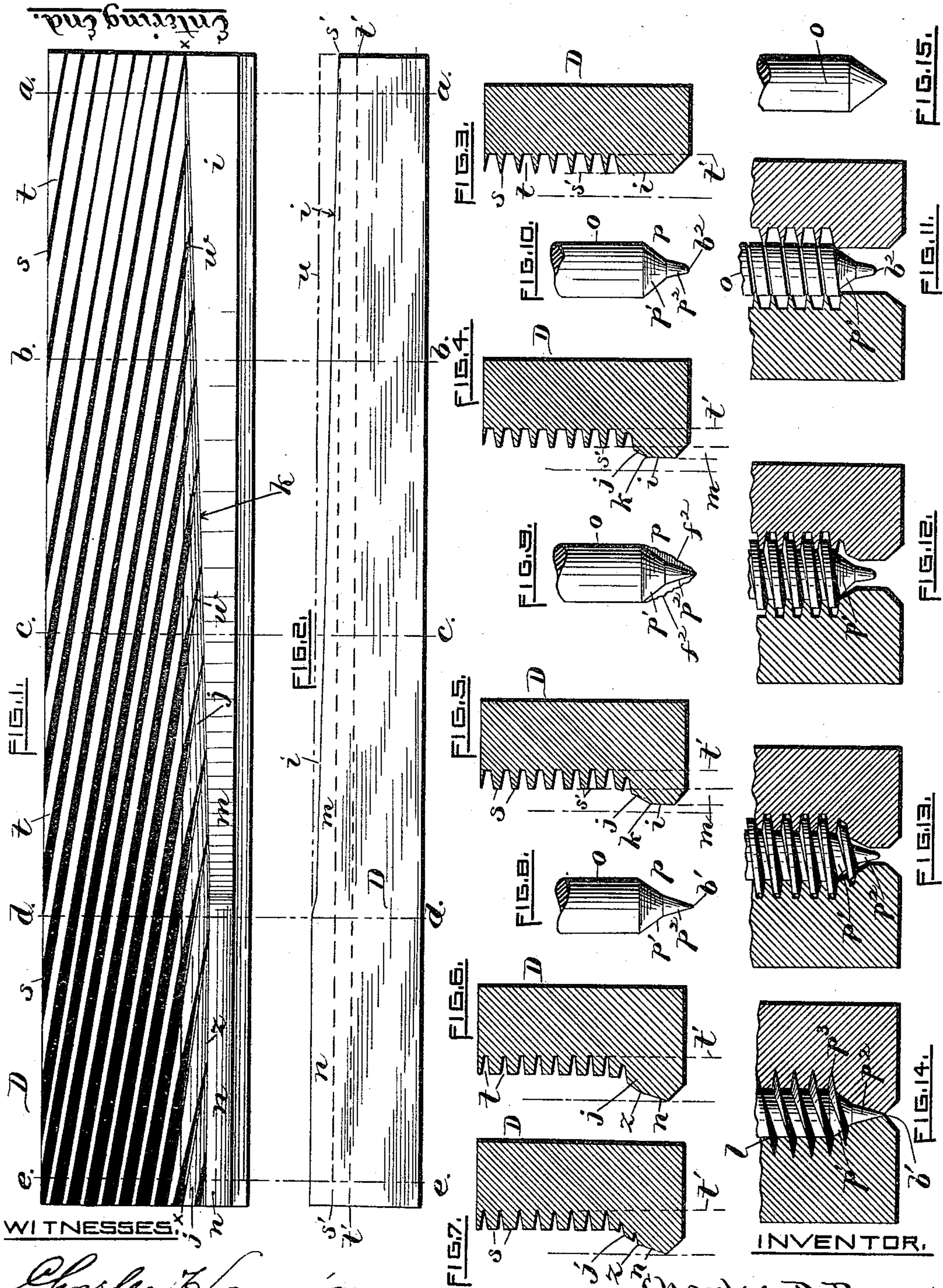


(No Model.)

C. D. ROGERS.
DIE FOR MAKING ROLLED WOOD SCREWS.

No. 440,333.

Patented Nov. 11, 1890.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES D. ROGERS, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE
AMERICAN SCREW COMPANY, OF SAME PLACE.

DIE FOR MAKING ROLLED WOOD-SCREWS.

SPECIFICATION forming part of Letters Patent No. 440,333, dated November 11, 1890.

Application filed August 4, 1890. Serial No. 360,868. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. ROGERS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Rolled Wood-Screws and Dies for Making the Same; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

In another application for Letters Patent filed by me simultaneously with this (Case No. 57) I have described and claimed a die for rolling screw-threads upon gimlet-pointed wood-screws. In that die the formation of the thread upon the cone-shaped point of the screw-blank by means of a gradually-increasing beveled surface provided with ribs and grooves constituted the novel features of the invention. In my present invention the die possesses certain features set forth in said companion application.

In still another simultaneously-filed application for Letters Patent (Case No. 56) I have described and claimed a wood-screw having a novel point. This screw has the lower or entering part of its point portion provided with an unthreaded sharpened spur-like extension having a cone-shaped form. The other part of the point portion is also cone shaped and provided with one or more screw-threads, the angle or inclination of the side of the threaded part of the said point portion exceeding that of the unthreaded part.

In making screw-blanks provided with the novel point portion just referred to the cutting-off dies frequently produce a "fin" of metal on the points. Aside from this defect the points vary somewhat in form and size, even though the cutting-off dies remain unchanged, the result being that when the blanks are subjected to the action of thread-rolling dies—such as usually made—the screws thus produced will be more or less imperfect or unsalable, such defect being due to the presence of a varying

amount of metal in the point portion of the blank, as stated. Another objection to the screws thus produced by such former thread-rolling dies is that the blanks are usually "rattled" before being threaded—that is, a quantity of blanks are placed within a suitably-mounted revolving vessel or barrel, which operation serves to brighten the blanks, and at the same time to remove any "chips," &c., adhering to them; but incidental to this rattling operation it is found that the sharpened ends of the blanks become very much worn or blunted, so that when the blanks are screw-threaded and ready for use the unthreaded end portion no longer possesses a sufficiently-sharpened tip.

The object I seek to attain by my present invention is to overcome the disadvantages or objections before referred to. This I am enabled to accomplish by means of a thread-rolling die having the lower or point-threading portion of its working-face cut away at the front end so as to not engage the cone-shaped point portion of the blank until the ribs of the die have commenced to act fairly upon the cylindrical part of the blank. The said lower portion of the die gradually increases in height from this point in a bevel form above the general surface longitudinally, and is provided with thread-forming ribs and grooves communicating with those of the main portion of the die, such increase extending until a point is reached where the raised bevel-shaped portion has a form transversely the counterpart of that to be given to the threaded portion of the screw-point. From this portion or point in the die the latter extends rearwardly along its lower side in an ungrooved beveled surface, the angle of which is less than that of the said grooved beveled portion. By means of my said improved dies, when suitably mounted and operated, the screw-thread is gradually produced upon the cone-shaped point portion of the blank, (the dies at the same time rolling the thread upon the cylindrical portion of the blank,) the formation of the thread commencing at the base of the point and terminating about midway of the point portion or at the intersection of the threaded and unthreaded parts. The die

from this point throughout to the rear end is substantially uniform cross-sectionally, but having in addition its lower side or edge provided with a smooth beveled surface, the angle of which is less than that of the grooved beveled portion. This peculiarity of the die acts to reduce and elongate the corresponding smooth portion of the screw to a uniform size and shape, the product being a rolled thread screw having its point portion provided with a screw-threaded cone-shaped part and a sharpened unthreaded part, the angle of the latter being less than that of the threaded part.

In the annexed drawings, Figure 1 represents a side or front elevation of my improved thread-rolling die, the same having its working-face provided with inclined ribs and grooves, and having the lower portion cut away and provided with inclined ribs and grooves, which gradually increase in length and communicate with those of the other portion of the die, and further having the rear part of the die along its lower edge provided with an ungrooved beveled surface, the shaded portions indicating the ribs. Fig. 2 is an elevation showing the lower side of the die. Figs. 3, 4, 5, 6, and 7 are cross-sectional views taken, respectively, on lines *a a*, *b b*, *c c*, *d d*, and *e e* of Figs. 1 and 2. Fig. 8 is a side elevation of the lower portion of a screw-blank when properly shaped. Fig. 9 is a similar view showing a fin of metal on opposite sides as produced by the cutting-off dies. Fig. 10 shows the same after rattling. Figs. 11, 12, 13, and 14 represent the gradual development of the screw thread and point, the several die-sections being taken on lines *a a*, *b b*, *c c*, and *e e*, respectively, of Figs. 1 and 2; and Fig. 15 shows a blunt point.

Again referring to the drawings, D designates my improved die as a whole, the proportions as drawn being somewhat exaggerated. The die represented is straight and adapted to be used in combination with a similar die in a reciprocating manner. The improvement may be used on curved dies.

The shaded portions, Fig. 1, indicate the inclined ribs *s*. The grooves between the ribs are indicated at *t*. The form or shape of the ribs and grooves transversely may have any desired form if adapted to the work required of them. As drawn, however, the angle of the sides of the ribs is substantially uniform or constant from one end of the die to the other. In any event the face of the ribs at the front or entering end should present as little surface or area as possible to the metal of the screw-blank, so that they can be the more readily impressed into it. The form or area of the ribs at the opposite end of the die should vary from those at the entering end, so that the grooves form the counterpart of the screw-threads to be produced. The greater portion of the working-face of the die D longitudinally is flat or substantially uniform in height throughout. The dotted

line *s'*, Fig. 2, &c., indicates the face of the ribs of such portion, and *t'* the bottom of the grooves. In Fig. 1 the horizontal line *x x* indicates the point of intersection of the surface *s'* of the ribs with the gradually-increasing grooved beveled surface *j*, adapted to produce the screw-threads on the cone-shaped part *p'* of the point portion *p* of the screw-blank. In Fig. 2 it will be seen that the die has a wedge-shaped portion *m* along its edge, the same commencing at the right or entering end flush with the surface of the ribs *s* or line *s'*. From this point it extends for about three-fourths of the length of the die in an incline *i*. From this point rearwardly it extends in a transversely-beveled ungrooved portion *n*, adapted to roll the sharpened cone-shaped part *p²* of the point portion of the screw. The inclination or angle of this portion *n* of the die is somewhat less than that of the contiguous grooved portion *j*, the intersection of these parts *n* and *j* being indicated at *z*. By means of the gradually-increasing beveled surface *j*, provided with the series of thread-forming ribs and grooves, which terminate therein, as at *w*, the work of forming the threads upon the point portion *p'* of the blank is greatly reduced, and the proportion of defective screws is reduced to a minimum.

It is to be understood, however, that it is not essential to my invention that the point of the blank shall have the two conical surfaces of different inclinations to the axis of the blank, or that the die shall have the provision for threading the point at the end of the rolling, the effect of the inclined smooth portion to act upon the point being the same on a point which is a simple cone or which is to be left smooth over its whole surface.

In producing wood-screws by means of my improved dies D, when suitably mounted and operated, the rattled blank, Fig. 10, is introduced between the dies at the right or entering end, (see also Fig. 11,) which immediately commence to form the threads upon the cylindrical portion *o* of the blank. The continued movement of the dies gradually develops the thread, and at the same time by means of the grooved beveled portion *j* gradually forms the thread upon the point portion *p'*. (See Figs. 12 and 13.) Now when the blank or screw arrives at or near the portion of the dies indicated at *d d*, Figs. 1, 2, and 6, the screw will be found to be practically completed as regards the screw-threads; but the spur portion *p²* will be still blunted, as at *b²*, and otherwise imperfect, because the dies up to this point have not acted upon such spur portion. Therefore the further travel of the dies will cause the ungrooved beveled portion *n* to engage the spur *p²*, and by rolling reduce and elongate it to a sharpened point *b'*, so that as the dies pass each other at the end of the operation the screw produced will be found to have the part *p'* of the point portion properly threaded and the part *p²* reduced to a true form and sharpened point.

In Fig. 15 the angle of the sides of the conical point portion of the blank is less acute throughout than the spur portion p^2 shown in Figs. 8 and 14. Consequently it is obvious
5 that its entering or driving capacity is rendered correspondingly more difficult.

I claim—

1. A screw-blank having a conical point, with a section between the base of the cone
10 and the cylindrical portion of the blank forming the frustum of a cone less acute than the cone forming the point.

2. A die for threading screws by rolling

provided with smooth beveled surfaces to act upon the conical portion of the blank while
15 its cylindrical portion is being threaded and bring it to the proper size and shape before a thread is formed thereon by a grooved portion of the beveled surface at or toward the
20 finishing end of the die.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES D. ROGERS.

Witnesses:

CHARLES HANNIGAN,
GEO. H. REMINGTON.