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NAIL AND METHOD OF MAKING SAME

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The present invention relates to a new and improved nail and to a method of making the same.

The invention relates to nails of the non-splitting type and this new nail is in the nature of a modification and improvement of the nails shown in my prior Patents No. 1,466,676 and No. 1,771,867.

It has been found that the splitting of wood by nails may be very greatly reduced by the use of nails with an entering face which is comparatively blunt and largely crushes the fibres of the wood rather than splitting them apart. The usual type of diamond pointed wire nail merely separates the fibres. A blunt ended nail with the end having an area which represents a substantial portion of the cross sectional area of the nail, will crush the fibres by means of the blunt end. When this end is joined to the body of the nail by sloping surfaces, the fibres will be pushed apart as the body enters the wood sufficiently so that the wood grips the nail firmly. It has been found by repeated tests that improved nails of this character have materially greater holding power in wood than have the usual type of diamond pointed nails.

In my prior patents above identified, I have shown blunt ended nails with the ends of different cross sections. In the second patent I have shown nails of this character having cupped ends. The nails of the present invention may also be made with ends of different cross section and with cupped ends.

I have shown herein means for forming these nails. Usual types of nail making machines make nails from wire by cutting off portions of the wire to form the points. This is done by means of registering dies which meet to shear off the pieces of metal and to cut the wire. Hammer means are used to form the heads on the ends of the wire, usually before the other end of the nail is pointed and severed from the wire. These nails sell at a price but little above the cost of the wire from which they are formed, and nail manufacture to be commercially practical must be capable of being carried out upon usual types of machines with the nails being formed rapidly and automatically. I have shown herein dies by which my improved nails may be made on usual types of nail machines at usual operating speeds. I have also shown nail making dies and nails made therewith which very materially reduce the loss of metal sheared off in pointing the nails over the loss in making usual types of diamond pointed nails.

It is an object of the present invention to provide a new and improved nail and means and methods for making such a nail.

It is an additional object to provide a means and method for making nails whereby the metal loss in making the reduced entering end of the nails is minimized.

It is also an object to provide a new and improved nail having a generally cupped end which is wholly or partly caused by breaking the metal away.

Other and further objects will appear as the description proceeds.

I have shown certain preferred embodiments of my invention in the accompanying drawing, in which—

Figure 1 is a perspective view of a die for forming a nail having an hexagonal end or entering face;

Figure 2 is a plan view of the working face of the die shown in Figure 1;

Figure 3 is a view of the die shown in Figures 1 and 2 as seen from below in Figure 2;

Figure 4 is a perspective view of the entering end of a nail formed on the die shown in Figures 1, 2 and 3;

Figure 5 is an elevation of the entering end of the nail of Figure 4, with the reduced portion shown in cross section;

Figure 6 is a view similar to Figure 2 but showing a somewhat modified form of die;

Figure 7 is a view similar to Figure 1 but showing a die for forming a nail having an entering end of circular cross section;

Figure 8 is a perspective view of the entering end of a nail formed in the die of Figure 7;

Figure 9 is a view similar to Figure 1 of a die for forming a nail having a square or diamond shaped entering end;

Figure 10 is a view similar to Figure 9 showing a further modified form of die for making a diamond or square ended nail;

Figure 11 is a view of the die of Figure 10 as seen from below;

Figure 12 is a perspective view of a further modified form of die for making a square or diamond ended nail;

Figure 13 is a perspective view of a nail such as made by the die in Figure 9; and

Figure 14 is a view similar to Figure 2 but showing a modified form of die for forming a nail having a hexagonal end.

Referring first to the form of die shown in Figures 1, 2 and 3, it should be understood that

two dies are used, these dies being exact duplicates of each other and meeting to form the ends of the nails. The die body 20 is provided with contact shoulders 21 and 22 which serve as abutments when the die meets a similar die in the forming operation. The die is provided with cutting edges 23 and 24 which substantially meet similar edges on the opposite die in order to shear off metal from the sides of the wire to reduce the end to the desired size and shape. The end forming recess between the edges 23 and 24 is provided with lateral faces 25 and 26 and with the bottom face 27. These three faces form one-half of the end of the nail, the adjacent die forming the remaining three surfaces of the hexagonal end.

The cutting edges 23 and 24 are joined by a cutting edge 28 which, with its cooperating edge on the adjacent die, serves to cut off the wire. The sides of the die adjacent edges 23 and 24 are cut away at 29 and 30 to permit disposal of the portions of metal sheared off by the cutting edges. The die is also cut away at 31 adjacent the cross cutting edge 28 so as to provide clearance for the end of the wire from which the pointed nail is sheared. As clearly shown in Figure 3, the cutting edge 28 of the form of die shown in Figures 1, 2 and 3 is substantially on the level with the abutment shoulders 21 and 22.

The nail formed by these dies is shown in Figure 4. It has the circular body portion 32, with the reduced entering portion 33 and the cup-shaped hexagonal end 34. It is found in operating the dies that due to the slope of the forming portions 25, 26 and 27, as the nail is sheared there is a tendency for the nail to be forced away from the cutting edge 28 by the angular compression of these surfaces. This occurs while the compression is taking place and results in a cupping of the entering end of the nail. This gives it a cross section substantially as shown in Figure 5.

The die shown in Figure 14 is generally similar to that shown in Figure 2, with the exception that the cutting edge 35 between the side cutting edges 36 and 37 is on a lower level than the abutment portions 38 and 39. The result of this is that the coating edges 35 on the two dies do not quite meet and consequently do not fully shear the nail from the wire. In usual types of nail machines a kicker is provided to knock the nail from the dies so as to prevent it getting in the way of the head forming hammer if it should not of its own accord drop freely from the dies after the point is formed.

In using dies such as shown in Figure 14 the nail is deliberately not fully cut and the uncut surface is fractured by the action of the kicker which knocks the nail off the end of the wire. This broken surface formed in this manner has been found to be generally cup-shaped, similar to that shown in cross section in Figure 5. By breaking the nail away, sharp edges are formed at the edge of the cup which assist in holding a nail in place on wood when it is pressed slightly against the wood, and which also are efficient in starting the shearing action as the nail is driven into the wood. By only a partial cutting of the wire the wear on the cutting surfaces of the dies is reduced and they have longer life.

In the die in Figure 6 the cutting wall 40 is V-shaped and enters slightly between the forward ends of the side cutting edges 41 and 42. This form of end cut causes an exaggerated cupping of the end of the nail.

In the form of die shown in Figure 7 the forming surface 44 is located between the cutting edges 45 and 46 and is in the form of half of a truncated cone. The end cutting edge 47 is arcuate in form and assists in forming a cupped end on the nail. This die is also provided with abutment surfaces 48 and 49. It will be understood that these surfaces engage when the dies are brought together and thus protect the cutting edges from injury. The cutting edges are usually located very slightly below the abutments so that they do not meet and jam against each other, and yet they come close enough to each other to shear the metal.

Figure 8 shows the form of nail made by the 15 die of Figure 7. This nail has a cylindrical body 50, the entering portion 51 in the form of a truncated cone, and the substantially circular cup-shaped entering end 52.

The forms of dies shown in Figures 9 to 12 are 20 used in forming square or diamond ended nails. The die of Figure 10 has the abutment surfaces 53 and 54 joined by V-shaped end edge 55. The lateral cutting edges 56 and 57 have between them the forming surfaces 58 and 59.

As shown in Figure 11, the forward cutting edge 55 is V-shaped in the vertical as well as in the horizontal direction, so that the nail is not entirely severed but is broken off as was described in connection with the form of construction 30 shown in Figure 14.

The die shown in Figure 9 has the abutment surfaces 60 and 61 joined by a slightly curved end cutting edge 62, which is only slightly below the level of the lateral cutting edges 63 and 64. This die also does not entirely sever the end of the nail, but severs it to materially greater extent than the form of die shown in Figures 10 and 11.

In the form of die shown in Figure 12, the 40 abutment surfaces 66 and 67 are joined by a straight end cutting edge 68 from which extend the side cutting edges 69 and 70. The end cutting edge 68 is on substantially the same level as the side cutting edges 69 and 70, and thus serves 45 to shear substantially the entire thickness of the wire.

In Figure 13 is shown a nail of the general type formed by the dies shown in Figures 9 to 12, inclusive. This nail has a body portion 71 50 which is circular in cross section and the sloping end portion 72, which is four sided, similar to the usual type of diamond pointed nail. The entering end 73 is approximately square or diamond pointed, and is cupped either by the action of the dies or by the action of breaking off the nail from the wire stock.

In the forming of these nails, and particularly those which are broken off from the wire stock by the action of the kicker, the edges surrounding 60 the entering end are serrated or slightly irregular in contour. This irregularity is desirable in that it makes it simpler to place the nail against wood for hammering, and also it aids in crushing and cutting the wood fibres rather than in splitting 65 them apart. This roughness or irregularity of edge, therefore, is one of the desirable features of my improved nail.

While in the drawing I have shown dies for making nails, and nails with hexagonal, circular 70 and square or diamond shaped entering ends, it is to be understood that ends may be made in various other forms with various numbers of lateral faces joining the body of the nail and the entering end. The forms of dies and nails 75

shown are to be understood to be illustrative only and I contemplate such changes and modifications as come within the spirit and scope of the appended claims.

5 I claim:

1. A non-splitting nail having a body portion, a reduced entering face having an area equal to a substantial portion of the cross sectional area of the nail body, and sloping surfaces joining the body and entering face, the entering face being roughened and cupped in formation.

2. A non-splitting nail having a body portion, a reduced entering face having an area equal to a substantial portion of the cross sectional area of the nail body, sloping surfaces joining the body and entering face, the entering face being roughened and cupped in formation, and serrations on the edge of the entering face, the serrations extending substantially in the places of the sloping surfaces joining the body of the entering face.

3. A non-splitting nail having a body portion, a reduced hexagonal entering face having an area equal to a substantial portion of the cross sectional area of the nail body, and sloping surfaces joining the body and entering face, the entering face being roughened and cupped in formation.

4. A non-splitting nail having a body portion, a reduced hexagonal entering face having an area equal to a substantial portion of the cross sectional area of the nail body, sloping surfaces joining the body and entering face, the entering face being roughened and cupped in formation, and serrations on the edge of the entering face, the serrations extending substantially in the places of the sloping surfaces joining the body to the entering face.

5. The method of forming a non-splitting nail which comprises cutting sloping portions from the sides of a continuous nail stock, thereby forming a reduced portion in the stock, and breaking the stock at the reduced point.

6. The method of forming a non-splitting nail which comprises heading an end of a continuous nail stock, cutting sloping portions from opposite sides of the stock at a point spaced from the head the desired length of the nail, thereby tapering the entering end of the nail in a direction away from the head, and breaking the formed nail from the stock substantially at the point of greatest cut from the stock.

7. The method of forming a non-splitting nail which comprises heading an end of a continuous nail stock, cutting sloping portions from opposite sides of the stock at a point spaced from the head the desired length of the nail thereby tapering the entering end of the nail in a direction away from the head, compressing the tapered portion to taper it substantially uniformly toward the axis of the stock, and breaking the formed nail from the stock substantially at the point of greatest cut from the stock.

8. The method of forming a non-splitting nail which comprises heading an end of a continuous nail stock, cutting sloping portions from opposite sides of the stock at a point spaced from the head the desired length of the nail thereby tapering the entering end of the nail in a direction away from the head, compressing the tapered portion to form a truncated hexagonal pyramid, and breaking the formed nail from the stock substantially at the point of greatest cut from the stock.

9. The method of forming a non-splitting nail, which comprises cutting sloping portions from the sides of a continuous nail stock, thereby forming a reduced portion in the stock, forming the reduced portion to a taper symmetrical about the axis of the stock, and breaking the stock at the point of greatest reduction to form a blunt entering end.

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