

July 7, 1925.

1,545,364

W. THOMA ET AL
NAIL AND METHOD OF PRODUCING SAME

Filed Jan. 28, 1924

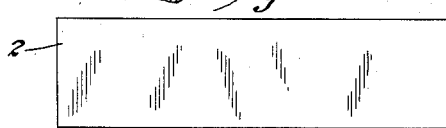
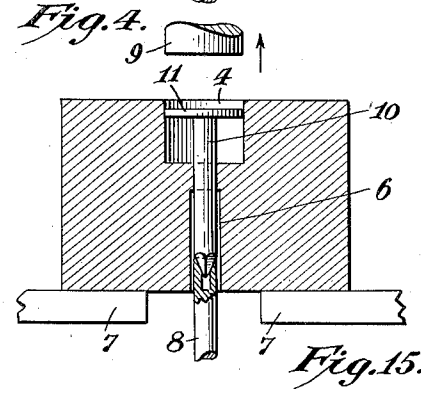
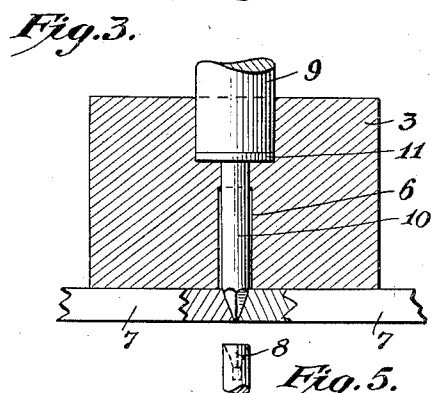
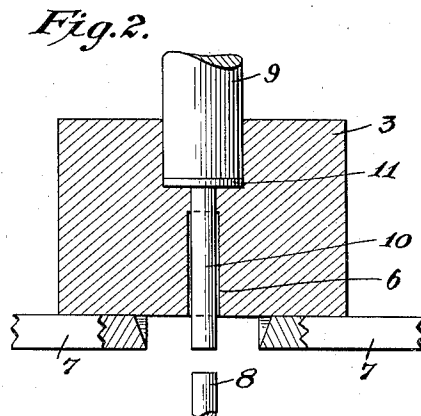
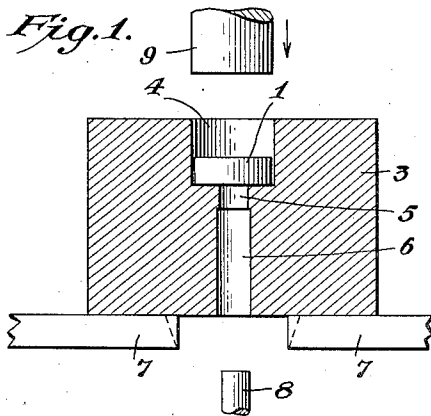
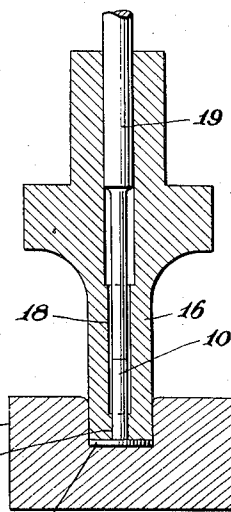
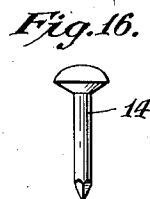
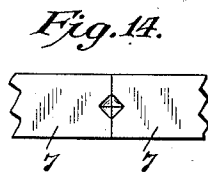
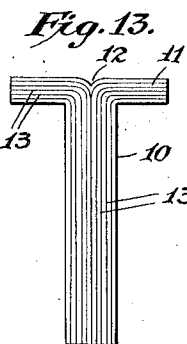
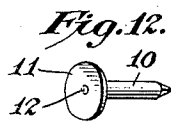
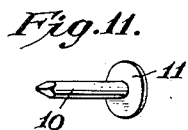


Fig. 6. *Fig. 7.* *Fig. 8.* *Fig. 9.* *Fig. 10.*



INVENTORS
Walter Thoma
Charles Thoma
BY
[Signature]
ATTORNEY

Patented July 7, 1925.

1,545,364

UNITED STATES PATENT OFFICE.

WALTER THOMA AND CHARLES THOMA, OF BROOKLYN, NEW YORK.

NAIL AND METHOD OF PRODUCING SAME.

Application filed January 28, 1924. Serial No. 689,053.

To all whom it may concern:

Be it known that we, WALTER THOMA and CHARLES THOMA, citizens of the United States, and residents of New York city, in the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Nails and Methods of Producing Same, of which the following is a specification.

10 This invention relates to nails or the like, together with a method of producing the same, and has for its main object and feature the production of nails or the like from zinc.

In the art of nailmaking, as now practiced, it is the custom to draw the material, 15 such as steel or copper, into wire, the head of the nail being formed by spreading one end of the wire after which the nail is severed from the wire strand.

20 It has long been desired to make nails or the like out of zinc and in consequence numerous attempts have been made and a great deal of money has been spent in an endeavor to devise a practical method of 25 drawing zinc into wire. The difficulty encountered there is that in order to draw material into wire, heating is required and this together with the heat generated when reducing material through the dies results in 30 explosions thereby rendering zinc wire drawing impractical.

Zinc has heretofore been extruded in the form of bars or rods. This operation presents few practical difficulties because such 35 rods or bars are of relatively large dimensions and the phenomenon of "snaking", that is, the twisting or distortion of such bars or rods as they issue from the extrusion die is immaterial because the bars or 40 rods are severed into convenient lengths and are therefore easily manageable. Zinc wire of relatively small cross-section cannot, however, be produced by extrusion any more 45 than they can be produced by drawing through dies for the reason of the heat generated and also because the "snaking" would render the wire unmanageable.

While the present invention uses the principle of extrusion, it employs it in a novel 50 and heretofore unknown way and in such a manner as to avoid the factors of undue heat and of "snaking". In the first place, it is not a continuous process such as the extrusion of a continuous wire and consequently there is not the cumulative effect 55 produced by the passage of a constant stream

of metal through a die opening, for in our case the operation is discontinuous, each nail being formed by a separate and independent extrusion process of short duration which not only extrudes a shank but shapes the head of the nail. In addition, provision is made whereby "snaking" is prevented, partly by reason of the short length of material extruded and partly by reason of the 65 provision of guiding means whereby the extruded shank is prevented from distortion out of the plane of the die opening so that the extruded shank may be returned through the die opening in order to remove the 70 finished article from the die.

In accordance with the above, one feature of the invention consists in a zinc nail or the like having a head from which extends an extruded portion forming a shank. 75 Another feature consists in the process for producing this nail. A detailed explanation of these various features follows.

In the accompanying drawings, the invention is disclosed in several concrete and preferred forms, in which: 80

Fig. 1 is a vertical sectional view through one form of mechanism by means of which the improved process can be carried out and the novel product be obtained, the parts 85 being shown in the position they occupy before the extrusion action begins.

Fig. 2 is a view similar to Fig. 1 showing the shank of the nail extruded.

Fig. 3 is a view similar to Fig. 1 showing 90 the action of the shearing members that may be employed.

Fig. 4 is a view similar to Fig. 1 showing the ejector acting to return the shank 95 through the die opening.

Fig. 5 shows a sheet of material from which the plugs or blanks may be cut.

Figs. 6 to 10 views of different shaped plugs or blanks that may be employed in carrying out the invention. 100

Fig. 11 is a perspective view of the improved product with the free end of the shank in the foreground.

Fig. 12 is a perspective view of the nail shown in Fig. 11 with the head in the foreground. 105

Fig. 13 is a diagrammatic view showing the flow of the metal during the extrusion action and the unbroken grain of the nail.

Fig. 14 shows a plan view of the shearing members. 110

Fig. 15 shows a modified mechanism,

whereby the improved process can be carried out and the improved product be obtained.

Fig. 16 shows one of many possible modifications of the product.

The blank or slug from which the nail is made is indicated at 1. This slug may be obtained in any suitable way such as by casting or it may be cut from a sheet as 2. The shape of this plug is practically immaterial and may be any of the several examples shown in Figs. 6 to 10, and we merely remark here in passing that if the slug is shaped as in Fig. 9 there is no scrap whatever left over in cutting up sheet 2. 3 indicates a die having a die chamber 4 preferably of the same shape as the plug. Communicating with the die chamber is a die opening 5 of a diameter equal to the desired diameter of the shank of the nail but of less length than that of said shank. On that side of the die opening which is remote from the die chamber is a guide opening 6, the walls of which constitute guiding means to prevent distortion out of the plane of the die opening. 7 indicates shearing members and 8 is an ejector entering through the guiding means to return the shank through the die opening. Guide opening 6 is slightly larger, say .003 or .002 of an inch, than the die opening. 9 is a plunger to coact with the metal in the die chamber.

In practice a slug or blank is produced in any of the several ways indicated and is placed in the die chamber. Plunger 9 now descends and extrudes a portion of the metal through the die opening to form a shank 10. The end of this shank extends into the guide opening 6 and is thereby prevented from distortion out of the plane of the die opening. The cam that operates the plunger is so timed and the stroke of the plunger is so related that said plunger does not descend to the bottom of the die chamber but a portion of the metal remains in the die chamber and forms head 11 of the nail. The nail may be pointed by grinding, but in case it is desired to make the nail complete in the same process then the end of the shank may protrude beyond the guide opening and members 7 will then move inwardly to shear off the end of the shank. Ejector 8 now rises and returns the shank through the die opening and, preferably, pushes the finished nail out of the mechanism. The object of the guide opening 6 is to prevent the extruded material from "snaking" and also to render it possible to return the shank through the die opening, for, it will be understood, if the shank were entirely surrounded by the die opening the friction might be too great to admit of the return of the shank.

The nail produced by the process is shown

in Figs. 11 and 12. Attention is called to the slight central depression 12 in the head 11 of the nail. In Fig. 13 is shown a diagram explaining the cause of this depression. As plunger 8 descends the under part of the metal is forced down through the die opening and this downward flow manifests itself by sucking the center of the head slightly downward. This downward flow causes the grain 13 of the metal to arrange itself unbrokenly from the head in curves toward the center and then straight down through the shank. This obviously makes for a stronger construction than that possessed by a nail made from a wire where the head is formed by crushing the metal and breaking the grain thereof. The nail also is non-corrosive, and can be produced at a cost approximately the cost of the step of galvanizing a steel nail.

Many other shapes of nails or the like can of course be produced. In Fig. 16 is shown a nail 14 with a curved upper surface and beveled undersurface on its head.

In Fig. 15 is shown a modified construction of die mechanism. As there shown, 15 indicates an open face die member adapted to receive the slug. 16 is a hollow plunger having a die opening 17 and a slightly larger guide opening 18. The descent of the plunger extrudes the metal into the hollow plunger. 19 is an ejector for pushing the product out of the hollow plunger. In other words, the construction here shown is the reverse of that disclosed in Fig. 1.

We claim:

1. The method of producing a zinc nail which consists in extruding, through a die opening, a portion of the metal of a blank to form a shank, the unextruded portion of the blank forming a head, and then returning the shank through the die opening.
2. The method of producing a zinc nail which consists in extruding, through a die opening, a portion of the metal of a blank to form a shank, the unextruded portion of the blank forming a head, shearing off the outer end of the shank, and then returning the shank through the die opening.
3. The method of producing a zinc nail which consists in extruding, through a die opening, a portion of the metal of a blank to form the shank, the unextruded portion of the blank forming a head, guiding the extruded shank to prevent undue distortion thereof out of the plane of the die opening during the extruding action, and then returning the shank through the die opening.
4. The method of producing a zinc nail which consists in extruding, through a die opening, a portion of the metal of a blank to form the shank, the unextruded portion of the blank forming a head, guiding the extruded shank to prevent undue distortion thereof out of the plane of the die opening

during the extruding action, shearing off the outer end of the shank, and then returning the shank through the die opening.

5 The method of producing a zinc nail
 10 which consists in placing a blank in a die chamber in line with a die opening, extruding, through the die opening, a portion of the metal of the blank to form the shank, the unextruded portion of the blank forming a head, guiding the extruded shank to prevent undue distortion thereof out of the plane of the die opening during the extruding action, and then returning the shank through the die opening.

15 6. The method of producing a zinc nail which consists in placing a blank in a die chamber in line with a die opening, extruding, through the die opening, a portion of the metal of the blank to form the shank, the unextruded portion of the blank forming a head, guiding the extruded shank to prevent undue distortion thereof out of the plane of the die opening during the extruding action, shearing off the outer end of the shank, and then returning the shank through the die opening.

25 7. The method of producing a zinc nail which consists in severing a blank from a sheet of zinc, placing the blank in a die chamber in line with a die opening, extrud-

ing, through the die opening, a portion of the metal of the blank to form a shank, the unextruded portion of the blank forming a head, guiding the extruded shank to prevent undue distortion thereof out of the plane of the die opening during the extruding action, and then returning the shank through the die opening.

8. The method of producing a zinc nail which consists in severing a blank from a sheet of zinc, placing the blank in a die chamber in line with a die opening, extruding, through the die opening, a portion of the metal of the blank to form a shank, the unextruded portion of the blank forming a head, guiding the extruded shank to prevent undue distortion thereof out of the plane of the die opening during the extruding action, shearing off the outer end of the shank, and then returning the shank through the die opening.

9. As a new article of manufacture a zinc nail having a head from which extends an extruded portion forming a shank.

Signed at New York city, in the borough of Brooklyn county of Kings and State of New York, this 21st day of January, 1924.

WALTER THOMA.
 CHARLES THOMA.