

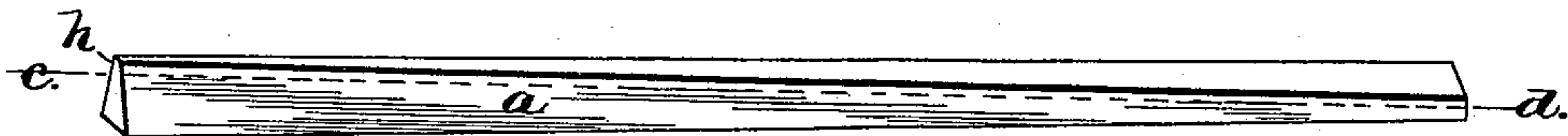
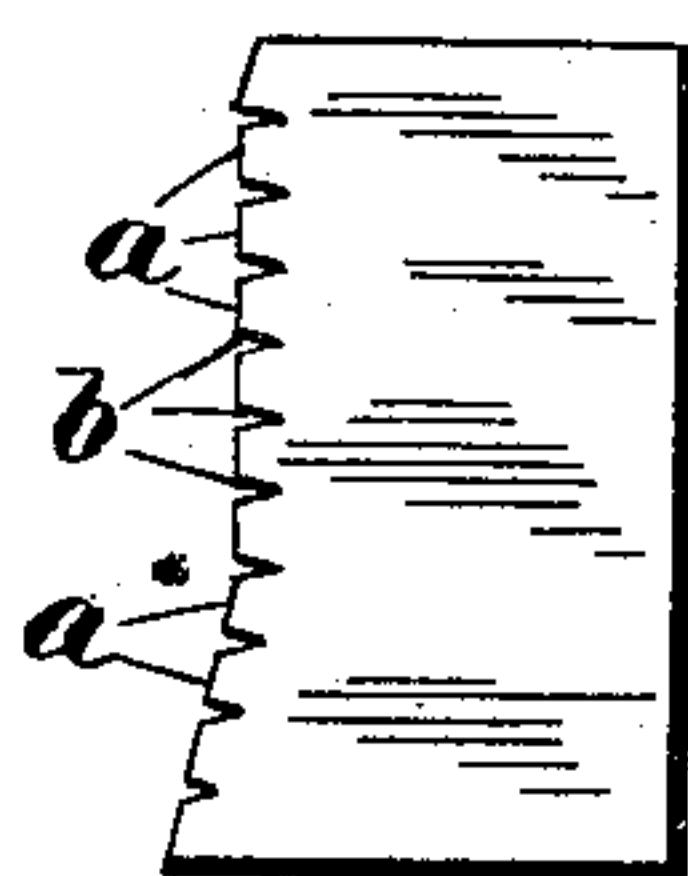
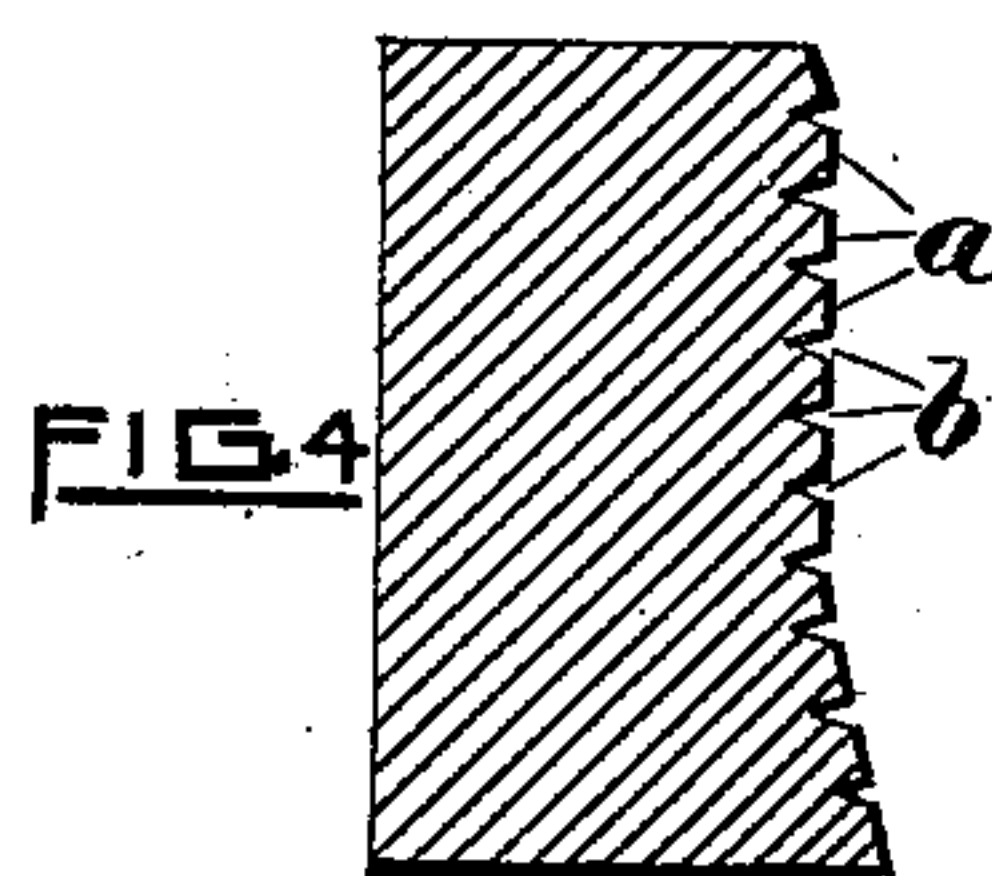
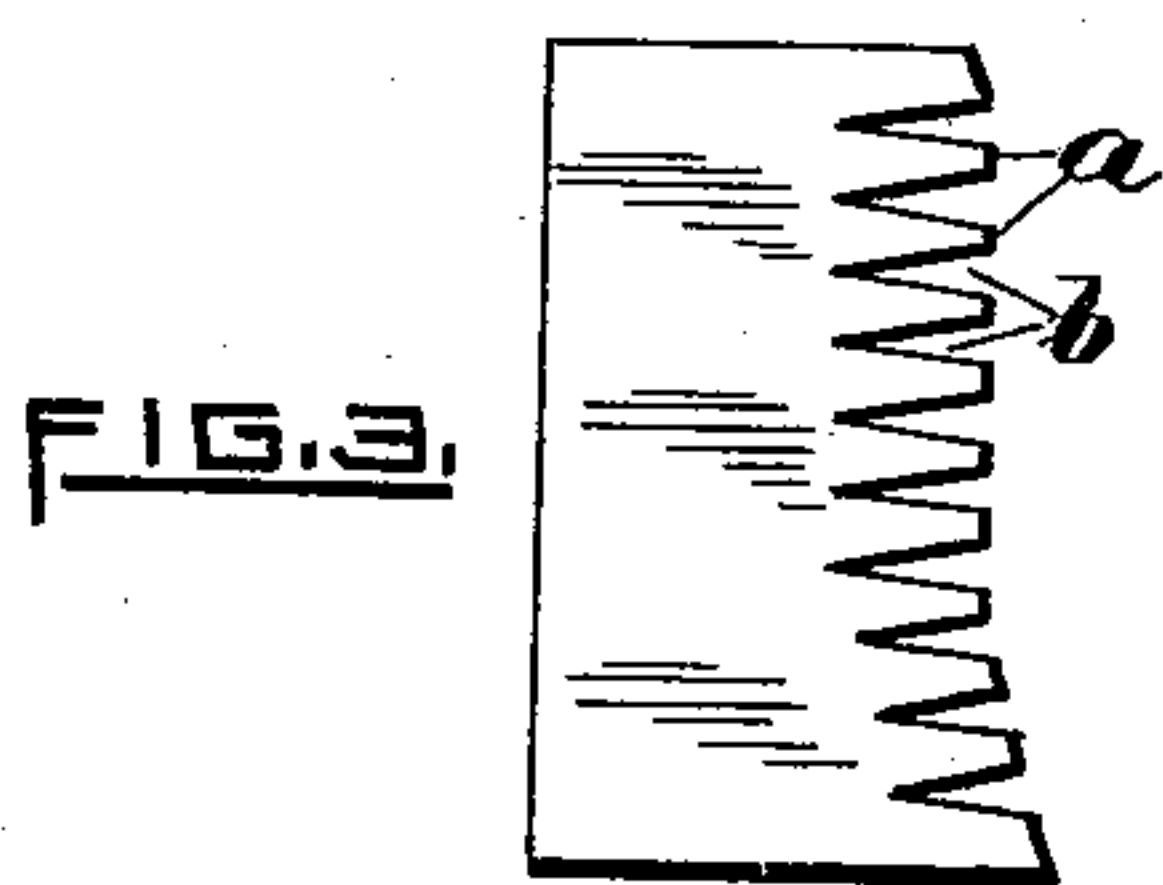
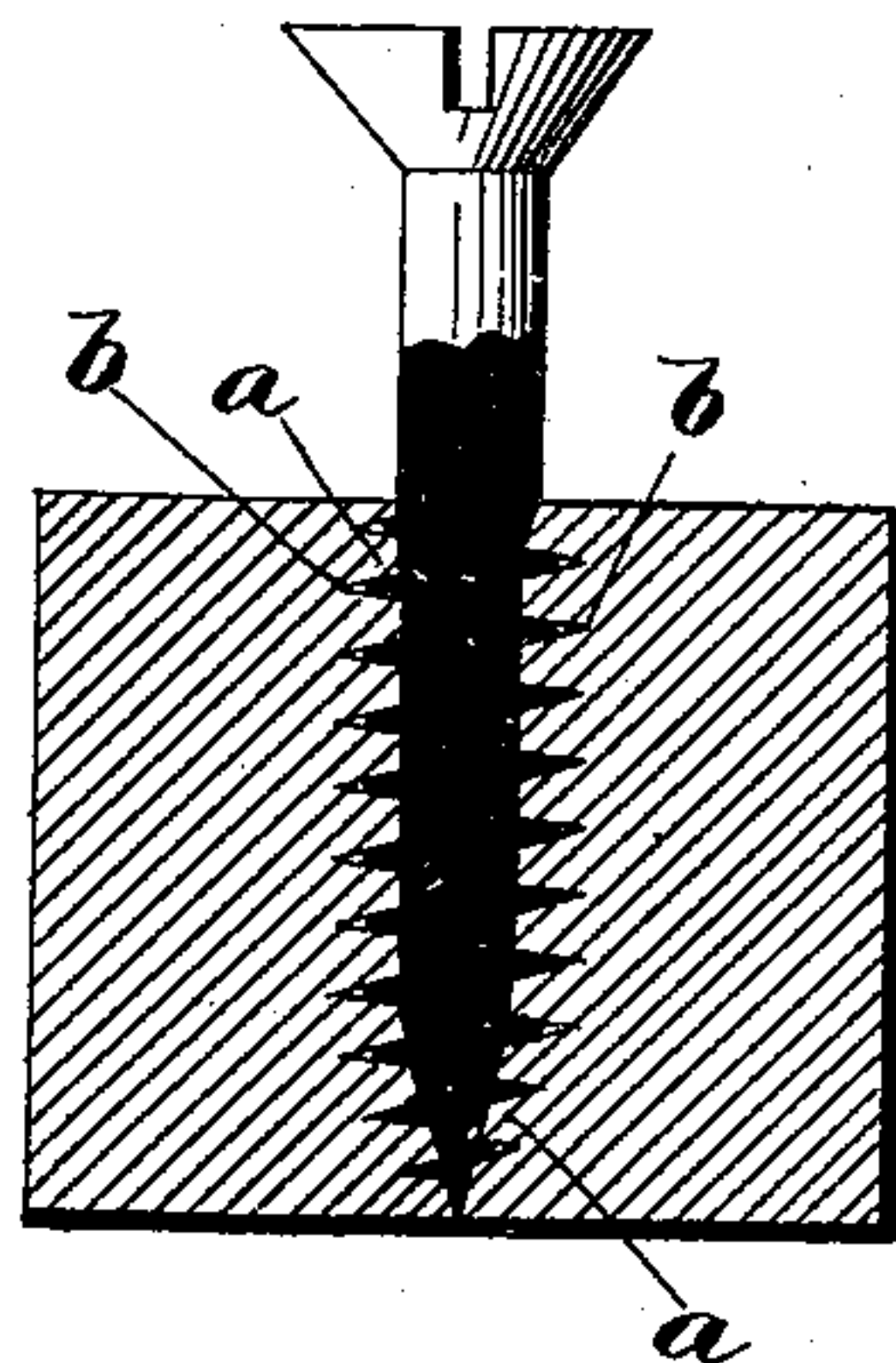
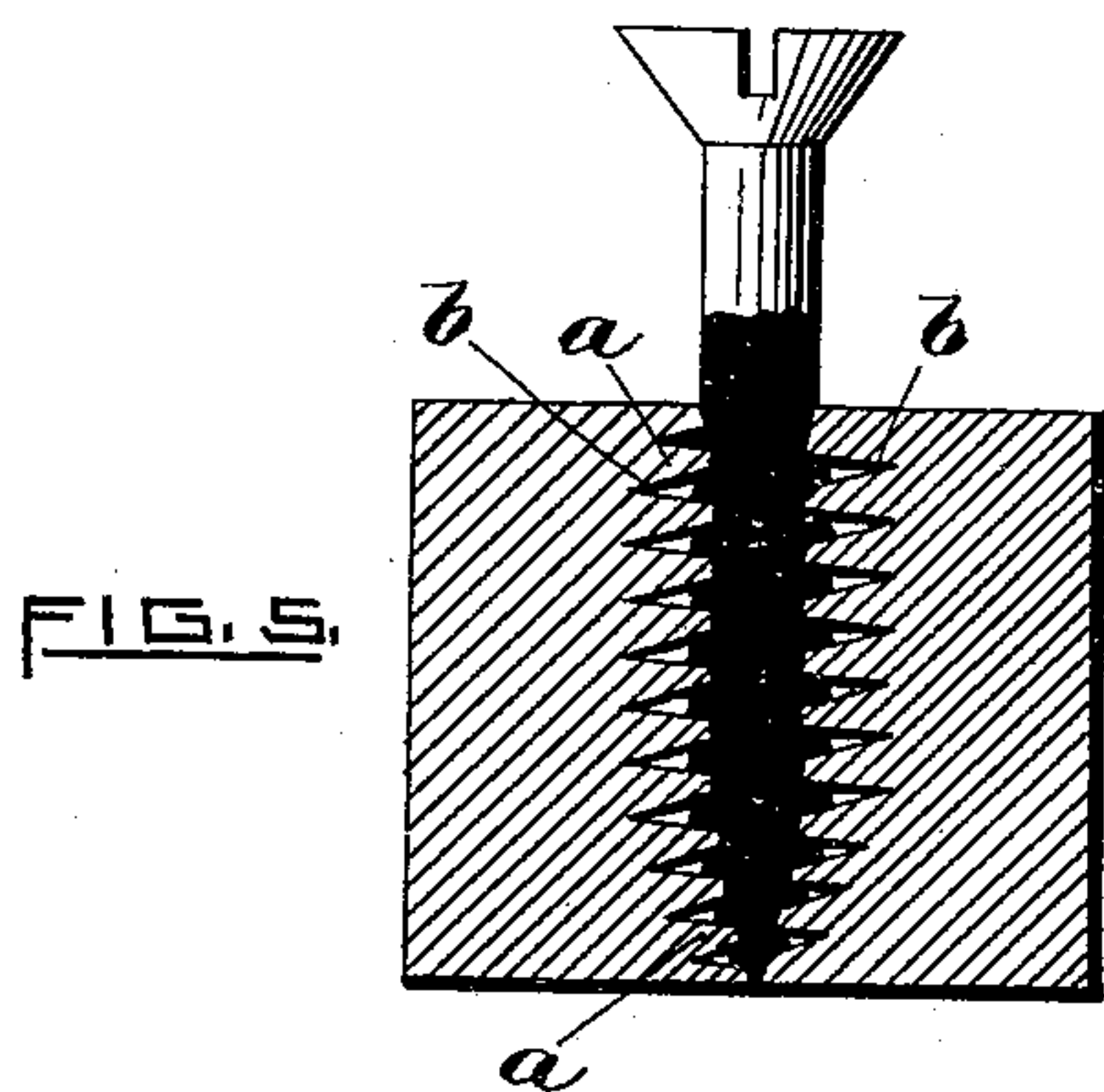
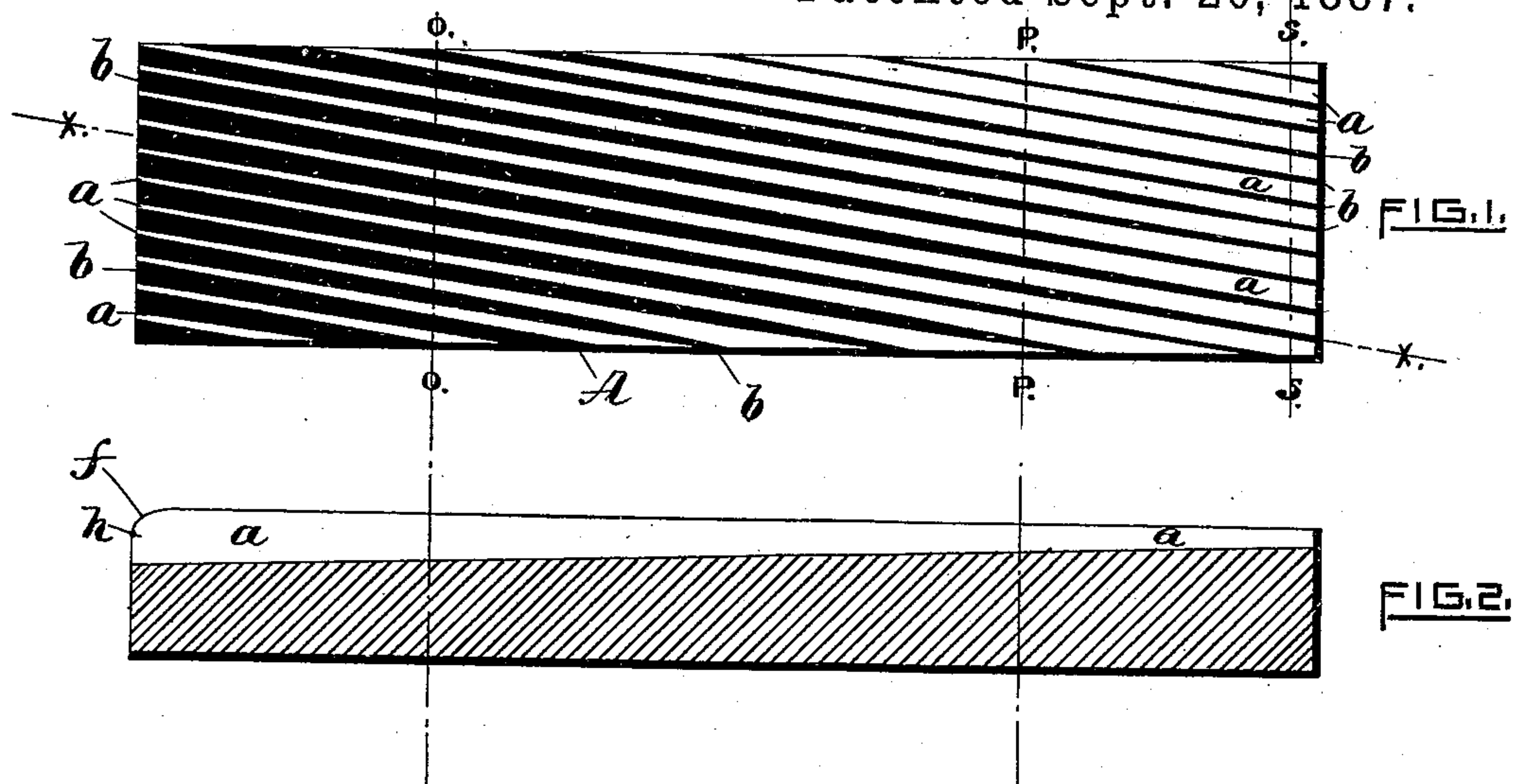
(No Model.)

C. D. ROGERS.

DIE FOR ROLLING SCREW THREADS.

No. 370,354.

Patented Sept. 20, 1887.



WITNESSES.

*Charles Hannigan.*  
*Joseph Sanford.*

INVENTOR.

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Attys.



# UNITED STATES PATENT OFFICE.

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

## DIE FOR ROLLING SCREW-THREADS.

SPECIFICATION forming part of Letters Patent No. 370,354, dated September 20, 1887.

Application filed May 11, 1887. Serial No. 237,824. (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 Dies for Rolling Screw-Threads; 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 or figures of reference marked thereon, which form a part of this specification.

My invention relates to dies for forming the threads upon wood-screws by rolling the blanks between them and raising the metal to form the threads radially from the body of the blank without extending the blank lengthwise.

The result I seek to obtain is to produce a solid thread, instead of one formed as shown in a patent of the United States granted to H. A. Harvey, June 30, 1885, and numbered 321,214, where the thread is formed by raising two separate spiral ridges of metal, which are finally brought together by the action of two dies, which constantly press the metal toward the axis of the blank as well as laterally. A considerable part of the pressure of the dies is exerted toward the axis of the blank to compel the metal to flow away from that axis.

With my improved dies the pressure upon the metal toward the axis of the blank is limited to the commencement of the rolling operation and to a comparatively small part of the metal displaced. These dies are represented in the annexed drawings, where—

Figure 1 shows a plan of the working-face of one die. The unshaded parts represent the faces of the ribs. Fig. 2 is a longitudinal sectional view taken on the oblique line *x x* of Fig. 1. The unshaded portion represents the depth of the grooves, or, what is equivalent, the height of the ribs or bars between the grooves. Fig. 3 is a view of the end of the die where the rolling operation commences. Fig. 4 is a sectional view on the line *s s*, near the opposite end of the die. Fig. 5 is a transverse sectional view taken through a pair of dies placed opposite to each other and having

the screw between them on line *o o* of Fig. 1. Fig. 6 is a similar section on line *p p*. Fig. 7 is a view of the end of the die opposite that shown in Fig. 3; and Fig. 8 represents in perspective, apart from the rest of the die, one of the thread-forming ribs of the die. The form of the dies transversely is indicated by the sectional views 3, 4, 5, 6, and 7.

It will be observed that, though the sections 5 and 6 are taken on different lines across the dies, the diameter of the body of the screw is the same in both figures.

In the several figures, the parts marked *a* represent the ribs or bars between the grooves, and the parts marked *b* indicate the grooves. (See, also, shaded portion, Fig. 1.) These grooves are V-shaped, the sides having the same inclination to each other as the opposite sides of the thread of the screw to be produced. The working parts of a die are the ribs between the grooves and the inclination of their adjacent sides to each other, which is constant from one end of the die to the other. The work of raising the thread is mainly performed by these sides. The angle of the inclined sides is the same in all and the same from one end of the die to the other; but the height of each rib and the width of its face or top varies throughout its length, and is determined at every point by the depth of the grooves adjacent to it. One of these ribs *a* is represented in perspective by Fig. 8, which shows especially the important feature of the varying width of the top or face. This top face, which is substantially level, has the form of a truncated wedge, very narrow at the end *h*, where the rolling commences, and much wider at the opposite end. A dotted line, *c d*, on the side and parallel with the face, indicates the depth to which the rib may be assumed to enter the body of the blank.

The face of the rib at the end where the rolling commences should be made as narrow as is consistent with its strength, in order that it may be required to displace but little metal as it enters the blank. To facilitate its entrance, the top may be slightly chamfered, as indicated by the line *f*.

The grooves in dies of this kind and the corresponding ribs may be cut by a milling-tool having a proper form to give the required in-



clination to the sides of the grooves, past which the plate to form the die is passed for each groove, the proper form for the surface of the die having been previously given and the depth of the cut for each groove at different points being secured by moving the plate either nearer to or farther from the cutter in conformity to a pattern.

The action of dies of this kind in forming the threads of a screw may be readily understood. Let it be assumed that the die A (represented by Fig. 1) is a stationary die, and that a similar die, with the ends reversed, is to move back and forth in front of it at the proper distance. To roll a screw, the movable die must be carried to the left until its right-hand end is a little past the left-hand end of the opposite or stationary die. A screw-blank is then placed vertically in the space between the opposed ends of the dies, and as the movable die is carried to the right the blank is seized and rolled along between them until the movable die passes the opposite end of the fixed die, when it drops from them. At the commencement of the operation the narrow ribs *h* of the dies are forced into the metal to the maximum depth required, and as the rolling progresses the metal between the ribs is more and more com-

pressed and gradually expands into the grooves of the dies until, at the end of the operation, it fills them, and the thread is completed.

In another application of even date I have described the details of a machine which operates the dies and in which the blanks are automatically fed to them.

I claim—

A die for rolling the thread on screws, having transversely the form to be given to that part of the body of the screw, in the direction of its length, on which the thread is formed, and having oblique V-shaped grooves presenting between them a series of bars or projections, narrow at the end where they commence to form the thread, so that they may be forced at the commencement of their action into the metal to the depth required to form the body of the screw, and gradually increasing in width, act laterally upon the metal between them and force it into the grooves which give it the form required for the thread.

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

CHARLES D. ROGERS.

Witnesses:

CHARLES HANNIGAN,  
GEO. H. REMINGTON.