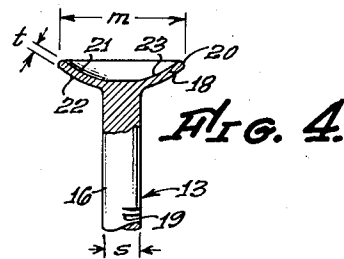
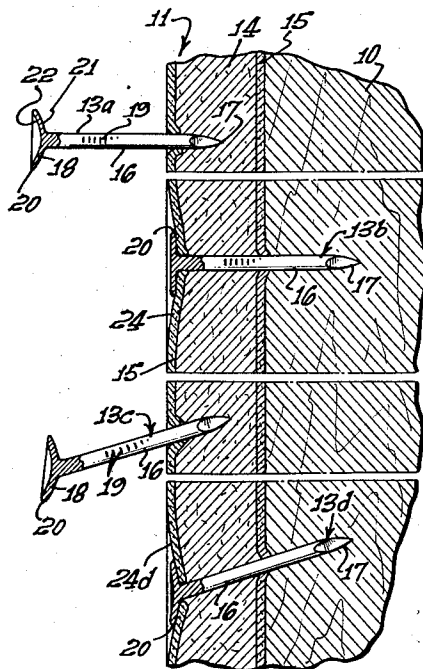
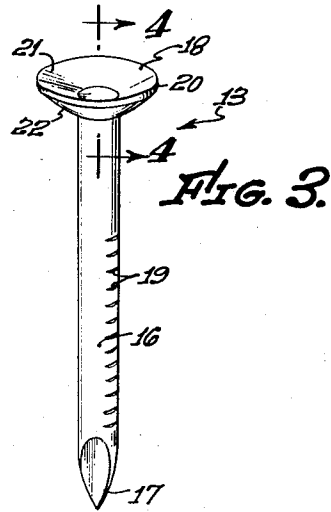
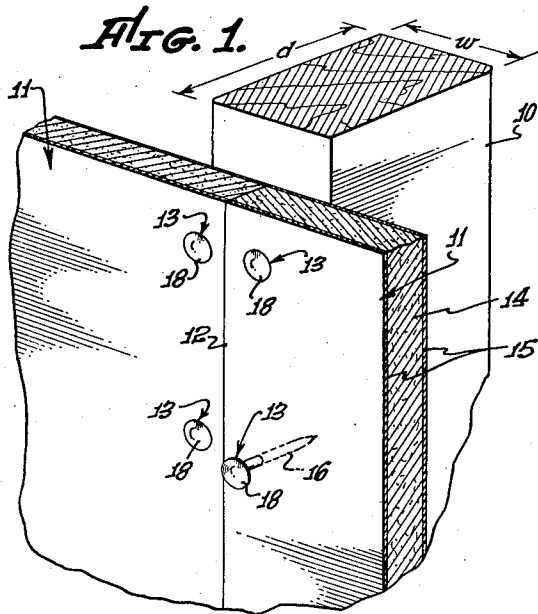


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DEFORMABLE HEAD NAILS

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DEFORMABLE HEAD NAILS

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This invention relates to improved nails of a type particularly adapted in certain respects for use in nailing wall boards to the studding in a house or building.

In recent years, there has been a vastly increased use in the building industry of prefabricated wall boards rather than lath and plaster construction. These wall boards are formed of a fairly thick layer of gypsum plaster which is covered at its opposite sides by a rather heavy paper. The boards are nailed to the framing members of the building, with the nails being driven in sufficiently far to allow the hammer or hatchet head to form very shallow recesses in the board surface about the nail heads, into which recesses a small amount of finishing cement may be filled to cover the heads prior to painting of the walls.

A major difficulty encountered in the application of wall boards of the above type resides in the tendency for the edges of the nail heads to gouge into and weaken the paper coating of the wall board, and thus start breaks which may ultimately render the nails entirely ineffective to properly hold the board against the studding. Such damage to the paper coating of the board occurs most frequently in cases where the nail is accidentally driven into the board at an oblique angle, rather than directly perpendicularly, with the result that one side of the head extends angularly toward the board and ultimately digs into the board before the nail is driven completely into place. This is of considerable practical importance because, in actual practice, a very substantial percentage of the nails driven into a wall board extend at an oblique angle to the board, and the defined damage to the board therefore occurs very frequently.

To avoid the above difficulty, the present invention contemplates the provision of a nail whose head is specially formed to prevent such gouging into the paper coating of a wallboard even though the nail may accidentally be driven into the board at an oblique angle. More particularly, the nail head is so formed as to be initially in a concave condition, and is gradually deformed from that condition to a more flattened condition by the hammer blows, with the flattening occurring in a manner such that the head ultimately lies substantially parallel to the wallboard surface even though the nail shank may be at an oblique angle. To allow for such deformation, the nail is formed of a material which can be bent to the desired degree without breakage, and the head is also rather thin in an axial direction. For best results, the thickness of the head should be small as compared with both the shank diameter and the head diameter. Also, the head should have a substantially greater transverse dimension than the shank. More specifically, the transverse dimension or diameter of the head may be at least two and preferably at least three times the shank diameter.

The nails of the present invention also have utility in the application of a wall of the lath and plaster type. In this type of construction, it is now customary to utilize, as the lathing material or base for the plaster, a prefabricated plaster board very similar to the above discussed

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wallboard. My nails may be used to considerable advantage for attaching these lath boards to the studding, and when so used will prevent damage to the paper coating of the lath boards when a nail is accidentally driven at an oblique angle to the board.

The above and other features and objects of the present invention will be better understood from the following detailed description of the typical embodiment illustrated in the accompanying drawing, in which:

Fig. 1 is a perspective view, partially broken away, showing two wall boards attached to a vertical stud in a building by means of a number of nails constructed in accordance with the present invention;

Fig. 2 is a vertical section taken through one of the wall boards of Fig. 1, and showing different nails in several different conditions during the application of the wall board;

Fig. 3 is an enlarged perspective view of one of the nails formed in accordance with the invention; and

Fig. 4 is a fragmentary side view, partially in section, of the headed end of one of the nails.

Referring first to Fig. 1, I have represented at 10 one of the wooden members which form the frame of a conventional wooden framed house or building. This framing member usually has a width dimension w of two inches, and a second dimension d of four inches. Along the inner sides of framing members 10, there are mounted a series of adjoining wall boards 11, which form the side walls and ceiling of a room in the building. In Fig. 1, there are shown two of these wall boards, with their edges in abutting engagement along a line 12 which is positioned opposite the center of one of the faces of framing member 10. The edge portion of each wall board 11 is fastened to framing member 10 by a series of spaced nails 13 which are driven through the wall board and into the framing member.

The sheets of wall board 11 are normally rectangular, and are of the type now being used very widely in buildings in which lath and plaster type of construction is not employed. Each of the wall boards 11 has a main body or core 14 of substantial thickness, which is formed of gypsum plaster, and which carries at its opposite sides two sheets of fairly heavy paper 15. Each of the sheets of paper 15 is normally formed of several plies of thin paper, but this laminated formation of the paper has not been represented in the drawing.

Where lath and plaster type of construction is utilized, it is now customary to employ a sheet of prefabricated wall board similar to that represented at 11 in Fig. 1 as the lath or baseboard onto which the plaster is applied. In this case, the boards utilized as lathing are attached to framing members 10 by nails 13 in essentially the same manner as are the wall boards 11 of Fig. 1. The nails of the present invention have advantages for mounting such lath boards as well as wall boards which are to be utilized without the application of an additional coating of plaster, and for this reason Figs. 1 and 2 may be considered as representations of the advantages of the present nail for both of the specified purposes. In this connection, it is noted that where the term "wall board" is used in the claims, it is specifically intended to include lath boards within the scope of that term.

Each of the nails 13 has the usual elongated shank portion 16 of substantially cylindrical configuration, which is tapered to a point 17 at one of its ends. At the opposite end, shank 16 integrally carries an enlarged diameter head portion 18 of the nail. Between these two ends, the sides of shank 16 may have a series of irregularities 19 for facilitating proper gripping of the stud by the nail, to prevent the nail from working its way loose to a condition allowing movement of one of the wall boards or a portion of a wall board away from

the associated stud. Nails 13 are of course normally formed of a rather strong metal or other material, usually steel, which may be surface treated to resist rusting or other corrosion in use.

The head 18 of each nail is desirably circular, and extends laterally outwardly from the end of shank 16 to an outer or peripheral circular edge 20 of the head. In describing the construction of head 18 specifically, this head may be considered as being defined by two surfaces 21 and 22 at its opposite axial sides, which surfaces may be generally parallel, and are preferably substantially directly parallel. In the initial condition of head 18, prior to driving of the nail into the wall board and stud, the head has the concave or recessed configuration shown in Figs. 3 and 4. In this condition, the two surfaces 21 and 22 at opposite axial sides of the head, in extending radially or laterally outwardly from shank 16 to edge 20, also extend or advance progressively in an axial direction away from the shank, to form the illustrated cavity or recess 23 at the hammer engaging or upper side of the head.

As will appear later, the material of head 18 is adapted to be deformed or bent axially during driving of the nail, and for this purpose is of a material which is sufficiently pliable or deformable to allow for such bending without breakage of the material of the head. That is, the nail and its head 18 cannot be formed of a highly brittle metal or other material. Ordinary unhardened low carbon steel, such as is conventionally used in most nails, is sufficiently deformable without breakage to serve the purposes of the present invention.

To allow for the desired deformation of head 18, this head should also be rather thin axially, as shown in the drawing. More specifically, the thickness t of head 18 between surfaces 21 and 22 should be small as compared with both the diameter m of head 18, and the diameter s of shank 16 (except at the location of pointed end 17 of the shank). For best results, thickness t should be not more than about 20% of the shank diameter s , and not more than about 7% of the head diameter m . Stating the first of these relations differently, the shank thickness s should be several times as great as head thickness t , and preferably at least five times as great. Also, the diameter m of head 18 should of course be substantially greater than the diameter s of shank 16. It is found desirable that diameter m be at least about twice as great as diameter s , and for best results at least three to four times as great as diameter s .

Referring now to Fig. 2, I have shown in that figure several nails which are in several different representative conditions during and after driving of the nails into a wall board or lath board 11 and framing member 10. The nails represented in Fig. 2 are illustrated in much more closely spaced relation than occurs in actual practice. The upper of the four nails 13a in Fig. 2 is shown after it has been driven only partially through wall board 11, and before it has reached framing member 10. This nail 13a is being driven in a proper perpendicular or "straight" condition into the wall board. As the nail 13a is progressively hammered into a wall board and framing member, the hammer head strikes against head 18 of the nail, and in particular engages the peripheral edge 20 of that head. Each blow of the hammer (or hatchet) causes the outer portion of head 18 to be deformed or bent axially through a short distance relative to the shank of the nail, so that the initially concave head progressively assumes a flattened or directly transverse condition. When the nail is fully driven into the wall board and framing member, the head is in the flattened condition of the second nail 13b of Fig. 2. A final blow of the hammer drives the nail in slightly beyond the initial surface plane of the wall board, so that the hammer head engages the paper 15 of the wall board, and forms a slight indentation or circular recess 24 in the surface of the wall board. The

head of the nail is received entirely within this slight recess 24, so that a small amount of finishing cement may be filled into that recess to cover the nail head prior to painting or papering of the wall.

If all nails could be driven into the wall board and framing member very accurately in the perpendicular condition of nails 13a and 13b in Fig. 2, then conventional flat headed nails could in most cases be utilized without an excessive tendency for the edges of the nail heads to gouge into and destroy the strength of the paper coating of the wall board. However, it is virtually impossible for a workman to be certain of thus always driving the nails in proper perpendicular condition. If a conventional flatheaded nail is driven in at an angle to the wall board or framing member, as at the angle represented by nail 13c in Fig. 2, this angularity of the nail causes one edge of the nailhead to dig into the paper coating of the wall board, and the resultant weakening of the wall board may eventually destroy the effectiveness of the attachment of the board to the framing members. It is in this situation that the concave headed nail of the present invention is most helpful.

The nail represented at 13c in Fig. 2 is a nail formed in accordance with the present invention, but which has been driven partially into the wall board at an angle to the desired perpendicular position. When a nail embodying the invention is driven in at such an angle, the hammer blows may still be directed against the nail head substantially perpendicular to the wall board, with the result that the hammer engages peripheral edge 20 of the head at only one side of the nail (the upper side as seen in Fig. 2). Such engagement of the hammer with the upper portion of the head bends that portion of the head axially inwardly relative to the shank and the rest of the head, so that the head assumes first the condition shown at 13c, and by the time it is completely driven in, the head has assumed the condition shown on nail 13d of Fig. 2. That is, the head has then assumed an essentially flattened condition, but extends at an oblique angle to the axis of the shank, rather than directly transversely of the axis. Consequently, the head is parallel to the surface of the wall board, rather than at an angle to that surface, and therefore no portion of the peripheral edge of the head gouges into the paper coating of the wall board. As in the case of nail 13b, a final blow against nail 13d forms a recess 24d in the surface of the wall board for receiving a small amount of finishing cement to cover the head of the nail.

In order to further assure against gouging of the peripheral edge 20 of head 18 into the wall board, the outer surface of edge 20 is rounded in the manner illustrated in the drawing to avoid presenting any sharp cutting edges to the wall board. That is, the peripheral surface 20 of head 18, in addition to being curved about the axis of the nail, is also curved or rounded axially as it extends between surfaces 20 and 21.

I claim:

1. A nail for attaching a plastic core wall board having an easily damaged outer surface to a wooden frame member of a building, comprising a shank having a first essentially pointed end, and a thin bendable concave head at the opposite end of and integral with said shank, said head extending laterally outwardly from said shank to an outer peripheral edge of the head, said head having a pair of oppositely facing surfaces at its opposite axial sides both of which surfaces, as they extend progressively outwardly from said shank toward said edge, also extend progressively in an axial direction away from said shank, and do so entirely about the axis of the nail, said head being sufficiently thin axially relative to the diameter of the shank to be deformed toward an essentially parallel relation with respect to said damageable surface before the shank would bend when the nail is driven at an angle which is not directly perpendicular to said surface.

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2. A nail as recited in claim 1, in which said edge of the head is defined by a peripheral edge surface which is curved about the axis of the nail and also is curved axially in extending between said two oppositely facing surfaces of the head to present a rounded edge free of any sharp corners which might gouge into said damage-
 5 able surface of the wall board, said head being circular, and the minimum thickness of said shank transversely through its axis, except at said pointed end, being several
 10 times as great as the thickness of said head between said surfaces thereof for the major portion of the radial extent of the head beyond the shank.

3. A nail as recited in claim 2 in which the thickness of the head between said oppositely facing surfaces for

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the major portion of the radial extent of the head beyond the shank is not more than about 7% of the transverse width of said head.

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