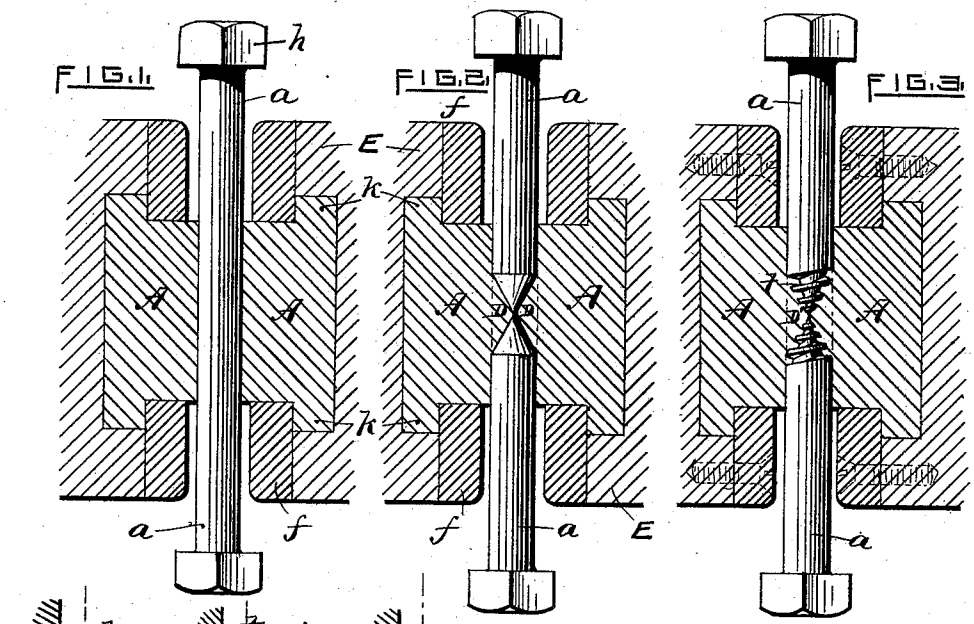
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C. D. ROGERS.

DIE FOR FORMING AND THREADING THE POINTS OF SCREWS.

No. 387,184. Patented July 31, 1888.



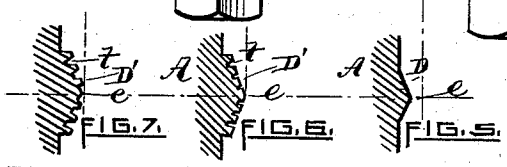


FIG. 4.

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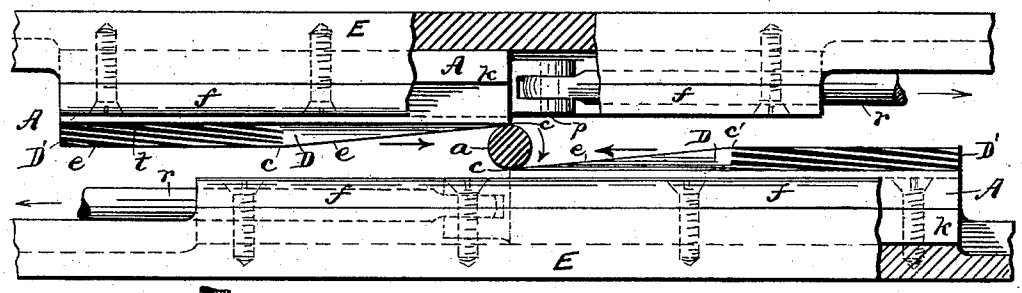
(No Model.) 2 Sheets—Sheet 2.

C. D. ROGERS.

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FIG. 8.



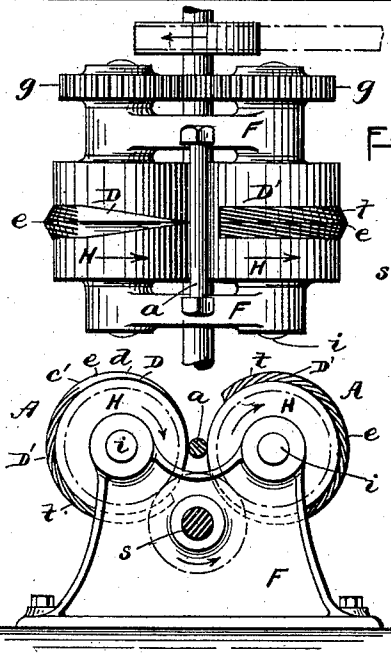
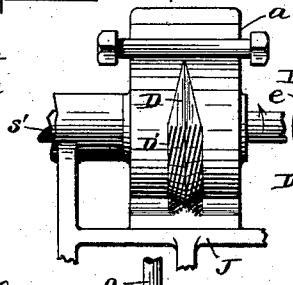


FIG. 11.

FIG. 13.



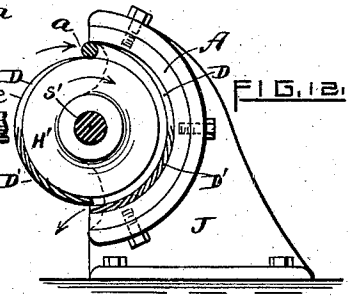


FIG. 12.

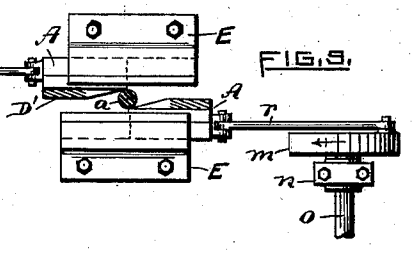


FIG. 9.

FIG. 10.

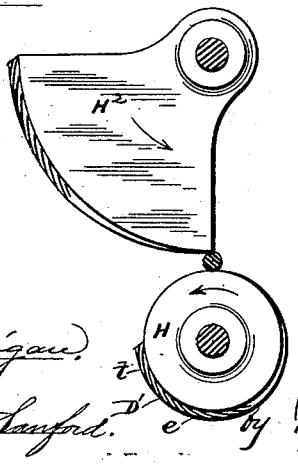


FIG. 14.

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 FORMING AND THREADING THE POINTS OF SCREWS.

SPECIFICATION forming part of Letters Patent No. 387,184, dated July 31, 1888.

Application filed December 24, 1886. Serial No. 222,517. (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 the Method of Pointing and Screw-Threading the Ends of Screws, Rods, &c.; and I do 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 the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to a new and improved method of pointing and screw-threading the ends of screws, bolts, or rods.

Said invention consists in subjecting a metallic rod (headed or plain) to the action of dies adapted to roll a V-shaped and screw-threaded peripheral groove therein at one operation.

It also consists in the novel construction of the dies for producing the said rolled and threaded beveled surfaces, all as will be more fully hereinafter set forth and claimed.

The object of my present improvements is to greatly reduce the cost of the manufacture of screws and bolts, particularly of the class termed "coach-screws."

By means of my invention a rod having a sufficient length to make two bolts is placed between a suitably-mounted pair of my improved rolling-dies, which gradually reduce (and at the same time elongate) the center portion of the rod to form a V-shaped neck. A further continuous movement of the dies simultaneously roll a screw-thread on each section of the cone-shaped neck of the rod, thereby producing by one operation two pointed and screw-threaded screw blanks or rods. The blanks thus made are then placed in the dies of a common bolt-cutting machine and "threaded" up the shank, as usual, the thread of the rolled point serving as a "leader" in guiding the blank to readily engage the main threading-die.

Heretofore in making coach-screws or other analogous screws or bolts it has been the practice, so far as I am aware, to first form (by means of swaging or turning) a substantially conical-shaped point on the end of the rod or blank, then submitting the pointed blank to a bolt-cutting-machine, which cuts the screw-thread on the shank, and, finally, screw-threading the point in another machine or die.

By means of my improvement, as just stated, I point and screw-thread the ends of two bolts at one operation.

In order to clearly illustrate my new method of pointing and screw-threading the ends of two bolts or screws by the same dies at one operation, I have prepared the accompanying two sheets of drawings, in which—

Figure 1 represents a double-headed rod in position between oppositely arranged and mounted dies, the latter shown in transverse section. Fig. 2 is a similar view of the same, the dies having been advanced, thereby forming the rolled double cone-shaped groove in the center of the rod, the rod being materially lengthened during the process. Fig. 3 is a similar sectional view, the dies having been farther advanced to produce the rolled screw-threads on the points and completing the operation. Fig. 4 is a side view or elevation, corresponding to Fig. 1, showing the rod in position to be acted upon by the improved combined pointing and threading dies. Fig. 5 is a partial transverse section through the plain portion of one of the rolling-dies, taken on line *s s*. Fig. 6 is a sectional view through the thread-forming portion of the die, taken on line *o o*. Fig. 7 is a sectional view of the same, taken on line *x x*, showing the full depth of the thread-forming grooves. Fig. 8, Sheet 2, is a plan view, in partial horizontal section, showing the dies oppositely arranged and mounted in a stationary frame or bed, and also showing the blank (sectionally) in position to be acted upon by the dies. Fig. 9 is a reduced plan view showing a means for reciprocating the dies to form the rolled screw-threaded conical point on the end of two bolts or screws at one operation. Fig. 10 is an end view of a machine having two driven rolls on which the dies, adapted to point and thread the blanks, are circularly arranged and secured. Fig. 11 is a top view of the same. Fig. 12 is an end view of a machine having a stationary die mounted therein, and also show-

ing a revolving cylinder carrying one of my improved dies. Fig. 13 is a partial side view of the same; and Fig. 14 represents a revolving circular die combined with a sector carrying a die of similar construction, each of said dies in the foregoing figures having a gradually-increasing V-shaped plain projection, terminating in a V-shaped projection having grooves cut in each side thereof adapted to form screw-threads.

The following more specifically describes the several steps employed in pointing, screw-threading, and severing a rod of metal. It also includes a description of the dies therefor.

Referring again to the drawings, A A designate the steel dies, the same, as drawn, being oppositely mounted to slide in stationary frames E, having a T-shaped longitudinal slot therein. Each of said dies A is provided with the raised V-shaped reducing portion D, terminating in the raised V-shaped threading portion D'. The part D rises from the center point, *c*, in a gradually increasing and divergent longitudinal direction. At *c'* it unites with and forms a part of the threading-die D', the latter being provided on each of its beveled sides with a series of grooves, *t*, adapted to form a thread by rolling. The apex *e* of the raised portions of the die, formed by the intersection of the two beveled sides, extends lengthwise thereof in a horizontal plane.

The principle of forming screw-threads on the surface of a rod or wire by rolling (instead of removing the stock by cutting) being generally understood, a more detailed description thereof is deemed unnecessary in this connection.

Each of the dies A is provided with a suitably-connected rod, *r*, for operating the same.

Figs. 8 and 9 represent plan views of a machine adapted to give a reciprocating motion to each of the dies.

In Figs. 10 and 11 two cylindrical rolls, H, are shown secured to shafts *i*, mounted in bearings of the upright frames F, said rolls being driven in the same direction by means of suitably-driven gearing, *g*. A circularly-arranged combined reducing and threading die, A, is formed on or otherwise secured to the periphery of each roll, said die consisting of the raised plain portion and the connected screw-threading part, substantially as just described with reference to the reciprocating dies A. In this machine, as well as the former one, the rod *a* simply turns on its axis while being submitted to the action of the traveling dies.

In Figs. 12 and 13 one of the dies A is secured to the stationary frame J and the other is secured to the cylinder H', mounted upon a driven revolving shaft, S'. In this arrangement the blank rod *a* enters at the top between the two dies and rests upon the cylinder H'. The latter, now, in revolving, in conjunction with the dies forces the rod *a* in the arrow-direction, (at the same time revolving also on its axis,) so that as it passes out from the lower end of the stationary die the combined action of both dies have reduced and pointed the rod midway of its length and formed the screw-threads thereon, the rod then being substantially as represented in Fig. 3.

The following describes the operation of the reciprocating dies, (although, if desired, one die may be stationary:) A rod, *a*, is first placed in a vertical position between the front and back dies, A A, as shown in Figs. 4 and 8. Now, upon imparting reciprocating motion to the dies by suitable means, the center points, *c*, of the V-shaped portion D thereof immediately engage the rod midway and impress a slight circular groove therein. The continued movement of the dies enlarges the groove in all directions until the end *c'* reaches the rod, at which time the groove forms the counterpart of the die at that point, thereby at the same time slightly elongating the rod, all as clearly shown in Fig. 2. The dies in their continued advance next present the V-shaped and grooved portion D' to the beveled or conical sides of the rod lying between them, thereby producing a small helical groove on each cone, which gradually deepens as the stock is rolled up therefrom and producing two complete screw-threaded points (see Fig. 3) at the termination of the stroke. Finally, the (now severed) blanks drop out, after which the dies are returned to the normal position shown in Fig. 8, again ready to reduce a rod, as before. The pointed and screw-threaded blanks are next fully threaded and finished, as usual—that is, by feeding them into the dies of a bolt or screw-cutting machine, the screw-threaded point serving as a "leader" in guiding the blanks to the threading-dies. Practically, in pointing and screw-threading the larger sizes of bolts by means of my improved method, I first properly heat the rod or bar at the point to be operated upon and prior to its being submitted to the action of the dies A. The arrangement or position of the said dies may be changed from that shown—as, for example, they can be placed horizontally and made to reciprocate one above the other.

It is obvious that long rods adapted for bridge-work, &c., may be thus pointed, screw-threaded, and severed by the employment of my invention, thereby more than doubling the production, as compared with the old method of pointing and threading each rod singly. After forming the screw-threaded point, the shank of the rod may be screw-threaded by means of a screw-cutting machine, as usual.

I do not claim, broadly, mechanism involving dies adapted to simultaneously point and divide a rod of metal at the adjacent apices by rolling.

I claim and desire to secure by United States Letters Patent—

1. In a machine for double-pointing, screw-threading, and transversely dividing a rod of metal, the combination of a pair of oppositely-mounted dies, each having an ungrooved A-shaped rib projecting from its face, the same

extending gradually and rearwardly from a point to a height substantially equal to one-half the diameter of the rod to be acted upon, and terminating in a grooved Λ-shaped portion having uniform angles and equal sides, adapted to simultaneously impress a screw-thread into the contiguous cone-shaped sections of the rod after the ungrooved portion of the ribs have completed their work, and mechanism for operating the dies, substantially as hereinbefore described.

2. The combination, with oppositely-arranged dies, each having a reducing portion, D, and a screw-thread-forming portion, D', secured to or formed thereon, of mechanism for reciprocating or operating said dies, and a frame in which the dies are mounted to travel, substantially as shown and hereinbefore described.

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

CHARLES D. ROGERS.

Witnesses:
CHARLES HANNIGAN,
WM. R. DUTEMPLE.