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Improvements in D-head and notched D-head nails

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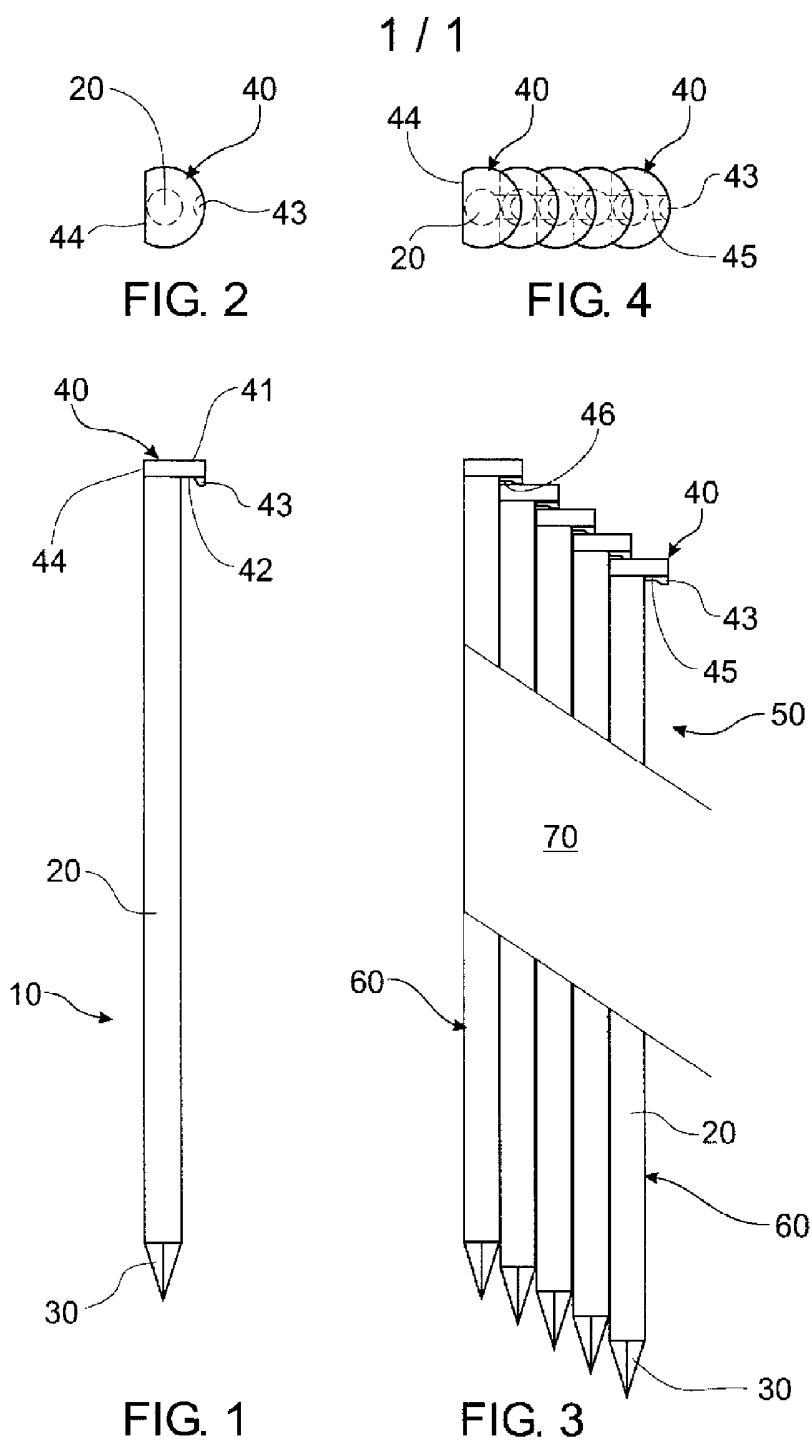
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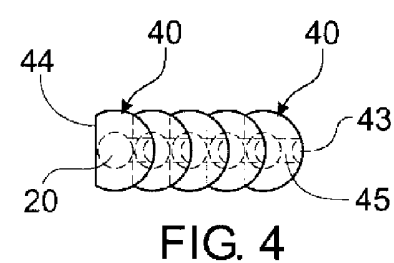
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ABSTRACT

An improved D-head nail comprising a shank, a point formed at an end of the shank and a head formed at an end of said shank distal from said point. The head has a straight edge that is clipped flush with said shank and
5 a protrusion extending downwardly from an underside of the head and spaced from the shank creating a recess between the shank, the protrusion and the underside of the head. When a plurality of D-head nails are collated into a stick for loading into a nail gun or the like the recess allows a desired collation angle for the stick to be achieved accurately without interference
10 from metal burrs from the clipped edge of an adjacent nail.



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FIG. 3

P/00/011
Regulation 3.2

AUSTRALIA

Patents Act 1990

**ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT**

Invention Title: "IMPROVEMENTS IN D-HEAD AND NOTCHED D-HEAD NAILS"

The following statement is a full description of this invention, including the best method of performing it known to me/us:

TITLEIMPROVEMENTS IN D-HEAD AND NOTCHED D-HEAD NAILSFIELD OF THE INVENTION

This invention relates to a nail of the type used as one in a stick of
5 nails. In particular, the invention relates to an improvement in locating
individual nails in a nail stick.

BACKGROUND TO THE INVENTION

The D-head nail and its notched head variant are manufactured
worldwide for use in automatic nailing guns.

10 The head of the nail is clipped off on one side flush with the shank of
the nail. This permits the nail shanks to nest up against one another when
the nails are close collated into a stick of nails for processing through an
automatic nailing gun.

The process of close collation forms a bonded stick of nails in which
15 the nail shanks are parallel and touching or almost touching. The nail heads
are set at an evenly staggered offset to one another. The staggered offset is
necessary to permit the head of each nail to overlap the head of its
neighbour.

Because the nail heads must overlap when nails are close collated,
20 the stick of nails takes on the shape of an oblique parallelogram. The
divergence of the corner angles of the parallelogram away from 90 degrees
is generally referred to as the collation angle for the stick of nails. The
collation angle must be closely controlled during manufacture of the nails to
ensure each stick of nails has the same collation angle. The angle must be

chosen to be compatible with the shape of the nail feed magazine for the nailing gun they are to be used in.

One method of collating nails to the correct angle is to adjust the thickness of the head of the nails to suit the spacing between the nails and set up the collating machine to assemble the stick of nails such that the underside of each nail head is in contact with the topside of the preceding nail head. The trigonometric tangent of the collating angle will equal the head thickness divided by the centre distance between nails (measured at right angles to the nail shanks). If the collation angle is any more than about 20 degrees the head thickness required is too great causing inconsistency of the nail head shape.

To control the collation angle and avoid the need for a thick head some nails are made with a rib formed on the underside of the nail head, located in a position diametrically opposite the clipped edge and along the diameter of the nail head.

However as the nail machine tooling wears, the point where this rib intersects the nail shank loses its sharp re-entrant corner and prevents the clipped edge of the nail from nesting snugly against the underside of the rib. This will cause inconsistencies in collation angle.

It is also difficult to manufacture D-head nails having a flat underside to the head such that the underside of the nail will consistently rest on the topside of the preceding nail. Any burr or metal flash along the clipped edge on the top side of the nail head will interfere with the contact between the underside of one nail head and the top side of the preceding nail head. It is

very difficult to maintain D-head nail tooling to a standard which guarantees there will be no burrs or metal flash along the clipped edge on the top of the nail head.

5 Some nails are made using a special tooling which does not form a burr or metal flash along the clipped edge on the top of the nail head.

However, the special tooling required is expensive to produce and difficult to reface when it becomes worn. These nails usually have a crescent shaped notch cut from the edge of the head. They are more difficult to collate than the straight clipped D-head nail as the crescent shaped head
10 does not slide into position as easily in the collating machines.

For these reasons, there is a need to improve the design of D-nails to ensure correct contact between the underside of one nail head and the top of the next nail head when this contact is to be used to control the angle of collation.

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OBJECT OF THE INVENTION

It is an object of the invention to overcome the problems identified above by providing an improved means of locating adjacent nails. Another object of the invention is to provide accurate and consistent control of the collation angle.

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DISCLOSURE OF THE INVENTION

In one form, although it need not be the only or indeed the broadest form, the invention resides in a nail comprising:

a shank;

a head formed at an end of said shank;

a locating means formed on an underside of said head and extending outwardly from said head, said locating means being spaced from said shank; and

a recess formed between said locating means and said shank.

5 Preferably, said locating means is a protrusion.

Optionally, a rib extends between said protrusion and said shank and the recess is formed by said shank, said rib and said protrusion.

In a further form the invention resides in a stick of nails collated for use in a nail gun, said stick of nails comprising:

10 one or more nails, each said nail having:

a head formed at an end of said shank;

a locating means formed on an underside of said head and extending outwardly from said head, said locating means being spaced from said shank; and

15 a recess formed between said locating means and said shank;
and

a means for securing said nails in said stick of nails;

wherein, said locating means of each said nail is positioned upon a topside of said head of an adjacent nail.

20 Preferably, said locating means of each nail has an outwardly extending length sufficient to enable said stick of nails to achieve a desired colation angle.

Preferably, said locating means of each nail is a protrusion.

Optionally, for each said nail a rib extends between said protrusion

and said shank and the recess is formed by said shank, said ridge and said protrusion.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention will now be described with reference to
5 the accompanying drawings in which:

FIG 1 shows a side view of a preferred embodiment of the invention;

FIG 2 shows a top view of a preferred embodiment of the invention;

FIG 3 shows a side view of a second embodiment of the invention
collated to form a stick of nails; and

10 FIG 4 shows a top view of a second embodiment of the invention
collated to form a stick of nails.

DETAILED DESCRIPTION OF THE DRAWINGS

There is shown in Figure 1 a side view of the preferred embodiment of
the nail 10 having a shank 20 with a point 30 at one end and a head 40 at an
15 opposite end. The nail head 40 comprising a top 41, an underside 42 and a
clipped edge 44 with a locating means 43 in the form of a protrusion
extending from the underside 42 of the nail head 40 opposite the clipped
edge 44 and spaced apart from the shank 20.

Figure 2 shows a top view of the nail head 40 illustrating the position
20 of the protrusion 43 located opposite the clipped edge 44 and spaced apart
from the shank 20. The protrusion is shown to lie on the outermost edge of
the nail head 40, but it will be appreciated by one skilled in the art that
locating the protrusion 43 closer to the shank 20 would achieve the same
end.

Figure 3 shows a side view of a plurality of nails 60 according to a second embodiment of the present invention. Nail 60 has a shallow rib 45 extending from protrusion 43 to shank 20. In Figure 3 nails 60 are collated into a nail stick 50 for use in a magazine of a nail gun or the like. The nails
5 are held in stick 50 using adhesive tape 70. Optionally, other known means for binding nails into a nail stick may be used. Each protrusion 43 is shown to rest on the top 41 of an adjacent nail head 40 in the assembled nail stick 50.

Figure 4 shows a top view of overlapping nail heads 40 of the
10 assembled nail stick 50 shown in Figure 3. The protrusions 43 achieve the desired stacking offset between overlapping adjacent nail heads 40.

It will be readily understood that a plurality of nails 10, as shown in Figure 1, may be similarly collated together to form a stick of nails as shown in Figures 3 and 4.

15 The locating means 43 ensures correct contact between the underside 42 of one nail head and the top 41 of the next nail head 40. The locating means 43 avoids the problems of excessive head thickness and interference caused by a burr along the clipped edge of the head. It is also easier to tool for than the nail made with a rib under the head and a burr free
20 clipped edge 44.

The locating means 43 in a preferred embodiment is a protrusion formed on the underside 42 of the nail head 40 spaced apart from the shank 20 when the nail head 40 is formed in the nail making machine. In a preferred embodiment, the protrusion 43 is located towards the outer edge of

the otherwise essentially flat surface of the underside 42 of the nail head 40 spaced apart from the shank 20. The combined thickness of the nail head 40 plus the protrusion 43 determines the stacking offset between adjacent nails in a stick of collated nails 50.

5 It will be appreciated by one skilled in the art that if space for burr is provided between alternate nail head tops 41 and undersides 42, the locating means 43 can provide the same benefits being placed closer to the shank 20.

 The protrusion 43 allows the thickness of the nail head 40 to be
10 reduced, as the protrusion 43 makes up the extra thickness needed to control the collation angle.

 With the protrusion 43 near the outer edge of the underside 42 of the nail head 40, a recess 46 is created between the nail shank 20 and the protrusion 43. This recess 46 provides a space to safely accommodate any
15 burr on the clipped edge 44 of the neighbouring nail head 40. This gap is not available on nails made with a rib under the head 40 and no protrusion 43. One variation is to have a shallow rib 45 combined with a protrusion 43 at the outer end of the rib. However, this will reduce the depth of the recess available to accommodate the burr on the clipped edge 44 of the
20 neighbouring nail. The inventor has found that the shallow rib 45 simplifies the manufacture process as it helps facilitate the flow of metal during the formation of the nail. Additionally, the nail head is strengthened due to the presence of the shallow rib 45.

 The protrusion 43 greatly improves the ease of manufacture of nails

suitable for collating when using contact between the top 41 and underside 43 of adjacent nail heads 40 as the mechanism to control collation angle. It permits nails 10 to be accurately collated even if they are made using a process that leaves a burr on the clipped edge of the head. This is not possible with nails having only a rib under the head 40 or simply a thickened head, unless they are made using a process that does not form a burr on the clipped edge 44 and tooling that leaves a sharp re-entrant corner on the underside of the head where it intercepts the shank.

It should be appreciated that various other changes and modifications may be made to the embodiments described without departing from the spirit or scope of the invention.

CLAIMS

1. A nail comprising:
 - a shank;
 - a head formed at an end of said shank;
 - 5 a locating means formed on an underside of said head and extending outwardly from said head, said locating means being spaced from said shank; and
 - a recess formed between said locating means and said shank.
- 10 2. The nail of claim 1, wherein said locating means is a protrusion.
3. The nail according to claim 1 or 2, wherein said head has a straight edge flush with said shank thus forming a D-shaped head.
- 15 4. The nail according to claim 1 or 2, wherein said head has a crescent shaped edge.
5. The nail according to claims 2-4, wherein a rib extends between said protrusion and said shank, said recess being formed by said shank, said
20 rib and said protrusion.
6. A stick of nails collated for use in a nail gun, said stick of nails comprising:
 - one or more nails, each said nail having:

a shank;

a head formed at an end of said shank;

a locating means formed on an underside of said head and
extending outwardly from said head, said locating means being
5 spaced from said shank; and

a recess formed between said locating means and said shank;

and

a means for holding said nails in said stick of nails;

wherein, said locating means of each nail is positioned upon a topside
10 of said head of an adjacent nail.

7. The stick of nails of claim 6, wherein said locating means of each nail
has an outwardly extending length sufficient to enable said stick of nails
to achieve a desired collation angle.

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8. The stick of nails of claims 6 or 7, wherein said locating means of each
nail is a protrusion.

9. The stick of nails of claims 6-8, wherein said head of each nail has a
20 straight edge flush with said shank thus forming a D-shaped head.

10. The stick of nails of claims 6-8, wherein said head of each nail has a
crescent shaped edge that abuts an adjacent nail.

11. The stick of nails of claims 8-10, wherein for each nail a rib extends between said protrusion and said shank, said recess being formed by said shank, said rib and said protrusion.

5 12. The nail substantially as hereinbefore described with reference to the accompanying figures.

13. The stick of nails substantially as hereinbefore described with reference to the accompanying figures.

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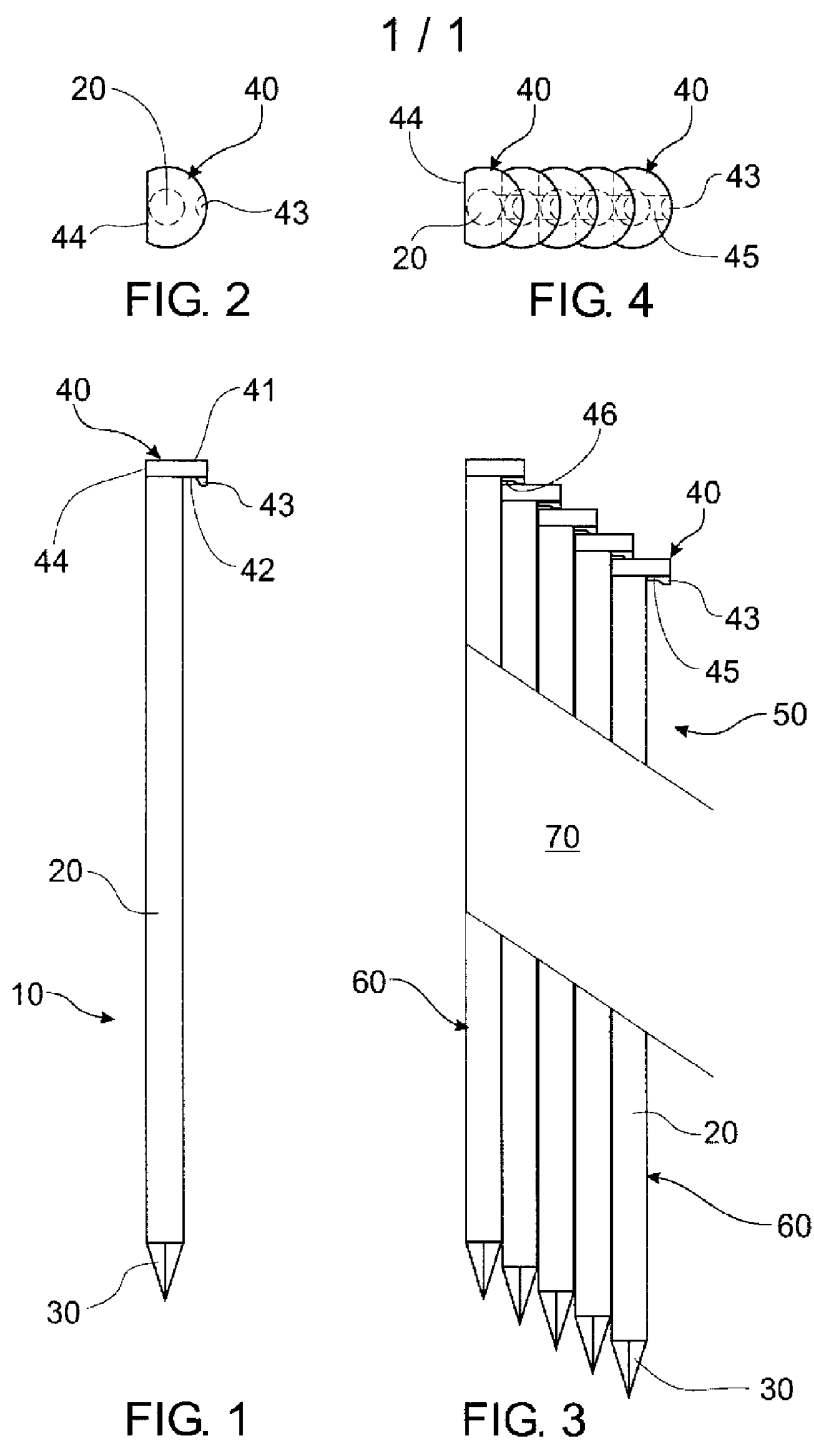
DATED this 8th day of August 2003

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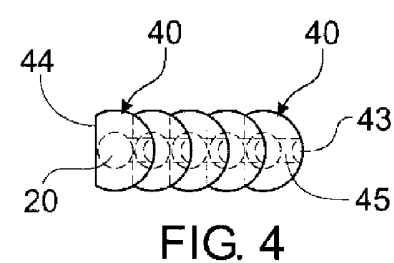


FIG. 4

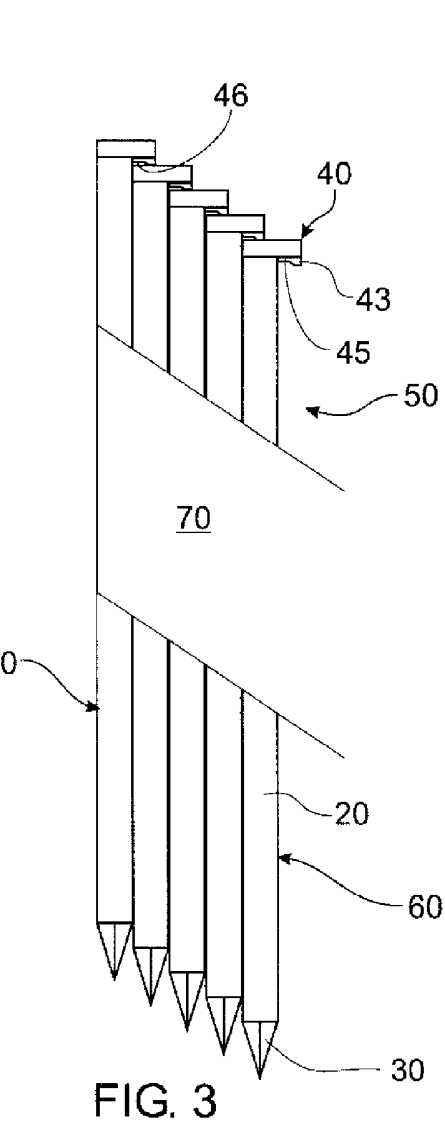


FIG. 3

FIG. 1