(No Model.)

W. L. AMES.

DIE FOR ROLLING SCREW THREADS.

No. 594,339. Patented Nov. 23, 1897.

Fig. 1.



Fig. 2.

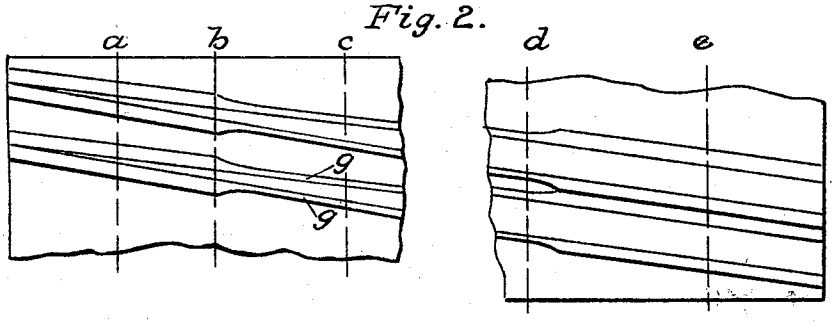


Fig. 3.



Fig. 4.

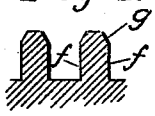


Fig. 5.



Fig. 6.

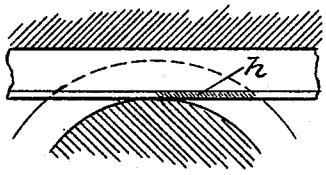


Fig. 7.

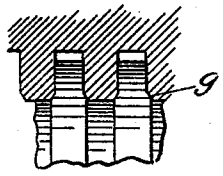


Fig. 8.

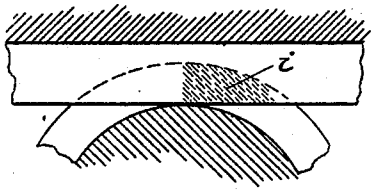
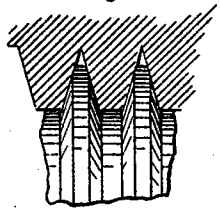


Fig. 9.



Witnesses.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM L. AMES, OF WORCESTER, MASSACHUSETTS.

DIE FOR ROLLING SCREW-THREADS.

SPECIFICATION forming part of Letters Patent No. 594,339, dated November 23, 1897.

Application filed July 6, 1897. Serial No. 643,683. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. AMES, a citizen of the United States, residing in Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Dies for Rolling Screw-Threads, of which the following is a specification.

My invention relates to dies for forming screw-threads by the rolling or swaging action of the dies upon suitably-prepared blanks, and is particularly applicable to dies for rolling wood-screws.

The object of the invention is to produce threads of a superior quality with a minimum of power required in forming the same. This object is attained by means illustrated in the accompanying drawings, in which—

Figure 1 represents a plan view of a screw-rolling die; Fig. 2, an enlarged partial plan view of a die, showing two adjacent ribs; Figs. 3, 4, and 5, sections of the ribs shown in Fig. 2 at the lines *a*, *c*, and *e;* Fig. 6, a partial end view of unfinished screw with partial side view of rib in position for rolling the thread; Fig. 7, an edge view of thread shown in Fig. 6 with section of die in position. Figs. 8 and 9 show a part of the ordinary die and unfinished screw corresponding to Figs. 6 and 7.

My improvement consists in a novel form of rib and is applicable to straight or curved dies having ribs arranged parallel or divergent or to dies for rolling straight or gimlet-pointed screws. For simplicity of illustration I have shown in my drawings a straight die for rolling wood-screw threads, in which the faces of the ribs are of increasing width from the entering end to the beginning of the finish at *d*, Fig. 2. At the entering end the faces of the ribs are reduced to a narrow edge for the purpose of easily entering the blank. The section of the ribs, Fig. 3, taken at the line *a*, Fig. 2, shows the sides of the rib diverging toward the base in order to give strength to the rib.

Proceeding now toward the finishing end of the die, as soon as the faces of the ribs are wide enough to insure sufficient strength the sides are so formed as to show in cross-section parallel lines *f f*, Fig. 4, with the exception of a small portion of the sides adjacent to the top or face of the rib *g*, Figs. 4 and 7. This small portion is beveled or chamfered preferably to an extent such that the plan view of the chamfered edge *g*, Fig. 2, should at least equal in width one-half the amount by which the groove is widened by the rib at that point. This form of rib continues till the width of the partially-formed thread is nearly or quite reduced to the width of the base of the desired finished thread. From the point *d*, Fig. 2, the form of the groove between the ribs corresponds to the form of the thread on the finished screw. The advantage of this form of rib over those now in use is due to the reduction of the area of surface of the metal undergoing swaging action at any point of the rolling from *b* to *d*, Fig. 2. This will be evident from a comparison of Figs. 6 and 8, in which the shaded portions *h* and *i* indicate the area of contact between the ribs of the die and the sides of the threads in the improved die, Fig. 6, and the ordinary form of die, Fig. 8.

It is a well-known fact that the resistance of any material to crushing is directly proportional to the areas in contact. Consequently not only is a greater pressure required between the surface of the die and thread, (shown in Figs. 8 and 9,) but the metal is there hindered from flowing radially, whereas with the improved die the pressure between the die and blank is reduced and the outward flow of the metal practically unhindered. Again, since there must be some sliding action between the sides of the ribs and the sides of the threads this pressure will cause considerable frictional resistance to the relative motion of such dies, as shown in Figs. 8 and 9, but which is not to such an extent encountered in the improved form.

In the above description in referring to the sides of the rib of the die I wish to be understood as meaning that portion of the sides which come in contact with the metal of the screw, it being evident that the remainder of the side can have no part in forming the thread, and may therefore be of any convenient form.

I claim as my invention—

A die for rolling screw-threads, having its

face provided with alternate grooves and ridges or ribs, the latter being narrow at the entering end of the die and increasing in width to the finishing part of the die, and for a part of this distance of such form that the cross-section outline thereof shall have parallel sides for a portion of the working depth, while for the remainder, or finishing portion of the die, the section of the ribs corresponds to the grooves—or space between threads— on the finished screw.

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