June 1, 1937. J. M. UPTON 2,082,604

METHOD OF AND APPARATUS FOR MAKING LEAD HEAD FASTENERS

Filed Nov. 25, 1935

Fig. 1.

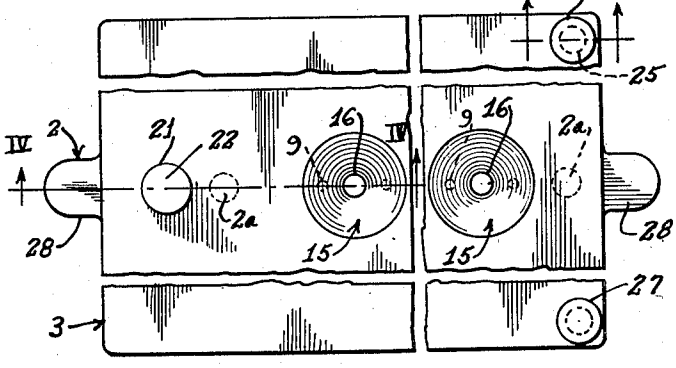
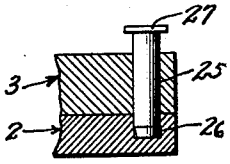


Fig. 6.



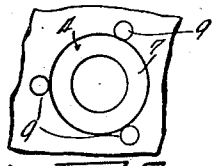


Fig. 8.

Fig. 3.

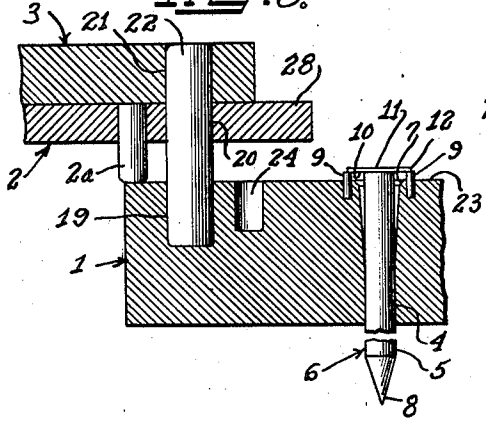


Fig. 4.

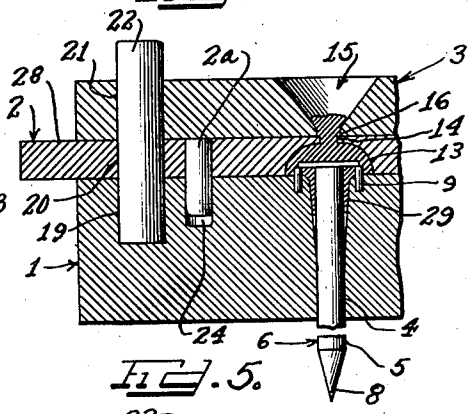
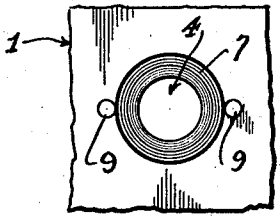


Fig. 5.

Fig. 2.



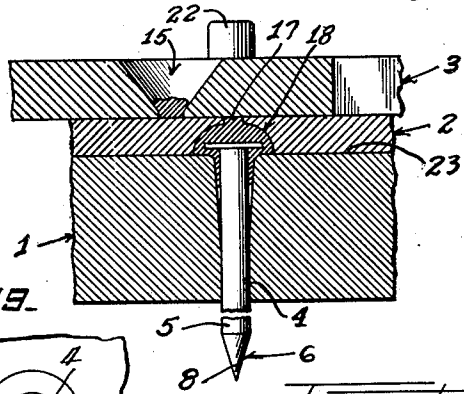
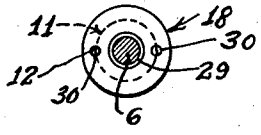
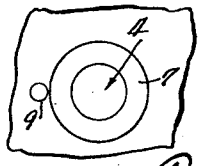


Fig. 9.

Fig. 7.





Inventor
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by Charles O. Fields Attys.

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UNITED STATES PATENT OFFICE

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METHOD OF AND APPARATUS FOR MAKING LEAD HEAD FASTENERS

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Application November 25, 1935, Serial No. 51,455

16 Claims. (Cl. 10—156)

This invention relates to a method of and apparatus for making lead head nails, and more particularly to the formation on the head of a nail, of a cap of lead or other relatively soft material. Such nails are employed for a variety of purposes such as the securement of corrugated metallic roofing, where it is necessary to seal the nail to the roofing above the hole through which the nail shank projects.

In the formation of lead or the like caps on nail heads by casting, it is important to insure the flow of a sufficient thickness of lead under the head, since it is this lead in particular which affords the sealing between the roofing and the nail itself. It is also important for the sake of economy to provide suitable means for spacing the blank nails uniformly and with dispatch.

Prior to the present invention, attempts to secure these desirable results have been attended with indifferent success, and have required the employment of cumbersome and time consuming apparatus.

It is accordingly a principal object of the present invention to provide a simple means for insuring the correct and uniform spacing of the blank nail heads so that an adequate thickness of lead will be cast thereto and thereunder.

It is another object of the invention to provide spacing means of this character involving no moving parts whatever.

It is a further object of the invention to incorporate spacing means of this character with a mold for casting purposes, as a unit.

Another object of the invention involves the provision of spacing means of this character with which conventional or other nail cap casting molds may be equipped, without any material change in any of the mold construction.

It is a still further object of the invention to provide a simplified method of positioning and holding blank nails in properly spaced relation to a casting mold structure.

Another object of the invention involves the provision of improved nail blank spacing means arranged to cooperate with a nail hole in the casting mold to bring the nail readily to rest in proper position for the casting operation.

The invention involves the further object of providing spacing means of this character which does not require adjustment at any time and which is not subject to wear.

In accordance with the general features of one form of the invention, there is provided at diametrically opposite points at the upper part of a mold and adjacent a nail hole, a pair of upstanding lugs of preferably the same height from the surface of the mold.

When a nail is dropped point downward into the hole, its head is arrested by the lugs and is held at rest by the lugs in a plane substantially parallel to the plane of the upper surface of the mold. The mold may be provided with any number of nail holes and with a pair of lugs as described for cooperation with each hole. Of course, any number of lugs may be provided, or if desired a ring may be employed instead.

A plate is preferably positioned over the mold and formed with a concavity of a shape corresponding with the cap to be formed. The spacing means may or may not project beyond the periphery of the nail head, and the wall of the cavity in the plate clears the outer periphery of the nail head. Above this plate is a top plate provided with pouring gates. Suitable provision is made for the proper alignment of the gates, cavities and nails. After the metal is solidified, the top plate may be swung so as to shear the poured metal flat with the intermediate plate in which the cavities are formed. The intermediate plate thereafter may be readily removed and the capped nails removed without difficulty.

Further objects and advantages of the invention will appear as the description proceeds.

The invention (in preferred forms) is illustrated in the drawing and hereinafter more fully described.

On the drawing:

Figure 1 is a fragmentary plan view of a mold assembly embodying the invention, preparatory to pouring of the capping metal.

Figure 2 is an enlarged fragmentary plan view of a nail receiving mold member employing the invention.

Figure 3 is a fragmentary sectional view showing a nail head spaced in accordance with the invention, prior to operative assembly of the mold parts.

Figure 4 is a fragmentary sectional view taken as indicated by the line IV—IV in Figure 1, but after the capping metal has been poured.

Figure 5 is a view similar to but taken at an angle to Figure 4, with the top plate shifted, leaving the complete capped nail.

Figure 6 is a fragmentary sectional view taken as indicated by the line VI—VI in Figure 1.

Figure 7 is a sectional view through the shank of the capped nail, looking toward the cap.

Figures 8 and 9 are views similar to Figure 2 but illustrate modified spacing means for the heads of fasteners.

Referring now more particularly to the drawing, the mold structure is illustrated as comprising a bottom nail receiving mold plate 1, an intermediate plate 2 complemental to the plate 1 in the formation of the lead or like nail head cap, and a top plate 3 provided with pouring gates complemental to the cap-forming cavity or cavities in the intermediate plate 2. Each of the plates may be formed to produce caps on one or a large number of nail heads. It will suffice for this specification, however, to describe portions of the plates cooperating in the formation of a cap for a single nail.

The plate 1 is illustrated with a nail hole 4 for receiving the shank 5 of a nail 6. The hole 4 may terminate upwardly without a flare, but is preferably flared as at 7 to facilitate insertion of the nail by guiding the point 8 thereof into the hole 4. The flare at 7 serves also to receive a portion of the lead to form part of the lead cap, as will appear hereinafter. In accordance with one form of the invention, two pins 9 are arranged preferably diametrically opposite each other adjacent the flare 7. These pins are fixedly embedded or secured otherwise to the nail receiving plate 1 and extend the same distance up from the plate 1. These pins afford an abutment to engage the underside 10 of the nail head 11 and may be so arranged as to lie inwardly of or project beyond the outer periphery 12 of the nail head.

The complementary mold plate 2 is provided with any desired shape of cavity 13 dependent upon the shape of cap desired. In the illustrated form of the invention this cavity is generally semi-spherical and of such size that sufficient space is provided for the flow of the lead and for the provision of a lead cap of the desired thickness throughout. The upper part of the cavity 13 is rendered accessible from the top by a communicating hole 14.

The pouring and shearing plate 3 is provided with a pouring gate 15 for each cavity 13. This gate converges downwardly and terminates in a hole 16 which is adapted to register with the hole 14 in the plate 2. The pouring plate 3 may be swung or otherwise shifted with respect to the intermediate plate 2, as shown in Figure 5, to thereby shear the metal at the upper surface of the plate 2, the lead in the cavity 15 and the hole 16 being again usable.

Nails of the same shank diameter are made in various lengths and various diameters of heads. Accordingly it will be appreciated that while the spacing means 9 may come within the outer periphery of the head of one size nail, they may come flush with or extend somewhat beyond such periphery. In any event said means serve equally well to properly space the nail head from the upper surface of the plate 1. The spacing means, when in the form of spaced lugs as at 9, are arranged laterally in spaced relation to the shank 5 in order to allow the molten lead to flow in the space between such lugs and the shank and thus completely surround the lugs 9.

The lugs 9 or other suitable spacing means may be of cylindrical or any other suitable form and, if desired, may be rounded transversely as at the upper extremities thereof.

As the shearing plate 3 is moved out of the way, the intermediate plate 2 is raised to or beyond the position previously occupied by the upper plate 3, so as to clear the knob 17 formed at the top of the cap 18, and is then shifted so as to expose all of the caps. The nails may be readily released from the spacing means 9 and adjacent surface of the plate 1 by jarring the latter or by exerting upward pressure on the nails as at their points 8. The capped nails may be thereupon readily removed to make way for the feeding of nail blanks to the holes 4.

The plate 1 is preferably stationary and is accordingly suitably supported preferably with the nail shanks projecting below.

The three plates may be pivotally connected and, to this end, provided with holes 19, 20 and 21, respectively, adapted to receive a pivot pin 22 which preferably is fixed to the plate 1.

The plate 2 is provided on its underside with one or more fixed projections 2^a of preferably slightly greater extent in a downward direction than the distance the finished cap will project above the upper level 23 of the plate 1. These lugs or projections are engageable with said level of the plate 1 whenever the respective mold openings are out of register.

In the use of this structure, the plates 2 and 3 are first positioned clear of the various nail holes 4 in the plate 1. Thereupon, a nail 6 is deposited in each hole, the nail coming to rest when the head 11 thereof abuts the spacing means 9. The gravity effect on the nail and the support of the head thereof at substantially diametrically opposite points will hold the nail head flat, so that the metal which is to flow thereunder will be formed of uniform thickness under the head. After the nails 6 have been deposited in the openings 4, the plate 2 in its elevated position is swung or otherwise shifted over the plate 1 until the mold openings are registered. When that point is reached, the lugs 2^a drop into corresponding holes 24 in the upper part of the plate 1, said holes being sufficiently deep to allow the plate 2 to rest on the level 23 of the lower plate 1.

The plate 3 may have one or more holes 25 registering with one or more holes 26 in the plate 2, to receive a removable pin or pins 27 to detachably hold these plates with their respective cap-forming openings in alignment.

The top plate 3 may be moved with or separately from the intermediate plate 2 when the latter is being moved to cooperative position over the plate 1. However, as pointed out above, after the pouring and solidification of the metal are completed, the top plate is moved relative to the plate 2 so as to shear the metal in the gate, leaving the completed cap for each nail.

The plate 2 is then jarred slightly to release the cavity walls thereof from the caps formed over the heads of the nails, and then the plate 2 is raised sufficiently to clear the knobs 17 on the nail caps. The plate 2 is then swung or otherwise shifted with the lugs 2^a sliding over the surface 23, if desired, to a position where it is laterally clear of the caps.

Manipulation of the plate 2, and the other plates, if desired, may be facilitated by the provision of ears 28.

Thereafter the plate 2 may be supported by engagement of its lugs 2^a with the plate 1.

The nails are then ejected.

It will be seen that the nail head spacing means embodying the invention is extremely simple, requiring no adjustment, subject to substantially no wear, and may be readily and permanently applied in position for cooperation with the blank

nail, and cooperates with the nail head in such a manner as not only to space it properly from the nail, receiving mold member but also to hold the nail head level with respect to the top level of the nail receiving mold. The hole for receiving the nail must of necessity be of a size to accommodate shanks of somewhat varying diameters inasmuch as, in the drawing of wire for nail making purposes, perfect uniformity of diameter is not obtained. Moreover, variance in the overall diameter of the nail shanks may result from nicks in the shank and from the formation of threads in the shank in the case of screw nails to be driven by a hammer or otherwise.

Notwithstanding the slight clearance that may exist between any nail shank and the wall of the opening therefor, the spacing means embodying the invention serves in conjunction with the wall of the hole to quickly bring the nail to rest with its head in proper position to receive a cap which will be of uniform thickness under the nail head and circumferentially over the head if desired.

Should the caps of the nails adhere to the mold plate 2, they may be jarred loose therefrom or thrust therefrom by pins applied over the knobs 17.

If necessary or desirable, the plate 1 may be inverted to dispose of the capped nails.

Because of the flare 7, the cap metal will form a generally wedge-like sealing projection 29 about the shank 5. The resultant nail has a hole 30 formed by each spacing element 9.

The cavity in the plate 2 may terminate at the upper surface of said plate, without the provision of the hole 14, if desired.

The spacing means 9 may be non-circular or angular in cross-section, if desired.

The pins 2a and holes 24 may be reversed, so that the pins may ride on the underside of the plate 2. Any other suitable equivalent means may be substituted therefor.

The nail head spacing means may be made adjustable if desired, to vary the thickness of cap metal under the head. Such means could for example be threadedly connected to the plate 1.

The cavity walls in the plate 2 preferably are lubricated so that when the casting and shearing are completed the capped nails will not cling to the plate 2 as said plate is raised. The capped nails then adhere to the mold plate 1, which is thereupon inverted and the nail points 8 struck to dislodge the nails, which fall into a keg or other suitable container.

The plate 2 could be arranged to be swung up from the mold plate 1, if desired. The shear plate 3 could be pivoted at its center to the center of the plate 2 and be simply rotated about such axis as it slides on the upper surface of the plate 2.

The mold plate 1 may be made convex upward or otherwise shaped at the spacing means 9 if it is desired to impart a fillet or concavity or other shape to the bottom side of the cap.

After considerable use of the plate 1, the holes 4 may become enlarged due to wear by the nail shanks as they are deposited in and removed from such holes. Hence three or more preferably substantially equally circumferentially spaced spacing lugs 9 may be employed at each hole in the first instance, so as to preclude any tipping or canting of the nails at any time, irrespective of the wear of the holes.

Figures 8 and 9 show spacing means comprising respectively one lug and three lugs.

As the invention is directed to a method of and apparatus for applying caps to headed securing devices or fasteners, obviously the particular securing element shown and mentioned in the claims, namely a nail, is employed herein merely for convenience. Accordingly the term "nail" in the description and claims manifestly is not one of limitation but rather is exemplary.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this inventon, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. Apparatus for casting a cap onto a nail head, comprising nail shank receiving means, and means for engaging the nail head and spacing it from the receiving means to provide clearance for the access of capping material under the nail head to embrace the shank.

2. Apparatus for casting a cap onto a nail head, comprising nail shank receiving means, and means for engaging the underside of the nail head and spacing it from the receiving means to provide clearance for the access of capping material under the nail head to embrace the shank.

3. In a method of forming a cap for a headed nail, providing a nail shank-receiving mold with means to space the nail head from the mold, providing an enclosure for the head and spacing means, and casting a cap in the enclosure about the nail head.

4. Apparatus for forming caps about nail heads, comprising a mold having a nail shank receiving hole, a projection extending upward from said mold adjacent said hole so as to abut the nail under the top of the head thereof and affording substantial clearance between the mold and the juncture of the shank and head for the reception of a substantial thickness of capping material at said juncture.

5. Apparatus for forming caps about nail heads, comprising a mold or die having a nail shank receiving hole having a flared wall at the top to provide between it and the upper part of the shank an annular space for the reception of capping material, and spacing means carried by said mold and engageable with the head of the nail for spacing the nail head from the mold to permit the capping material to enter said annular space.

6. Apparatus for forming caps about nail heads, comprising a mold or die having a nail shank receiving hole having a flared wall at the top to provide between it and the upper part of the shank an annular space for the reception of capping material, and spacing means carried by said mold and engageable with the under side of the head of the nail for spacing the nail head from the mold to permit the capping material to enter said annular space.

7. Apparatus for forming caps on nail heads, comprising a mold member having a nail receiving hole, means carried by said mold member for spacing the nail head from the mold member, a complemental mold member adapted to be supported by the first mold member and having a cap-shaped cavity adapted to receive the elevated nail head, and also adapted to receive the cap metal to be poured, means for holding said members in cooperative relation during the pouring operation, said members being separable to an extent enabling the upper mem-

ber to shift laterally clear of the top of the cap so formed, and means for spacing said members to said extent during such shifting of the upper member.

8. Apparatus for forming caps on nail heads, comprising a mold member having a nail shank receiving hole, projecting means extending from said member adjacent said hole so as to engage the nail head and space the latter from said member, said means being positioned in spaced relation to the shank when the shank is in the hole, whereby the cap-forming material may enter under the head and between said means and the upper part of the shank.

9. Apparatus for forming caps on nail heads, comprising a mold member having a nail shank receiving hole, projecting means comprising an abutment extending from said member adjacent said hole so as to engage the nail head and space the latter from said member, said means being positioned in spaced relation to the shank when the shank is in the hole, whereby the cap-forming material may enter under the head and between said means and the upper part of the shank.

10. Apparatus for forming caps on nail heads, comprising a mold member having a nail shank receiving hole, projecting means comprising a plurality of spaced abutments extending from said member adjacent said hole so as to engage the nail head and space the latter from said member, said means being positioned in spaced relation to the shank when the shank is in the hole, whereby the cap-forming material may enter under the head and between said means and the upper part of the shank.

11. Apparatus for forming caps on nail heads, comprising a mold member having a nail shank receiving hole, projecting means extending from said member adjacent said hole so as to engage the nail head and space the latter from said member, said means being positioned in spaced relation to the shank when the shank is in the hole, whereby the cap-forming material may enter under the head and between said means and the upper part of the shank, said means being of relatively small cross section so as not to materially weaken the under side of the cap.

12. Apparatus for capping headed nails, comprising a mold member having a hole to receive a nail shank, and means extending up from said member adjacent the hole and providing a substantially three-point support for the head of the nail in the desired spaced relation to said member.

13. Apparatus for capping headed nails, comprising means for receiving the shank of a nail, means providing a surface facing the under side of the head of the nail, and means of less than circular extent relative to the axis of the nail and engageable with a part of the under side of the head of the nail for spacing the head from said surface so that capping material may enter between said surface and an unengaged part of the nail head in circular alignment with said means.

14. Apparatus for capping headed nails, comprising means of less than circular extent relative to the axis of the nail and engageable with a part of the under side of the head of a nail in spaced relation to the shank of the nail for spacing the head from a surface so that capping material may enter between the surface and an unengaged part of the nail head in circular alignment with said means.

15. Apparatus for forming caps on nail heads, comprising a mold member having a nail receiving hole, means for spacing the nail head from the mold member, a complemental mold member having a cap-shaped cavity adapted to receive the elevated nail head, and also adapted to receive the cap metal to be poured, and means for holding said members in cooperative relation during the pouring operation, said members being separable to an extent enabling the upper member to laterally clear the top of the cap so formed.

16. Apparatus for forming caps on nail heads, comprising a mold member having a nail receiving hole, means engageable with the head of the nail for spacing the nail head from the mold member, a complemental mold member having a cap-shaped cavity adapted to receive the elevated nail head, and also adapted to receive the cap metal to be poured, and means for holding said members in cooperative relation during the pouring operation, said members being separable to an extent enabling the upper member to laterally clear the top of the cap so formed during such relative lateral movement of said members.

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