(No Model.) 2 Sheets—Sheet 1.

C. D. ROGERS.

MANUFACTURE OF WIRE NAILS.

No. 368,688. Patented Aug. 23, 1887.

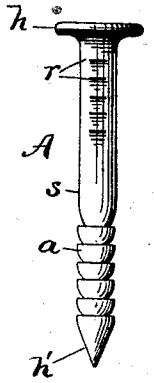


FIG. 1.

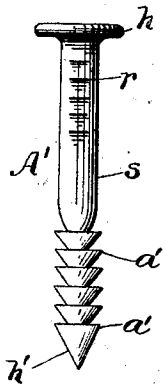


FIG. 2.

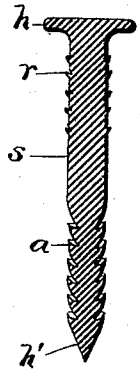


FIG. 3.

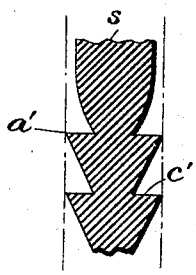


FIG. 4.

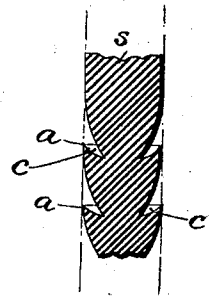


FIG. 5.

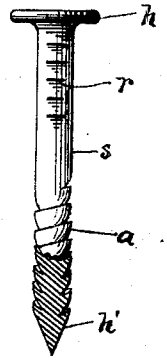


FIG. 5½.

WITNESSES.

Charles Cannigan.

Joseph A. C. Sanford.

INVENTOR.

Charles D. Rogers.

by Remington & Hawthorne

Attys.

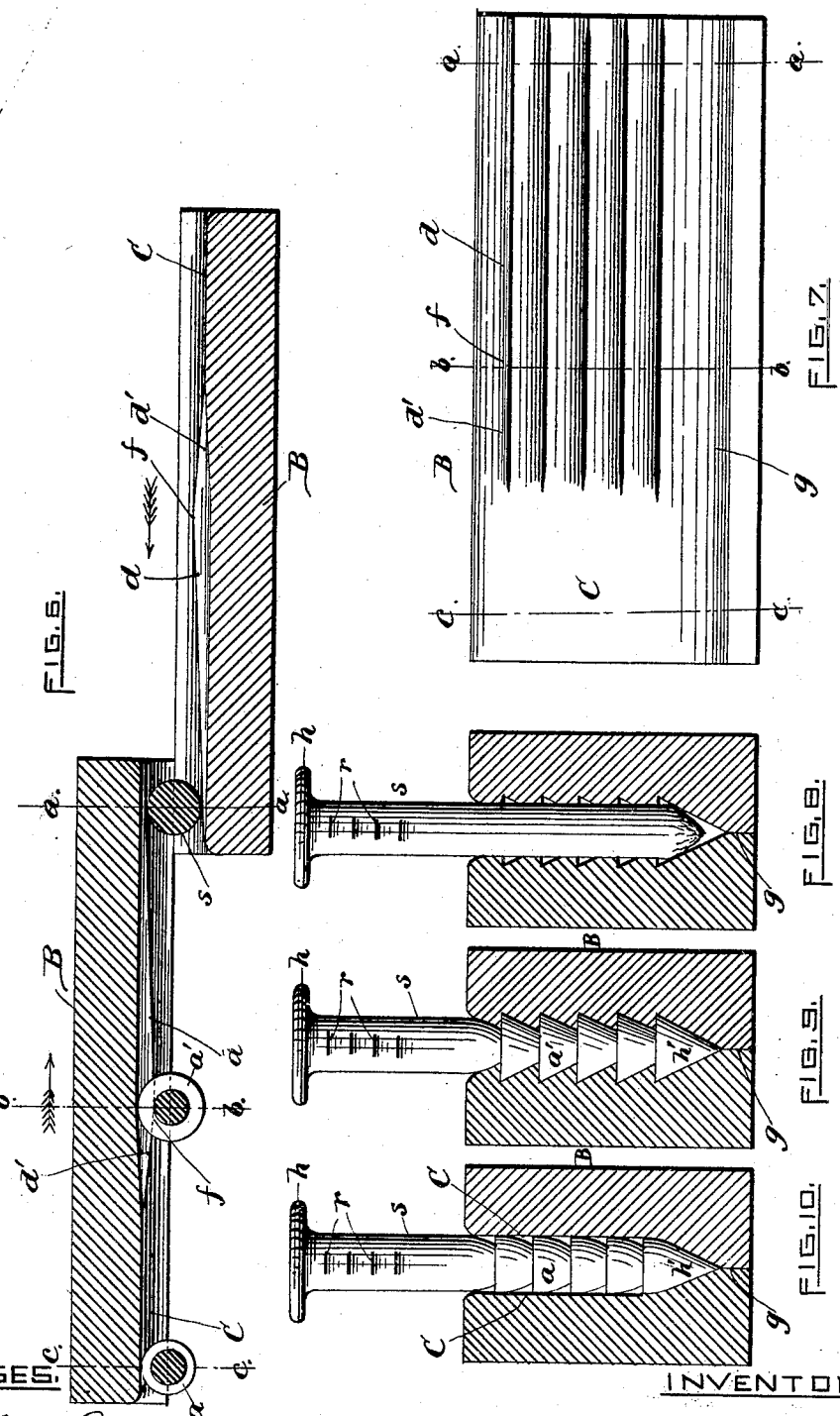
N. PETERS. Photo-Lithographer, Washington, D. C.

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MANUFACTURE OF WIRE NAILS.

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UNITED STATES PATENT OFFICE.

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

MANUFACTURE OF WIRE NAILS.

SPECIFICATION forming part of Letters Patent No. 368,688, dated August 23, 1887.

Application filed March 8, 1887. Serial No. 230,075. (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 Manufacture of Wire 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 or figures of reference marked thereon, which form a part of this specification.

My present invention relates to certain improvements in the method of forming curved corrugations upon the shanks of wire nails; and it consists, essentially, in passing that portion of the shank of the nail which is to be corrugated between two dies adapted in their joint operation to first impress or roll therein a series of corrugations whose diameter is larger than that of the normal diameter of the wire forming the nail, and, finally, while still passing between the said dies, gradually reducing the diameter of and at the same time upwardly curving the points or outer portion of the said corrugations or barbs until they are substantially uniform in diameter with the plain portion of the nail, all as will be more fully hereinafter set forth and claimed.

The object of my improvements herewith is to produce a stronger wire nail, which at the same time possesses superior holding qualities, wherein the outer diameter of the upwardly-curved corrugations are substantially the same as that of the wire forming the nail.

By means of the novel construction of the dies the upward curvature or bend of the barbs is effected immediately after the outward flow of the metal producing them, thereby obviating the employment of another machine or operation for the purpose.

It is found that by first rolling or reducing to a smaller diameter the stock or portion of the nail-shank to be barbed that the metal loses in a great measure its ductility, thereby affecting the wire to such an extent that the durability or "life" of the barb-forming dies is greatly lessened. The nails thus produced are also inferior, owing to the change of the atoms composing the barbs, which latter then are very brittle and easily rendered unserviceable.

To illustrate the invention I have prepared the annexed two sheets of drawings, wherein Figure 1 represents a perspective view of the wire nail as made by my improved method, and having upwardly-curved corrugations whose diameter is uniform with that of the plain portion of the wire. Fig. 2 is a similar view of the nail preparatory to passing between the barb-curving portion of the dies, and having the angular corrugations or barbs formed thereon, the diameter of which exceeds that of the wire from which it is formed. Fig. 3 is a vertical central sectional view of the finished nail. Fig. 4 is a vertical sectional view, enlarged, of a portion of the nail, showing the enlarged corrugations formed therein previous to having the points thereof upwardly curved and made equal in diameter to that of the wire by the process of rolling between the dies. Fig. 5 represents a similar enlarged sectional view of a portion of my finished nail, showing the corrugations upwardly curved or bent. Fig. 5½ is a view in partial section of a drive-screw having its thread upwardly curved. Fig. 6, Sheet 2, is a horizontal sectional view of the reducing or rolling dies, adapted to receive a blank wire, then to form a series of enlarged corrugations therein, and at the same time to point the wire, and after thus making the corrugations to reduce the diameter thereof by upwardly curving the points, so that the shank of the finished nail is substantially uniform throughout its length, said figure also showing in cross-section the relative positions of the nail to the die. Fig. 7 is a side view of one of the said improved dies, showing the working-face thereof, adapted to form enlarged concentric corrugations, &c., upon the wire nail, as just stated. Fig. 8 is a transverse sectional view of two dies, corresponding to line *a a* of Figs. 6 and 7, showing the wire blank in position preparatory to having the corrugations impressed therein. Fig. 9 is a similar sectional view of the same pair of dies, taken on line *b b* of said figures, showing the nail having the series of corrugations rolled therein whose points exceed the normal diameter of the plain portion of the wire, the

latter being at the same time slightly elongated and pointed; and Fig. 10 is a transverse sectional view of the dies, taken on line *c c* of Figs. 6 and 7, showing the plain portion of the dies in engagement with the barbed or corrugated shank of the nail and corresponding to the finished portion, or, in other words, reducing the said corrugations to the normal diameter of the plain portion of the wire, while at the same time the points thereof are upwardly curved.

The following is a more detailed description of my improved method of making wire nails:

A, again referring to the drawings, designates the finished wire nail complete, the same consisting of the shank *s*, the series of upwardly-curved barbs *a*, substantially uniform in diameter with that of the plain portion of the wire, a head, *h*, the roughened portion *r*, adjacent thereto, and sharpened point *h'*.

A', Fig. 2, represents the nail in a semi-completed state, the rolled barbs or corrugations *a'* thereof exceeding in diameter that of the wire or shank *s*. The corrugations or barbs *a'* are substantially cone-shaped, the same, as drawn, being concentric with the head, the upper surfaces, *c'*, (corresponding to the base of the cones *a'*,) being at right angles to the axis of the nail. By a further gradual engagement with the dies the points of the corrugations are severally deflected or bent in an upward direction until they coincide with the diameter of the wire or shank *s*, thus producing the curved barbs *a*, each having the concave or cup-shaped upper surface, *c*. (See Fig. 5.)

B B designate the two rolling or shaping dies, the faces of each for a portion of about one-half their length consisting of a series of projecting surfaces or ribs, *d*, adapted to form said barbs *a'*, the barb-forming portion proper terminating at *f* and in the direction of the path of the nail. The projections *d* gradually diminish from this point until they finally merge into or unite with the flat or plain surface C of the die, as shown at *d'*. This latter-named portion *d'* of the die is adapted to upwardly roll, and at the same time to reduce the diameter of the points of the previously-formed barbs *a'* of the nail to correspond substantially with that of the wire *s*, the length of the plain surface C of the die being more than equal to the circumference of the engaged nail.

The lower longitudinal edges of the dies B are provided with the projecting beveled surface *g*, the same being adapted to form the point *h'* on the nail by rolling, and at the same time that the shank *s* of the nail is being corrugated.

The method of producing the wire nail A by means of my improved dies B is substantially as follows. I would first state, however, that as machines for rolling nails and screws are common a detail description thereof is not deemed essential herewith. Therefore the following relates more especially to the construction and arrangement of the two dies B, adapted in their joint operation to produce a pointed wire nail having upwardly-curved barb-like corrugations, whose diameter when completed is substantially equal to the diameter of the unbarbed portion.

In view of the foregoing the dies B B are assumed to be suitably mounted in the machine (one or both dies being made to reciprocate) with their corrugated or working surfaces facing each other, as shown in Fig. 6, and so adjusted as to allow the shank *s* of a previously-headed blank to be placed between them. (See also Fig. 8.) Now, upon forcing the die forward in the arrow direction that portion of the wire which lies between the corrugated portions *d* of the dies gradually receives the impression thereof, while at the same time the comparatively blunt end of the blank is being elongated and finally pointed by contact with the beveled portion *g* of the die. When the nail reaches the point *f*, the maximum (as indicated by Figs. 6 and 9) impressing capacity of the dies has been reached, resulting in a corresponding increase in the diameter of the corrugations over that of the shank *s* by the outward flow of the metal therefrom, as also clearly shown at *a'*, Figs. 2, 4, and 9. At this stage of the movement of the dies, the nail being now completely barbed or corrugated, a further advancement of the dies, in connection with the inclined groove *d'*, gradually commences to upwardly turn the points *a'* of the barbs, and by final contact with the plain surface C of the dies the diameter of the barbs is reduced to substantially that of the normal size of the wire *s*, (see Figs. 1, 3, 5, 6, and 10,) the said barbs then assuming the cup-shape form shown sectionally in Fig. 5. A further movement of the dies allows the now completed nail A to drop therefrom. The return-stroke causes the die to again assume the normal position for engagement with another blank, as before.

It is obvious that circular dies may be employed for the purpose, the stationary die being concave, while its mate is correspondingly convex and secured to a roll adapted to revolve, without departing from the spirit of the invention. It is further evident that a spiral groove having its outer edge upwardly bent, as shown in Fig. 5½, may be formed in the surface of the wire by simply substituting dies having their forming-ribs *d d'* located at an angle with the base of the dies, in lieu of the arrangement shown in Fig. 7.

It will be noticed that during the barb-forming operation the wire blank is not materially lengthened or elongated, as would be the case were the wire to be first reduced in diameter and then corrugated, an objection to this latter method, as hereinbefore stated, being to produce inferior work, &c.

The improved nail A forms the subject of a separate application for Letters Patent filed by me in the United States Patent Office upon even date herewith and being serially numbered 230,074.

Having thus described my invention, what I claim, and desire to patent, is—

1. In a machine for making wire nails, the swaging-dies B, each having barb-forming ribs adapted to receive the plain wire and roll a series of barbs thereon whose maximum diameter exceeds that of the wire, and, further, having the said ribs terminating in a substantially plain surface adapted to bend the outer edges of the nail-barbs in an upward direction, and forming the cup-shaped cavities *c*, thereby reducing the diameter of the barbs to that of the unbarbed portion of the nail, substantially as shown and described.

2. In a wire-nail-making machine, the combination of the pair of dies B, hereinbefore described, having a series of barb-forming ribs, *b*, to produce the enlarged barbs or corrugations *a'*, and having barb-reducing ribs forming a continuation of the said ribs *d*, to deflect the edges of the enlarged barbs in an upward direction, and the plain or unribbed portion into which the ribs terminate for completing the bending of the barbs, thereby producing the upwardly-curved cup-shaped corrugations *a*, having diameters substantially equal to that of the normal size of the wire, substantially as shown and described.

3. In a machine of the class specified, the combination of the pair of dies, hereinbefore described, having an enlarged barb-forming portion, a barb-reducing portion, and a pointing portion, all constructed and arranged substantially as specified.

4. The improved method of producing barbs or grooves upon the shanks of wire nails, &c., which consists, first, in rolling the barbs thereon, and having their outer diameters extend beyond the sides or periphery of the plain portion of the wire, (the wire thereby not being materially elongated,) and, next, in bending or upwardly curving the barbs to reduce the said outer diameters thereof, and forming the cup-shaped corrugations whose diameters are substantially equal to the normal size of the wire, substantially as hereinbefore described.

5. The improved method of forming grooves upon the shanks or stems of wire blanks and pointing the same, which consists in rolling the grooves (one or more) to produce barbs or ribs whose outer diameter considerably exceeds that of the wire itself, and at the same time elongating the end of the blank and forming the point, and, next, in reducing said barbs or ribs by bending the outer edges thereof to a diameter substantially uniform with that of the plain portion of the shank, substantially as shown and hereinbefore described, and for the purpose specified.

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

CHARLES D. ROGERS.

Witnesses:
CHARLES HANNIGAN,
WM. R. DUTEMPLE.