

(No Model.)

2 Sheets—Sheet 1.

C. D. ROGERS.
DIE FOR MAKING SCREW NAILS.

No. 553,262.

Patented Jan. 21, 1896.

FIG. 1.

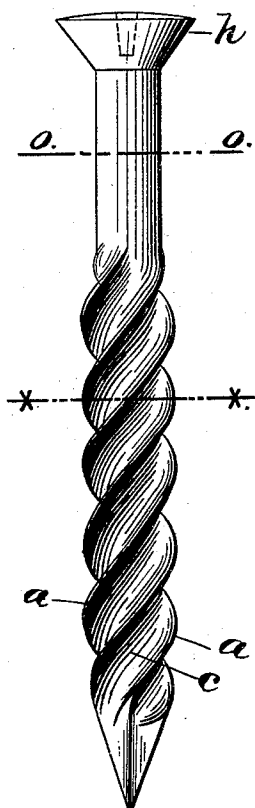


FIG. 3.

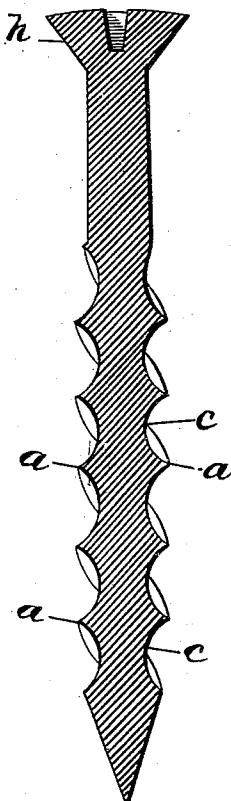


FIG. 2.

FIG. 4.

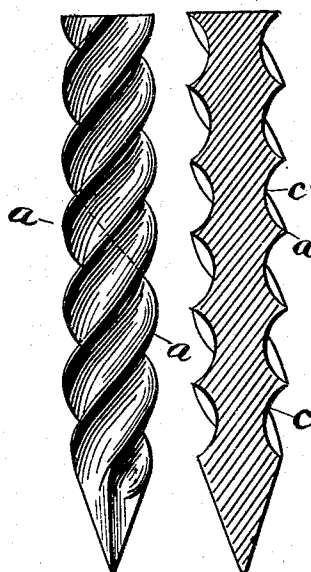


FIG. 5.

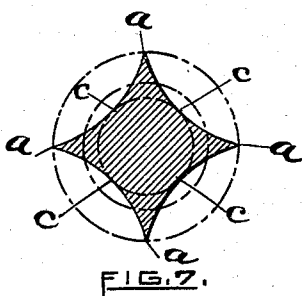


FIG. 7.



FIG. 6.

WITNESSES.

Charles Hannigan.
Charles W. Boardman.

INVENTOR.

Charles D. Rogers.
by Remington & Henthorn
Atty's.

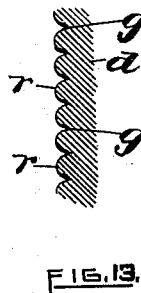
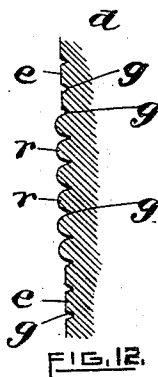
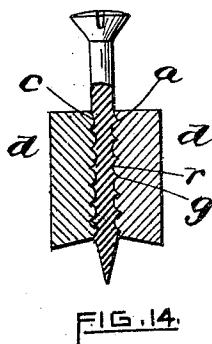
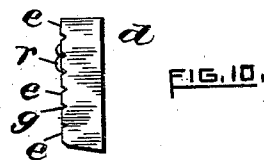
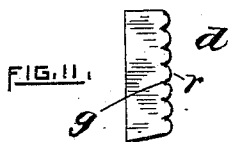
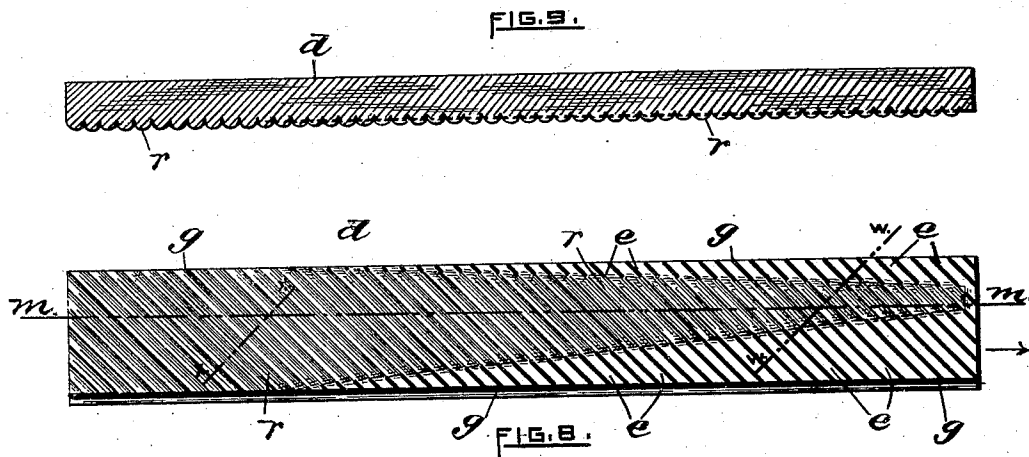
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2 Sheets—Sheet 2.

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WITNESSES:

Charles H. Boardman

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INVENTOR.

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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 SCREW-NAILS.

SPECIFICATION forming part of Letters Patent No. 553,262, dated January 21, 1896.

Application filed July 18, 1889. Serial No. 317,959. (No model.) Patented in England February 18, 1890, No. 2,609; in France February 18, 1890, No. 203,847; in Belgium February 18, 1890, No. 89,556; in Germany February 18, 1890, No. 54,737; in Austria-Hungary May 5, 1890, No. 1,559 and No. 1,472, and in Canada July 18, 1890, No. 34,726.

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 Making Screw-Nails; 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.

The object of my invention is to produce a screw-nail which shall turn on its axis when driven into wood under the successive blows of a hammer; and the invention consists in flat fluting-dies having diagonal ribs of successively-increasing length, and of pitch, height and contour corresponding to the pitch, depth and contour of a screw-nail adapted to be driven into wood and turn on its axis.

The invention has been patented in other countries as follows: Great Britain, February 18, 1890, No. 2,609; France, February 18, 1890, No. 203,847; Belgium, February 18, 1890, No. 89,556; Germany, February 18, 1890, No. 54,737; Austria-Hungary, May 5, 1890, No. 1,559 and No. 1,472, and Canada, July 18, 1890, No. 34,726.

Figures 1 and 2 represent in elevation two of my nails, one of them provided with a head *h*, similar to the common head of a screw. Figs. 3 and 4 represent longitudinal sections taken through the center of these nails respectively. Fig. 5 is a transverse section taken through the fluted portion of said nails on line *xx*. Fig. 6 is a transverse sectional view taken on line *oo* through the wire or unfluted portion of the nail shown in Fig. 1.

The cylindrical surfaces of my screw-nails are in whole or in part fluted spirally by the compression and displacement of the metal by two dies between which the wire is rolled. It will be observed, where the fluting does not extend over the whole surface, that the diameter at the edges of the spirals is greater than that of the wire where the surface is plain.

In the enlarged cross-section shown in Fig. 7, the interior circle represents the diameter of the screw-nail at the bottom of the flutings *a*. The outer circle represents the diameter of a circle just touching the edges of the flutings. The intermediate circle represents the original diameter of the wire. The space occupied by the metal outside of this circle is very nearly the same, but slightly less, than the space of the flutings inside the circle. The cross-section of the metal in the finished screw-nail is therefore only a trifle less than the cross-section of the original wire, the difference being due to a slight elongation of the wire in the rolling to which it is subjected.

The dies *d*, by which I produce my nail, are represented in plan or face view by Fig. 8, and in section through the middle longitudinally on line *m m* by Fig. 9. The working face of this die is provided with diagonal ribs *r*, making with the middle line of the die an angle of about forty-five degrees. The surfaces of these ribs are rounded to correspond with the flutings *a* of the nails produced. A portion of these ribs are planed down to a little more than one-half the depth of the grooves between them, as shown at *e*, thus giving such portions a flat surface which bears upon the normal surface of the wire as it is rolled between the dies, but which does not displace the metal. By reason of this construction, which makes the ribs short which first engage with the metal, the flutings are commenced at the middle of the part of the blank to be acted upon, and advance progressively in opposite directions. The displacement of the metal to form the flutings is effected by the unplaned part of the ribs which extend above the plane surfaces, and the grooves *g*, between the ribs below such surfaces, receive the metal which is displaced with the exception of a small amount which goes to the elongation of the wire.

Figs. 10 and 11 represent the front and back ends of the die, respectively. Fig. 12 is an enlarged partial cross-sectional view taken on line *ww* of Fig. 8 at the forward portion of the die. Fig. 13 is a similar view taken at *xx* at the opposite end of the dies, and Fig. 14 represents a vertical transverse sec-

tional view taken through a pair of dies, and also showing a fluted nail between them.

Two of these dies are placed in a machine which gives them reciprocating movement in opposite directions and in the direction of their lengths. They are to be placed at such a distance apart that the planed surfaces *e* of the ribs will just bear upon the surface of the wire to be operated upon. A machine suitable for operating such dies is described in a patent granted to me September 20, 1887, and numbered 370,353, but machines of different construction may well be employed.

The wire or blank for a nail is to be so placed between the dies that the rolling and the consequent formation of the flutings will be commenced at the middle of the portion to receive the flutings, which will proceed simultaneously and progressively in opposite directions to the ends, the wire being left free to expand slightly each way. The form of the nail and the condensation of the metal are due to the action of these dies in rolling the wire, and, so far as I am aware, these features cannot be secured by any other means now known. The action of these dies *d* in fluting the metal differs in a marked manner from the action of the dies employed to produce the thread of the screw described in a patent granted to H. A. Harvey, numbered 321,214, and from a die previously invented by myself for producing a rolled screw with a raised solid thread, and described in a patent granted to me September 20, 1887, and numbered 370,354. In these last-named dies the ribs and grooves are but slightly inclined to the line of motion of the dies. The Harvey die acts mainly by pressure toward the axis of the screw-blank, and each rib of the die spreads the metal laterally on both sides, with the result that seamed and therefore defective threads are produced. The dies act in rotating the blank-like frictional gears.

In my dies described in my patent above referred to I provided ribs which after they had entered the metal acted like wedges to

press the metal sidewise on both sides, but in such a manner as to raise a solid thread. These dies also act in rotating the blank-like frictional gears. In my present dies, by virtue of their large inclination to the line of motion of the die, the ribs *r* engage with the metal as a rack engages with a pinion, the pressure of the ribs upon the metal being not only in the direction of the axis, but also in the direction of the line of motion, so that the flow of the particles of the metal is, I believe, mainly in the same direction. The result is the production of a solid compressed nail having a tensile strength and stiffness due not merely to the normal condition of the metal, but to its compression and radial enlargement, as above explained.

The die forming the subject-matter of this application differs from the die shown and described in my Patent No. 408,528, dated August 6, 1889, in that the plane surfaces between the ribs of that patent corresponding to the normal surface of the wire are wanting, and in that it makes a screw having uniform grooves on both sides of the thread, whereby the screw is much more easily driven and makes much less displacement of the wood than the resulting screw when such plane surfaces are present.

I claim—

The flat fluting dies herein described having diagonal ribs of pitch, height and contour corresponding to the pitch, depth and contour of the flutings of a screw-nail adapted to be driven into wood and turn on its axis as described, the said ribs being of successively increasing length and the spaces between them being of uniform contour, as and for the purpose described.

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

CHARLES D. ROGERS.

Witnesses:

CHARLES HANNIGAN,
GEO. H. REMINGTON.