

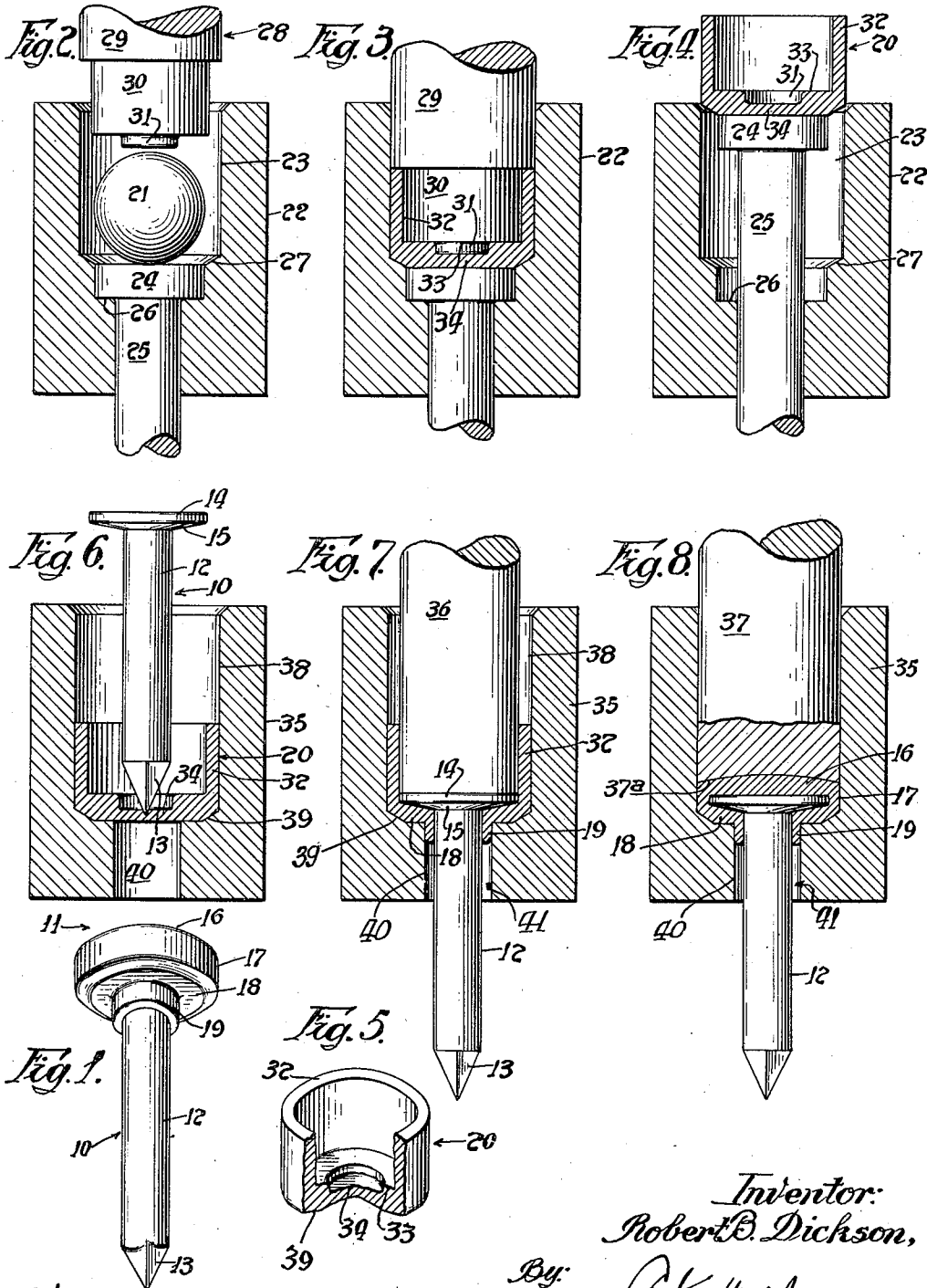
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METHOD OF AND MEANS FOR MAKING WEATHERPROOF NAILS

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METHOD OF AND MEANS FOR MAKING
WEATHERPROOF NAILS

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This invention relates to improvements in method of and means for making weatherproof nails, and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The weatherproof nail with which the present invention is more especially concerned is one wherein the head is enclosed in a cap of softer metal, with a part of the cap surrounding the adjacent portion of the shank.

The general object of the present invention is to provide a method of and means for enclosing a nail head in a cap of softer metal with a portion of such metal disposed to engage and surround the nail shank wherewith the capping operation may be performed quickly and at low cost.

Again, it is an object of the invention to provide a method and means wherewith the life of the dies employed may be increased by causing the softer metal, of which the cap is to be formed, to act as a cushion between certain of the die parts, thus avoiding direct contact of die parts with one another.

Another object of the invention is to provide a method and means whereby the nail to be capped will act as a die member in performing one of the operations, thus reducing the number of die parts required and also reducing the number of operations.

A further object of the invention is to provide a method of this kind which may be carried out as a "cold" method and whereby a mass of softer cap metal is transformed into a cap blank adapted for application to and thereafter caused to enclose and seal about the head of the nail being capped, to produce the finished capped nail.

Also, it is an object of the invention to provide a simple and efficient cup shaped cap blank so formed that part thereof may be easily pierced by a nail in the initial assembly of the blank and nail, thus enabling the nail to serve as a die without materially affecting the driving characteristics of the nail point.

To accomplish the above objects, a cup-like cap blank is formed of relatively soft metal, with a part of the bottom of the blank thinner than the remainder thereof. A nail and a cap blank are then moved relatively so that the pointed end of the nail passes through the relatively thin part of the cap blank and forms a burr which is transformed into a collar that surrounds the shank of the nail near its head. Thereafter, portions of the cap blank are displaced and caused to flow inwardly into enclosing and seal-

ing engagement upon the top surface of the nail head.

The above mentioned objects of the invention, as well as others, together with the several advantages thereof will more fully appear as the specification proceeds.

In the drawing:

Fig. 1 is a perspective view of a weatherproof nail made in accordance with the improved method.

Fig. 2 is a vertical sectional view through a die structure for forming a cap blank thereafter applied to the head of a nail in accordance with a part of the invention, the parts of the structure being shown in a position ready to transform a mass of softer metal into a cap blank.

Fig. 3 is a view similar to Fig. 2 showing the position of the parts of the die structure, after the forming of the cap blank.

Fig. 4 is a view similar to Fig. 2 with the parts of the die structure in the position they occupy after having ejected the cap blank from the forming die.

Fig. 5 is a perspective view of the finished cap blank ready for application to a nail head, a part of the blank being shown as cut away better to disclose the structure thereof.

Fig. 6 is a vertical sectional view through a second die employed in carrying out the steps of applying the blank shown in Fig. 5 to an ordinary wire nail to produce the finished capped nail appearing in Fig. 1 and more particularly illustrates the piercing of the cap by forcing the pointed end of a nail therethrough.

Fig. 7 is a view similar to Fig. 6 and illustrates the nail after it has been forced through the cap blank and the head of the nail has been disposed within the blank and in engagement with the bottom thereof.

Fig. 8 is a view similar to Fig. 7 and illustrates the step following the step of Fig. 7 and wherein the cap material at the open end of the blank has been displaced inwardly into a covering and sealing engagement upon the top surface of the head of the nail.

Referring now in detail to the weatherproof nail shown in Fig. 1, which has been produced by the improved method, the same comprises a conventional or stock "wire" nail 10 and a weatherproof cap 11 of metal softer than that of the nail. Lead is a metal which is much softer and which is well adapted for the purpose. The nail includes a shank 12 having a driving point 13 at one end and a substantially round flat top head 14 at the other end. The underside 15 of

the head flares upwardly and outwardly from the shank to the peripheral edge of the head.

The cap 11, as here shown, includes a crowned top wall or portion 16 enclosing the top of the nail head, and a peripheral portion 17 surrounding the periphery of the nail head. Said cap further includes a bottom portion 18 enclosing the flared bottom of the nail head and a collar 19 surrounding that portion or neck of the shank 12 adjacent the head. The finished cap, which is best shown in Figs. 1 and 8, is produced by applying a cup-like blank to the head of the nail. Said blank is best shown in Fig. 5 and is therein indicated as a whole by the numeral 20. The blank 20 is preferably made by the so-called "cold" method by pressing a mass of softer metal between a coacting die and plunger instead of by the "hot" method wherein a mass of molten softer metal is cast in a mold.

In Figs. 2-3 and 4 inclusive is illustrated a means for forming the blank 20 from a mass of soft metal 21, which in this instance is shown as a sphere. Such means includes a die member 22 in which is an open top end cavity 23 of a diameter approximating that of the blank 20. The major portion of the bottom of said cavity is provided by the head 24 of an ejector 25 slidably arranged in the bottom of the die coaxially with the cavity 23. The die 22 is provided with an annular shoulder 26 below the bottom of the cavity and the marginal portion of the ejector head has supporting engagement upon this shoulder. A flaring surface 27 connects the peripheral top edge corner of the head 24 with the bore of the cavity 23.

Associated with this die member 22 is a punch or plunger 28 that has an upper portion 29 of a diameter snugly to fit the cavity 23. Said punch also has a lower portion 30 of a diameter approximating the desired inside diameter of the blank 20 and an axial bottom end boss 31 of a diameter less than that of the portion 30 and having a shallow depth.

To form the blank 20, a mass 21 of softer metal is placed in the cavity 23 so as to rest on the ejector head 24. The die 22 and the punch 28 are then moved axially toward each other so that the punch enters the cavity 23. The mass 21 is then displaced so that the metal is caused to flow to fill the space between the cavity and punch part 30 to form the annular side wall 32 and the bottom wall 33 for the blank. The wall 33 then has a depression in its upper surface formed by the punch part 31 so as to leave a thinner central diaphragm portion 34 in said bottom wall. After the blank has thus been formed, the punch 28 is withdrawn from the cavity 23 and thereafter a relative movement is produced between the die 22 and the ejector 25 whereby the finished blank is ejected from the cavity 23 for transfer to the means which forms the blank into a finished cap 11 on the nail head.

In Figs. 6, 7 and 8 are shown the means just above referred to. Said means includes a second die 35 and coacting plungers 36 and 37 respectively. The die 35 has an open top cavity 38 therein of the same diameter as the cavity 23 in the die 22. The bottom 39 of the cavity flares upwardly and outwardly to meet the wall of the cavity 38. In the bottom end of the die 35 is an axial opening 40 of a diameter slightly larger than that of the shank 12 of the nail.

A blank 20 is then inserted, closed end down, into the cavity 38 until the bottom 33 of the blank 20 rests upon the bottom 39 of the cavity.

This will dispose the wall portion 34 in line with the opening 40, the side wall 32 of the blank fitting substantially snug in said cavity. A nail 10 is then inserted into the cavity and its point 13 is suitably centered upon the thinner wall portion 34 of the blank 20 and with the opening 40. The nail is then forced downwardly as by means of the plunger 36 having substantially the same diameter as that of the nail head 14 which in turn is substantially the same as the inside diameter of the wall 32 of the cup blank. When the plunger 36 pushes the nail downwardly, the point 13 pierces the wall portion 34 of the cap blank and pushes parts thereof radially outward as a burr which enter the space 41 between the shank 12 of the nail and the wall of the opening 40 to form the collar 19. The plunger 36 is employed to push the nail downwardly until the head 14 of the nail engages the bottom 33 of the blank and this leaves a considerable portion of the wall 32 of the blank extending beyond the nail head. The punch 36 is then withdrawn. Thereafter the plunger 37 is entered into the cavity 38. This plunger, which has a concaved bottom surface 37a, snugly fits in the cavity 38. As the punch surface 37a approaches the top edge of the wall 32 of the blank, the said wall is turned or displaced inwardly and downwardly into a covering and sealing engagement upon the top surface of the nail head to form the top 16 of the cap. In this final forming of the cap, the material forming the cap top 16 is so intimately pressed together as to be substantially devoid of objectionable hair-like cracks or fissures.

The punch 37 is then withdrawn and the finished capped nail is ejected from the die cavity in any suitable manner.

The finished capped nail thus produced has its entire head and a portion of its shank enclosed in the cap material.

From the foregoing it will be seen that the soft capping metal forms a cushion between certain of the die parts when the cup-like blank is formed, thus preventing contact between certain die parts and reducing wear. Also, that the nail itself serves to form the opening in the bottom of the cup and to press the metal downwardly into surrounding relationship to the shank. It thus serves as a die part, but since the cap metal is relatively thin where the nail pierces it, the nail point is not dulled to any appreciable extent.

While in describing the invention I have referred in detail to the various steps of the method as well as to the sequence thereof, and to the specific structure of the cap blank employed in making the cap, the same is to be considered only in the illustrative sense so that I do not wish to be limited thereto except as may be specifically set forth in the appended claims.

I claim as my invention:

1. The method of making a weatherproof nail which consists in providing a relatively soft metal cup-like blank open at one end and closed at the other end and having an annular side wall, said closed end of the blank being made thinner at its central portion so as to be more readily pierced by a nail point at its central portion than at portions spaced radially therefrom, arranging the closed end of said blank upon a support having an opening therein substantially coaxial with said blank, forcing the pointed end of a nail through said central portion of said closed end of the blank from the open end thereof, until the head of the nail substantially en-

gages said closed end of the blank and is spaced inwardly from said open end, and then causing that part of the side wall beyond said head to be displaced inwardly into a covering and sealing engagement with the top surface of said head.

2. The method of making a weatherproof nail which consists in providing a relatively soft metal cup-like blank open at one end and closed at the other end and having an annular side wall, said closed end of the blank being so formed as to be more readily pierced by a nail point at its central portion than at portions spaced radially therefrom, arranging the closed end of said blank upon a support having an opening therein substantially coaxial with said central portion of the closed end of the blank, and which opening is of a diameter larger than that of the diameter of the shank of the nail to be operated upon, so as to provide an annular space therebetween, forcing the pointed end of a nail through said central portion of the closed end of blank from its open end, so as to pierce said central portion of said closed end and to enter into said opening, until the head of the nail substantially engages said closed end of the blank, the pointed end of the nail, when piercing said central portion of said closed end of the blank, forming an annular burr on the closed end of the blank, which burr is forced radially into said annular space to transform said burr into a collar surrounding said shank adjacent said head, and then causing that part of the side wall beyond said head to be displaced inwardly into a covering and sealing engagement with the top surface of said head.

3. The method of making a weatherproof nail which consists in providing a relatively soft metal cup-like blank open at one end and closed at the other end and having an annular side wall, said closed end of the blank being made thinner at its central portion so as to be more readily pierced by a nail point at its central portion than at portions spaced radially therefrom, pushing said blank by means of a punch, closed end first into a die cavity so as to dispose the closed end against the bottom of said cavity and which bottom has an opening therein substantially coaxial with said central portion of said cavity so as to fit the blank to said cavity, and when said blank has been fitted into said cavity, forcing the pointed end of a nail through said central portion of the closed end of the blank and into said opening, from the open end of the die cavity, until the head of the nail engages the closed end of the blank, and then employing a second punch to upset and displace that part of the annular wall of the blank beyond the nail head inwardly into a covering and sealing engagement with the top surface of said nail head.

4. The method of making a weatherproof nail which consists in providing a soft metal cup-like blank comprising an annular body open at one end and closed at the other end by a wall having a thinner central portion, arranging the blank with said closed end wall in engagement against a support and with said thinner central portion arranged in line with an opening in said support of a diameter larger than that of the shank of the nail so as to leave an annular space between said opening and shank when the latter is disposed therein, forcing the pointed end of the nail through said thinner central portion of said closed end of the shank from the open end of the body so as to pierce said central portion and to bring the head of the nail into engagement upon the closed end of the blank, said piercing of said central portion of the closed end of the blank forming an annular burr which is forced into said clearance space to produce a collar upon that part of the shank adjacent said head, and then causing that part of said body outwardly of said head to be displaced inwardly into a covering and sealing engagement with the top surface of said head.

5. The method of making a weatherproof nail which consists in placing a mass of relatively soft metal in the cavity of a die and then operating upon the same to form it into a cup-like blank comprising an annular body open at one end and closed at the other end by a wall having a thinner central portion, transferring said blank to the cavity of a second die and then so positioning the same therein that the closed end of the blank is disposed upon the bottom of the cavity in the second die and which bottom has an opening therein of a diameter larger than that of the shank of the nail so as to leave an annular clearance space therebetween when said shank is disposed in said opening, forcing the pointed end of the nail through said thinner central portion from the open end of the body by means of a punch engaged with the head of the nail so as to pierce said portion and to bring the head of the nail into engagement upon the closed end of the blank, said piercing of said central portion of the closed end of the blank forming an annular burr which is forced into said clearance space so as to produce a collar upon that part of the shank adjacent said head, and then inserting a second punch in the cavity of said second die and which has a snug fit in said cavity and imposing a pressure thereon as the same engages the body beyond the nail head to upset and displace the same inwardly into a covering and sealing engagement with the top surface of said nail head.

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