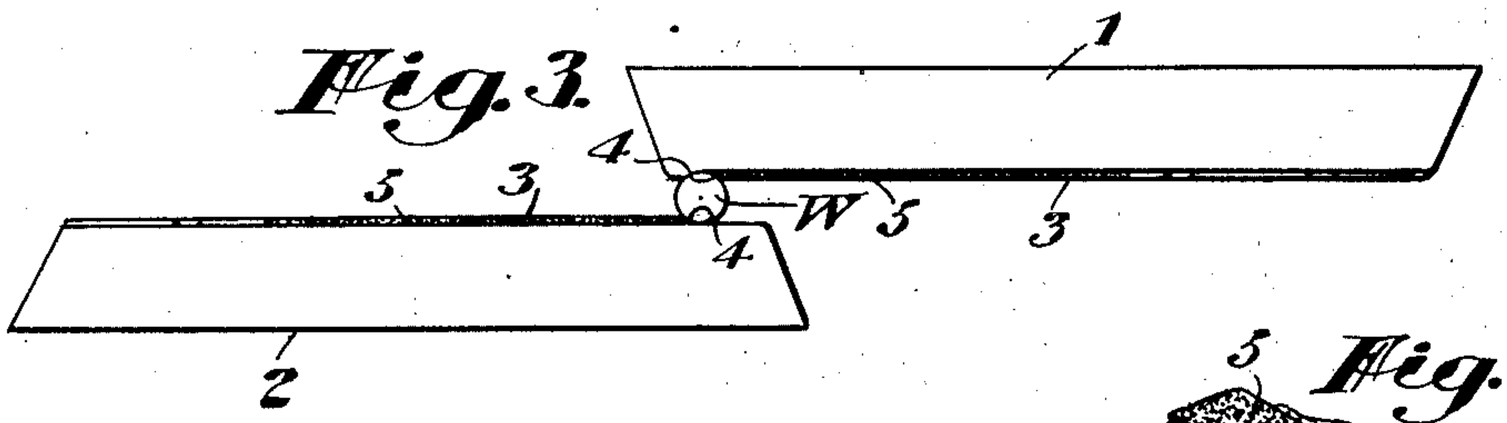


Fig. 4.

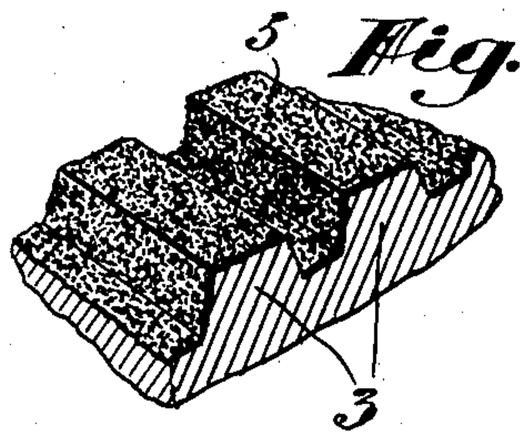


Fig. 5.

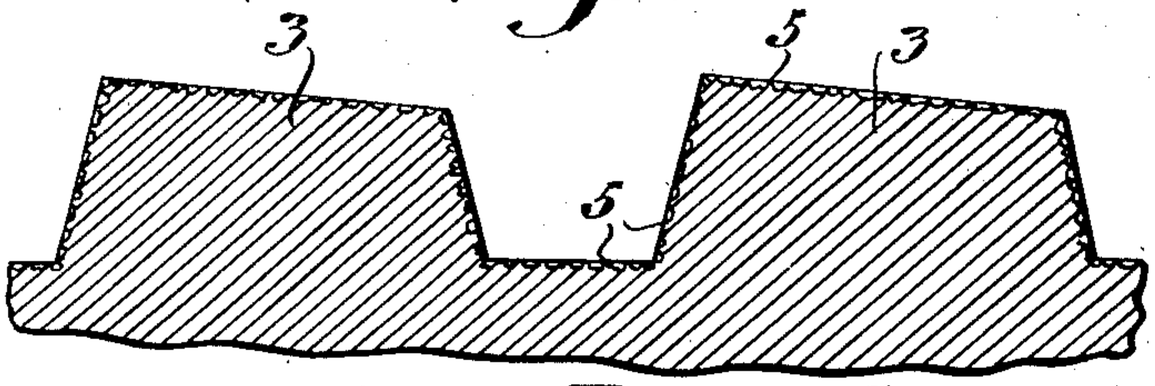
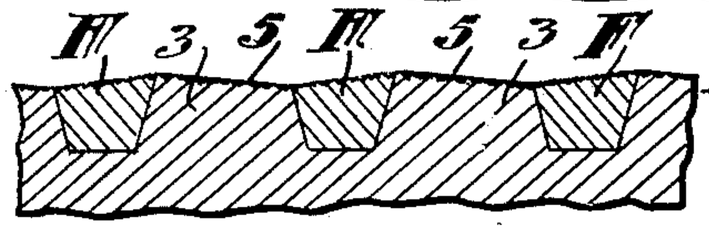


Fig. 6.



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1,961,257

THREAD ROLLING DIE

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Application February 12, 1932, Serial No. 592,542

11 Claims. (Cl. 80—9)

Important objects of the present invention are, to improve the tractive effect of rolling dies and prevent slippage between the dies and the work and consequent distortion of the work, and to provide thread rolling dies having their thread-forming serrations roughened in an improved manner to give them a required tractive effect.

Other objects of the invention will appear hereinafter.

In the drawing:

Fig. 1 is a face view of one of a pair of cooperative thread rolling dies embodying my invention;

Fig. 2 a face view of the other die;

Fig. 3 an edge view of the dies upon a reduced scale showing them in cooperating relation at the beginning of a thread rolling operation;

Fig. 4 an enlarged sectional perspective view of a portion of one of the dies;

Fig. 5 an enlarged cross-sectional view of several of the thread-forming serrations of one of the dies; and

Fig. 6 a view similar to Fig. 5 showing a manner of protecting the grooves of the thread-forming serrations of the die during a roughening operation thereon so that the crests only of the serrations will be roughened.

The bodies of the dies are flat, rigid plates preferably formed of high speed steel and shaped for mounting in a standard thread rolling machine. The die which is to be mounted in the machine for reciprocation is designated 1 and the fixed die is designed 2. Each has a rectangular working face serrated to form thread-forming ribs, or ridges 3, inclined according to the helix angle of the thread to be rolled and beveled at their leading ends as at 4.

In the preparation of each die the serrated face thereof is accurately finished throughout the entire length of the serrations by finding or lapping. Then the serrated face is subjected to a roughing treatment to increase its tractive effect upon the work during the early part of the thread-forming operation. In this treatment a leading length A of the die face, including the leading ends of the serrations, is subjected to a spraying operation which produces a stippled roughness 5, in the form of minute pits. Preferably this roughness is produced by very forcible sand-blasting. It may, however, be produced by an acid spray or otherwise. During the roughening operation the remaining length B of the die is covered by a shield which protects the serrations and keeps them free from roughness and in condition for performing the thread-finishing operation. Preferably the roughness 5 diminishes gradually and approximately uniformly from the leading ends of the serrations inward to the beginning of the finishing length B of the serrations. This diminution is produced by gradually increased diffusion of the minute pits. In the present instance the roughness extends over the full width of the die face and it covers the crests, sides and beveled ends of the thread-forming ribs 3, and the bottoms of the grooves between the ribs. The surfaces and areas covered by the roughness may be varied, however, to suit different requirements.

Along their roughened leading length A, the dies perform most of their thread-forming operation and the bolt blank or other work piece W operated on by the dies is firmly gripped by the roughened serrations for positive tractive effect. Thereby slippage between the dies and the work piece and consequent distortion or lobing of the work piece is prevented. When the work piece is passed on from the length A of the dies to the following, finishing length B, the smooth serrations in length B remove any roughness which may have been imparted to the thread and act to accurately finish the thread. Preferably the length A includes several turns of the work piece and the length B includes at least one complete turn of the work piece.

In the present instance the thread-forming ridges 3 of the two dies have a cross sectional contour designed for forming the well-known Dardelet type of thread disclosed in U. S. Patent No. 1,657,244. The ridges are materially wider than the grooves between them, the crests of the ridges make an angle of preferably six degrees with the die faces and their side faces converge outward slightly. Such die ridges will form, upon a bolt or similar work piece, an external thread having a groove materially wider than its rib and a sloping root surface adapted for self-locking coaction with a similarly sloping surface upon the crest of an engaged internal thread. This self-locking coaction is obtained by relative crosswise displacement of the engaged threads upon relative turning of the threaded members without axial advance. It is most desirable that threads of this character be accurately formed in order that they will coact properly for self-locking. The present invention contributes materially to the accurate forming of such threads by the rolling process.

If it is desired to have only the crests of the die ribs roughened the grooves between the ribs 3 of the die may be temporarily charged with a suitable filler F, as shown in Fig. 6. This filler

may be of any suitable material. Preferably a plastic material such as plaster of Paris or putty is employed, and after the roughening operation it is removed. The filler shields the bottoms and sides of the groove from the sand blasting or other roughening treatment. In a thread rolling operation the portion of the work piece W which protrudes into the grooves of the dies, owing to its greater diameter, must move at a greater lineal speed than the portion which rolls upon the rib crests. Consequently there is slippage of the surfaces of the work piece in engagement with the sides and bottoms of the grooves. Omission of the roughness from the sides and bottoms of the grooves enables said surfaces of the work piece to slip more freely.

What I claim is:

1. A pair of cooperative thread rolling dies each comprising a body provided with a serrated thread-forming die surface having a leading work-engaging length along the serrations roughened for tractive engagement with the work to prevent slippage and a following length along the serrations free from roughness to finish the thread on the work.

2. A pair of cooperative thread rolling dies each comprising a body provided with a serrated thread-forming die surface having a leading work-engaging length along the serrations roughened for tractive engagement with the work to prevent slippage and a following length along the serrations free from roughness to finish the thread on the work, said roughness diminishing gradually lengthwise of the serrations toward said following thread-finishing length.

3. A pair of cooperative thread rolling dies each comprising a body provided with a serrated thread-forming die surface having a leading work-engaging length along the serrations roughened for tractive engagement with the work to prevent slippage and a following length along the serrations free from roughness to finish the thread on the work, said roughness being in the form of minute pits distributed over the serrations.

4. A pair of cooperative thread rolling dies each comprising a body provided with a serrated thread-forming die surface having a leading work-engaging length along the serrations roughened and a following length along the serrations free from roughness to finish the thread on the work, said roughness being in the form of minute pits distributed over the serrations and in gradually increasing diffusion toward said following thread-finishing length.

5. A pair of cooperative thread rolling dies each provided with a serrated thread-forming die surface having a leading work-engaging length along the serrations roughened from the leading ends of the serrations inward and a following length along the serrations free from roughness to finish the thread on the work, said roughness being in the form of minute, distributed pits in gradually increasing diffusion toward said following thread-finishing length of the die surface.

6. A pair of cooperative thread rolling dies each provided with a serrated thread-forming die surface having a leading work-engaging length thereof along the serrations roughened from the leading ends of the serrations inward and a following length along the serrations free from roughness to finish the thread on the work, said roughness being in the form of minute pits distributed over the crests, sides and groove bottoms of the serrations.

7. A pair of cooperative thread rolling dies each provided with a serrated thread-forming die surface having a leading work-engaging length thereof along the serrations roughened from the leading ends of the serrations inward and a following length along the serrations free from roughness, to finish the thread on the work, said roughness being in the form of minute pits distributed over the crests, sides and groove bottoms of the serrations in gradually increasing diffusion toward said following thread-finishing length of the die surface.

8. A thread rolling die comprising a body provided with a serrated thread-forming die surface having a leading work-engaging length along the serrations roughened for tractive engagement with the work to prevent slippage and a following length along the serrations free from roughness to finish the thread on the work, said roughness diminishing gradually lengthwise of the serrations toward said following thread-finishing length.

9. A thread rolling die comprising a body provided with a serrated thread-forming die surface having a leading work-engaging length along the serrations roughened for tractive engagement with the work to prevent slippage and a following length along the serrations free from roughness to finish the thread on the work, said roughness being in the form of minute pits distributed over the serrations and in gradually increasing diffusion toward said following thread-finishing length.

10. A thread rolling die provided with a serrated thread-forming die surface having a leading work-engaging length thereof along the serrations roughened for tractive engagement with the work to prevent slippage and a following length along the serrations free from roughness to finish the thread on the work, said roughness being in the form of minute pits distributed over the crests, sides and groove bottoms of the serrations.

11. A rolling die provided with a die surface longitudinally serrated to engage and form the work and having a leading work-engaging length of the serrations roughened for tractive engagement with the work to prevent slippage and a following length of the serrations free from roughness to finish the work.

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