

(No Model.)

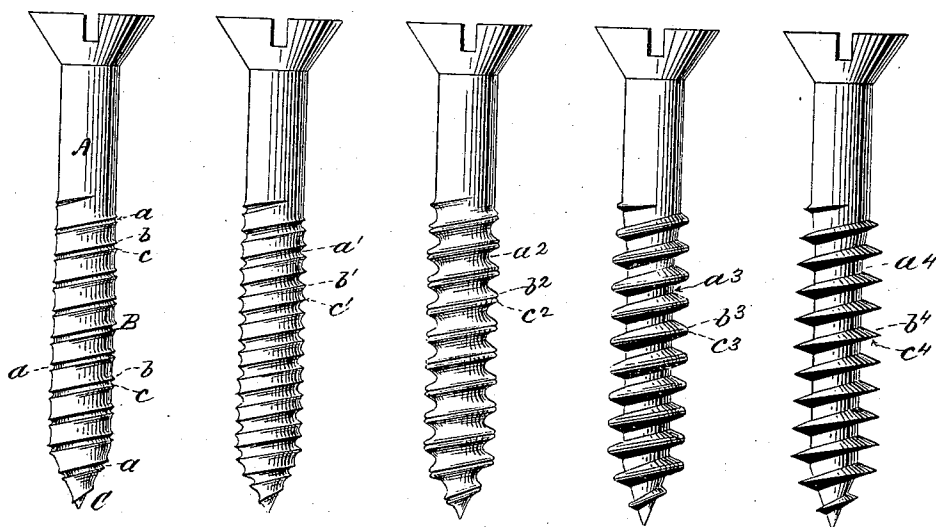
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GIMLET POINTED ROLLED WOOD SCREW.

No. 321,214.

Patented June 30, 1885.

*Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5.*



*Witnesses:*

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# UNITED STATES PATENT OFFICE.

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## GIMLET-POINTED ROLLED WOOD-SCREW.

SPECIFICATION forming part of Letters Patent No. 321,214, dated June 30, 1885.

Application filed May 9, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, HAYWARD A. HARVEY, of Orange, New Jersey, have invented a certain Improvement in Gimlet-Pointed Rolled Wood-Screws, of which the following is a specification.

In the ordinary method of rolling the threads upon screw-blanks the action of the dies tends to elongate the body of the blank. In rolling gimlet-pointed screws this is objectionable, because it crowds the metal upon the part of the die which forms the gimlet-point; and it is further objectionable, because the attenuation of the body in a longitudinal direction diminishes to some extent the quantity of metal available for forming a thread projecting laterally outward from the body.

By the method which I pursue I produce a screw having its thread formed of two parallel ridges of metal extending outwardly from and spirally around the body and point of the screw, and folded together. In the production of this screw the blank, which has first been conically pointed, is introduced between the convex face of a rotating die and the concave face of a stationary die or back-rest. The dies have formed upon their faces series of parallel ribs relatively inclined in opposite directions. The space between the rotating die and the stationary die is so graduated relatively to the diameter of the blank that the first effect of the dies is to produce a comparatively shallow groove around the body and point of the blank, and to throw up two parallel ridges of metal along the opposite sides, respectively, of such spiral groove. The further action of the dies is to deepen this spiral groove upon the body of the blank, and to increase the height of the parallel ridges, and to ultimately fold them together, their apices at their point of junction forming the apex of the finished thread. In this operation the metal of the blank is gathered together in the spaces between the adjoining ribs of the die, and is therein subjected to transverse compression, the resultant effect of which is to cause the metal to flow laterally outward from the body of the blank, and to thus produce a thread the diameter of which considerably exceeds the diameter of the unthreaded portion of the body.

In another pending application, made jointly by Charles S. Clark, of Providence, Rhode Island, and myself, there is described a die which is well adapted for producing the improved screw herein described. This die has a series of parallel inclined ribs, and in a line extending diagonally across the thickest portions of the ribs. The die corresponds to the shape of one edge of a central longitudinal section of the finished screw. The ribs of the die, where they first engage the blank, are sharp-edged and V-shaped in cross-section, and are gradually transformed into truncated threads by a gradual widening of their apices. The first effect of the die is to make upon the body of the blank a V-shaped spiral groove, which finally acquires such depth that the radius of the blank at the bottom of the groove is of the same, or nearly the same, length as the radius of the core of the finished screw. The metal between the convolutions of the groove in the body of the blank is subjected to transverse compression between the opposed faces of the parallel ribs, and is hence made to flow radially outward from the body of the blank, with the result that before the completion of the operation of forming the thread the blank exhibits two parallel spiral ridges between each two adjoining convolutions of the groove impressed upon the blank. By the continued action of the V-shaped portion of the dies these two spiral ridges are folded together, and there is thus formed upon the blank a V-shaped thread, the diameter of which somewhat exceeds the diameter of the unthreaded portion of the blank. By the action of the truncated portion of the ribs upon the blank the V-shaped grooves in the blank are gradually transformed into flat-bottomed grooves, and the metal displaced from the bases of the convolutions of the thread is driven laterally outward, so that the thread upon the blank finally assumes the form of a wood screw-thread having a comparatively narrow base, the sides forming acute angles with each other and obtuse angles with the flat-bottomed groove extending spirally around the body of the screw.

A screw made in this way is distinguishable from other rolled screws by the excess of diameter of the thread over the diameter of the

unthreaded part of the body, and also by the circumstance that upon close examination a spiral line in the center of the edge of the thread serves to indicate the division between the two spiral ridges of metal which have been folded together to form the finished thread.

The thread upon the conical point of the blank is formed concurrently with the formation of the thread on the body thereof and by a similar mode of operation.

Owing to the hold which the rotating die maintains upon the metal composing the body of the blank and the direction in which that metal is displaced in forming the thread, there is no such elongation of the body as causes any difficulty in symmetrically forming the gimlet-thread upon the point.

The accompanying drawings are elevations, respectively representing the screw at five different stages of its manufacture, and are intended to illustrate the character of the progressive action of the dies in rolling the thread upon the body and point by my improved method.

Figure 1 represents the effect produced upon the blank by the dies soon after the commencement of the rolling operation. Figs. 2, 3, and 4 illustrate the character of the progressive modifications in the form of the blank which finally result in the production of the finished screw, which is shown in elevation in Fig. 5.

On reference to Fig. 1, it will be seen that there is impressed upon the blank A a shallow groove, *a*, extending spirally around the lower part, B, of the body and around the conical point C, and that the metal displaced in forming the groove *a* has flowed radially outward and produced along the opposite edges of the groove *a* the parallel ridges *b* and *c*, respectively.

Fig. 2 illustrates the deepening of the spiral groove *a'*, and the heightening of the ridges *b'* and *c'*, and also their approach to each other.

Fig. 3, illustrating the further effect of the dies, shows the spiral groove *a''* to be still deeper, and the ridges *b''* and *c''* thrown still farther out from the body of the blank, and brought together at their bases, the spiral groove *a''* still retaining its V shape in cross-section.

Fig. 4 illustrates the effect produced by the dies in changing the form of the spiral groove *a'''*, which, it will be seen, is now flat-bottomed, and it will be observed that the ridges *b'''* and *c'''* are folded still closer together and extend still farther outward from the body of the blank.

Fig. 5 illustrates the final effect resulting from the progressive action of the dies. As will be seen, the flat-bottomed spiral groove *a''''*

has been widened to its full width, and the ridges *b''''* and *c''''* have been so compressed together that their apices are united and form the sharp-edged finished thread represented in the drawings.

The effects illustrated in Figs. 1, 2, and 3 may be produced by the use of a rolling-die provided with parallel ribs which are V-shaped in cross-section by gradually increasing the pressure of such a die upon the blank from the commencement of the rolling operation to the stage represented in Fig. 3.

The effect illustrated in Fig. 4 can be produced upon a blank brought into the shape illustrated in Fig. 3 by means of a rotating die provided with parallel inclined ribs, which, instead of being V-shaped in cross section, are truncated, having narrow faces, and conforming in reverse to the shape in cross-section of the groove *a''*. (Shown in Fig. 4.)

Having been brought into the condition illustrated in Fig. 4, the screw can be finished by being subjected to the action of a third rolling-die, provided with parallel ribs having wider flat faces, and in their cross-section presenting the shape in reverse of the groove *a''*. (Shown in Fig. 5.)

The principle of the mode of operation is the same whether the screw-thread be formed in progressive steps by the use in the proper order of dies, respectively of different shapes, or whether it be performed by the use of the single die described in the pending application of Charles S. Clark and myself, hereinbefore referred to, which single die has parallel inclined ribs which are V-shaped in cross-section at the part of the die which first acts upon the blank, and which, by the gradual widening of their apices, are transformed into the shape of truncated threads.

I do not restrict myself to the herein-described method of forming the thread upon the body and point of gimlet-pointed screws; and I do not herein claim the said method, because I intend to make it the subject of claim in another application for a patent.

I claim as my invention—

As a new article of manufacture, a rolled gimlet-pointed screw the thread of which is composed of two ridges of metal extending outwardly from and spirally around the body and point of the screw and folded together, their united apices forming the apex of the finished screw-thread.

H. A. HARVEY.

Witnesses:

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