

(No Model.)

H. K. JONES.  
DIE FOR ROLLING SCREW THREADS.

No. 502,256.

Patented July 25, 1893.

Fig 1.

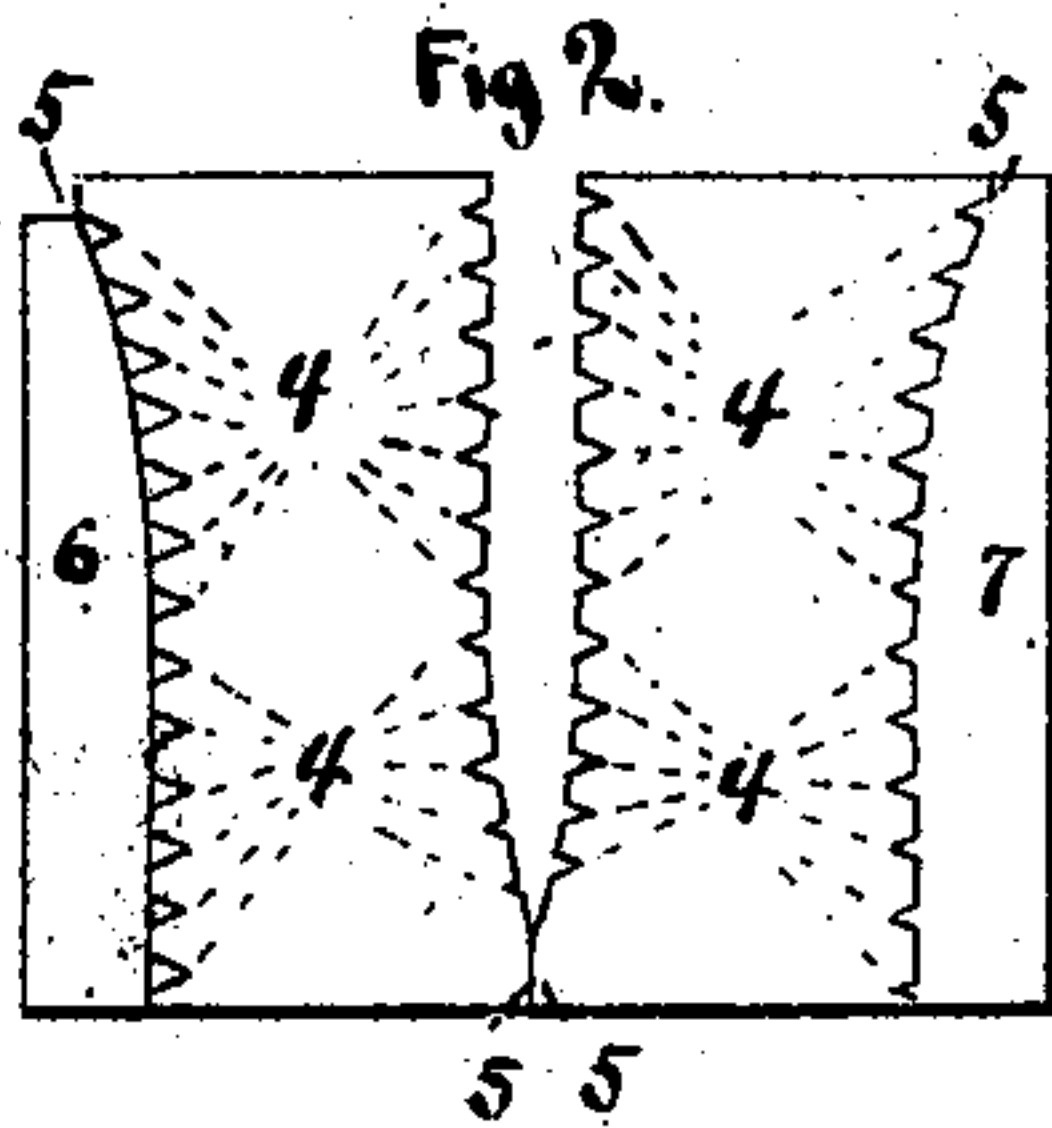
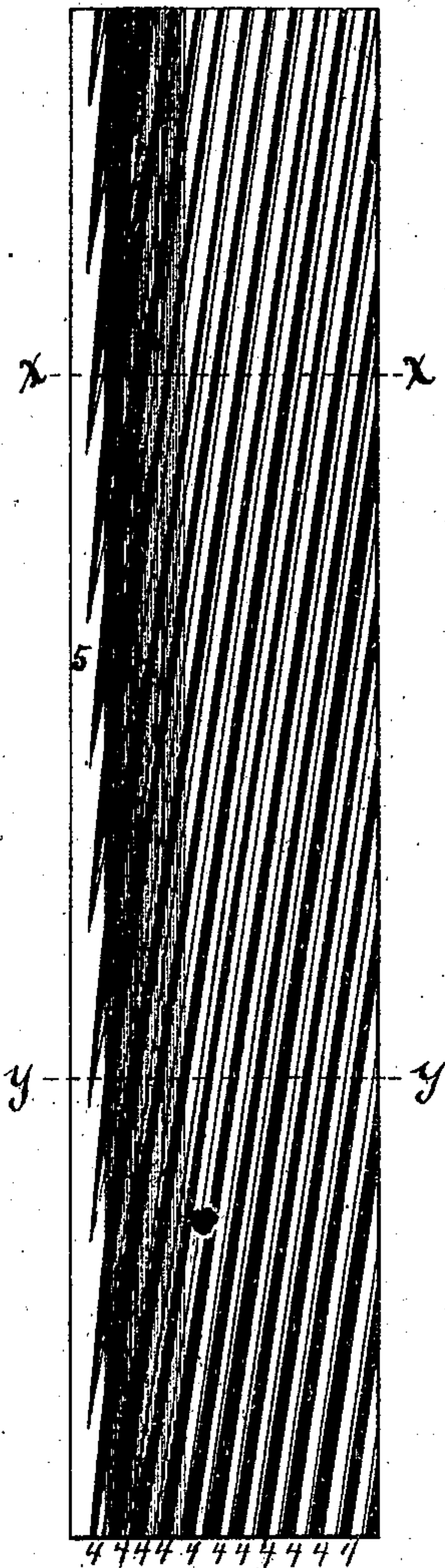


Fig. 3.

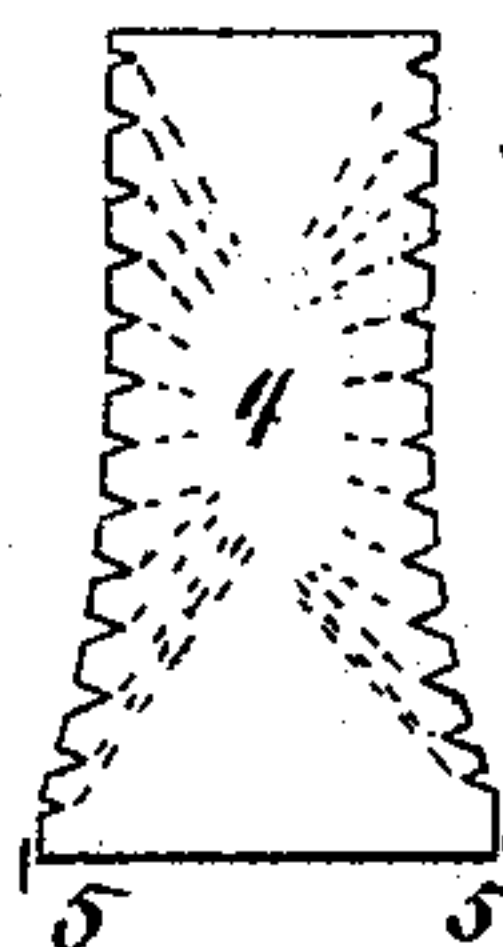
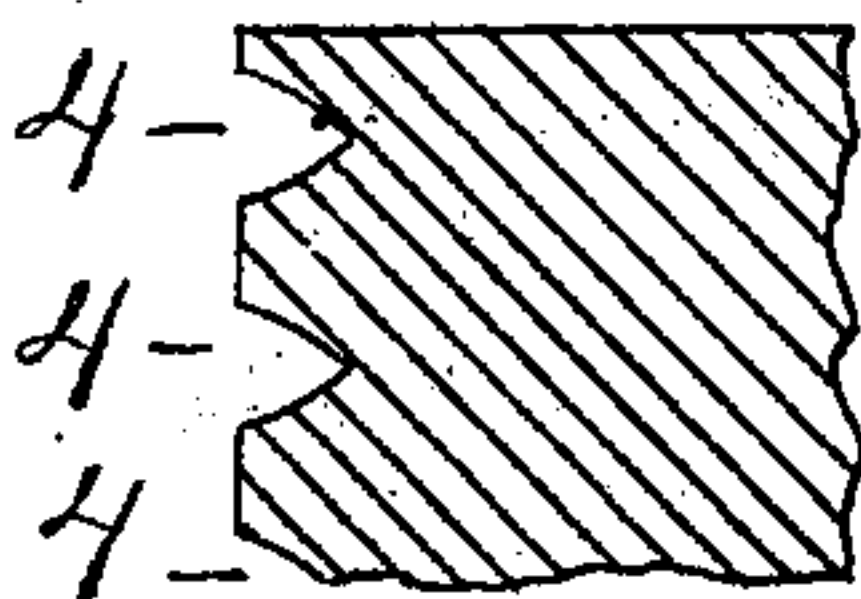


Fig. 4.



Witnesses.

B. S. Lewis.

F. H. Griswold.

Fig. 6.

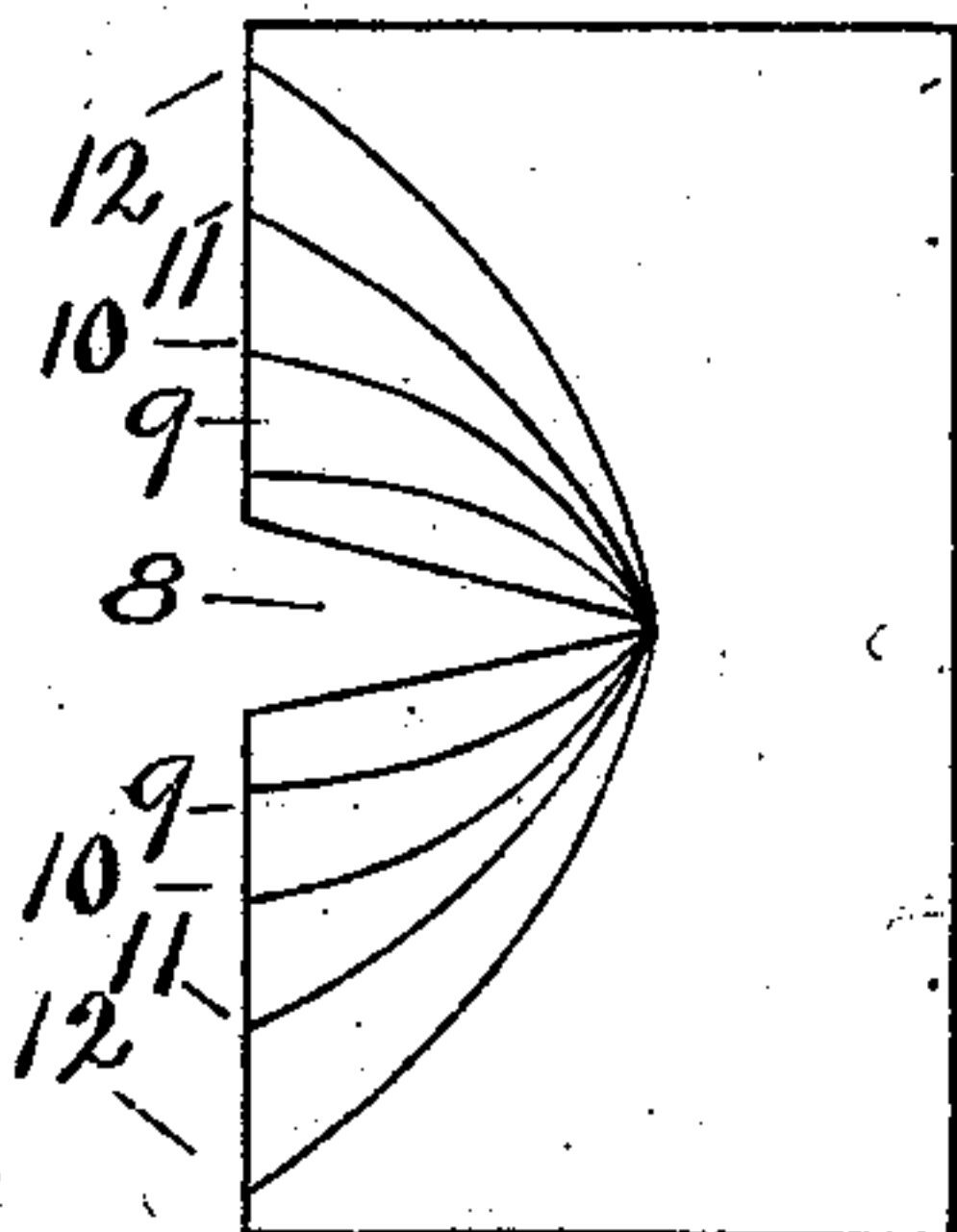
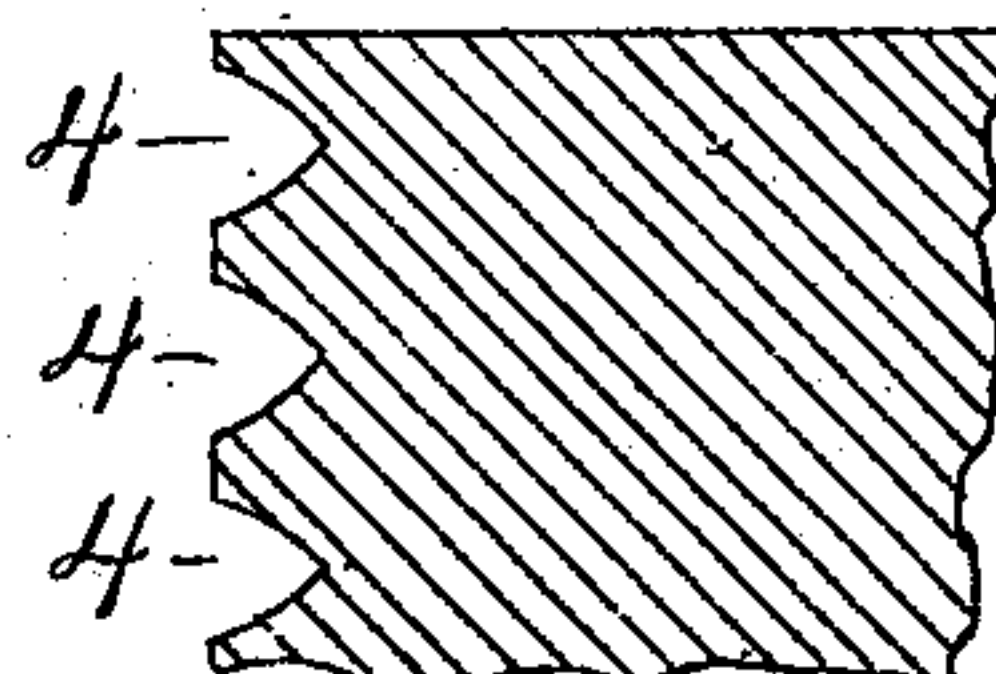


Fig. 5.



Inventor.

Horace K. Jones.

By James Shepard.

Atty.



# UNITED STATES PATENT OFFICE.

HORACE K. JONES, OF HARTFORD, ASSIGNOR TO THE RUSSELL & ERWIN MANUFACTURING COMPANY, OF NEW BRITAIN, CONNECTICUT.

## DIE FOR ROLLING SCREW-THREADS.

SPECIFICATION forming part of Letters Patent No. 502,256, dated July 25, 1893.

Application filed May 24, 1892. Serial No. 434,151. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE K. JONES, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Dies for Rolling Screw-Threads, of which the following is a specification.

My invention relates to improvements in dies for rolling ribs or screw threads and the objects of my improvement are economy in metal and labor in making the dies, increased wear of each die block and the production of a die of a more perfect form.

In the accompanying drawings Figure 1 is a face view of my die. Fig. 2 is an end view showing the finishing end of a pair of such dies, together with a suitable backing for blocking them up for being held in the die holder. Fig. 3 is an end view of one of my dies with the point threading portion differently placed thereon. Fig. 4 is an enlarged sectional view of a portion of one of my dies on the line  $x x$  of Fig. 1. Fig. 5 is a like view on the line  $y y$  and Fig. 6 is a diagram illustrating the form of said die groove in transverse section at various points along its length.

My dies are of the class in which the confronting faces of a pair of long blocks are provided with alternate grooves and ridges for rolling a screw thread as said blocks are reciprocated relative to each other with a proper blank under pressure between them and so far as some features of my invention are concerned these grooves and ridges may be of any known form. Examples of such die may be found in my Patents No. 425,035, dated April 8, 1890, and No. 444,554, dated January 13, 1891. The grooves 4 as shown in this application are V shaped in cross section varying from a true V to a modified V with concave sides, but they may of course have for a part of their length the rounded groove or the truncated V shaped groove as specified in said prior Patent No. 425,035. Heretofore these dies have had the alternate ridges and grooves on one face while the opposite or back face is plain. When the point threading portion is employed this makes a die block of a still less

symmetrical form and one that is much thicker at one edge than at the other.

In my improved die I make both faces alike, that is to say, there are alternate ridges and grooves extending over the body and point threading portions on both of the opposite broad sides as shown in Figs. 1, 2 and 3. I prefer to place the point threading portions on diagonally opposite corners as shown in Fig. 2, so that the upper and lower edges of the die block are of the same thickness. But owing to the projection of said point rolling portion the die blocks are not of the proper shape to be clasped by the ordinary straight faced jaws of the die holder. I therefore provide a backing like either of the backing blocks 6 or 7, to build up the back to facilitate holding the die in the die holder. This backing may have a plain face and the tops of the ridges between the grooves on the confronting side of the die, rest upon said plain face as shown by block 6 Fig. 2, or it may have a ribbed and grooved face that fits the ribs and grooves on the confronting face of the die as shown by the block 7 in Fig. 2. Such a block can readily be formed by running molten metal, as for instance type metal upon the face of the die. These blocks may either of them extend up substantially even with the top of the die as at 7 or fall a little below the same as at 6 and they may be of any desired thickness.

My die can be made of a thin block of metal, and a pair of them can be made with a saving in labor over making a pair of ordinary dies. Both faces are capable of use, thereby getting double the amount of wear from each block. A very decided advantage is also gained in tempering inasmuch as there is much less tendency to warp or break owing to the uniformity in all the opposite faces of each block and the equal thickness of the upper and lower edges as in Fig. 2, or the other symmetrical arrangement of them as shown in Fig. 3.

While my double faced die may have ordinary forms of die grooves I prefer to make the grooves of a true V shape at or near the finishing end of the die as shown by the end views Figs. 2 and 3 and with a tapering portion having concave and warped sides meet-



ing each other at the bottom of the grooves and whose angle of inclination gradually and constantly changes along their length as may be seen by comparing the true V shaped grooves of Fig. 2 with the successive sections at the points  $x x$  and  $y y$  shown in Figs. 4 and 5 or by the diagram Fig. 6 in which the true V shaped portion is shown in the middle at 8, the concave side at another point along the length of the tapering grooves at some distance therefrom as at 9 and so on for different points successively along the length of the grooves as at 10, 11 and 12, the change in shape from one to the other of each of these forms being gradual and constant throughout. I make said grooves with a single pass of a variably moving cutter. In edge view this cutter is V shaped, in side view it is oval, the difference between its shorter and longer diameter being substantially equal to or in excess of the depth of the die groove. The cutter is mounted to rotate on one axis and to vibrate on an axis that extends transversely to said rotating axis and is controlled by special mechanism. The apparatus for making this die as well as one form of die produced by said apparatus is made the subject matter of another application, Serial No. 434,152, filed May 24, 1892.

For making screw threads the ribs and grooves run obliquely along the face of the die block and the same form of ribs and grooves in transverse section will roll circumferential ribs if made parallel to the longitudinal edges of the die block. A rotating cutter of elliptical contour in side view vibrating upon its major axis which passes at right angles through the axis of rotation will make a groove the cross-section of which at any point will be the segment of an ellipse, the proportions of the ellipse being governed by the extent of the vibration of the cutter. This form of die groove may vary somewhat by the variable motion given to the cutter teeth and the length of the die block or degree of taper and consequent running together of adjacent grooves near one end of the dies, or making the groove deeper at one end, or by the form of the teeth in edge view, but in all of them the tapering portions of the grooves have concave sides meeting at an angle in the bottom and gradually warped along their length with a constantly changing slope. Such a die is more efficient for some uses and produces a better thread.

I claim as my invention—

1. The combination of a die block for rolling ribs or screw threads having alternately ribbed and grooved body rolling portions and

point rolling portions on its opposite faces, with a backing one side of which is fitted to one of said faces while its opposite or back side lies in a plane that projects beyond the point threading portion on that side of said block which confronts said backing substantially as described and for the purpose specified.

2. A die block for rolling ribs or screw threads having alternate ribs and grooves for rolling the body portion on its opposite faces and having also ribbed and grooved point rolling portions symmetrically arranged on said opposite faces, substantially as described and for the purpose specified.

3. A die block for rolling ribs or screw threads having alternate ribs and grooves on its opposite faces for rolling the body portion and having also the ribbed and grooved point rolling portions at diagonally opposite corners on said opposite faces, substantially as described and for the purpose specified.

4. A die for rolling ribs or screw threads with alternate tapering grooves and ridges, the tapering portions of the grooves having concave sides meeting each other at an angle in the bottom of the groove substantially as described.

5. A die for rolling screw threads having alternate tapering grooves and ridges, the grooves in which are of a V shape in cross section at or near the finishing end and in the form of a modified V with concave sides at or near the entering end, while between said two forms the grooves taper with a gradual and continuous change in shape for the entire distance, substantially as described and for the purpose specified.

6. A die for rolling raised threads or ribs upon cylinders or other circular forms of metal having alternate tapering ridges and grooves, the form of the latter being in cross-section the segment of an ellipse, with the smaller curve thereof at the bottom of the groove, substantially as described and for the purpose specified.

7. A die for rolling raised threads or ribs upon cylindrical or other circular forms of metal having alternate tapering ridges and grooves, the form of the latter being in cross-section the segment of an ellipse the proportions of which vary as the width of the grooves increases, substantially as described and for the purpose specified.

HORACE K. JONES.

Witnesses:

THOS. S. BISHOP,  
M. S. WIARD.