Jan. 5, 1954 E. GISONDI 2,664,778

SELF-CLENCHING NAIL

Filed July 9, 1951

Fig. 1.

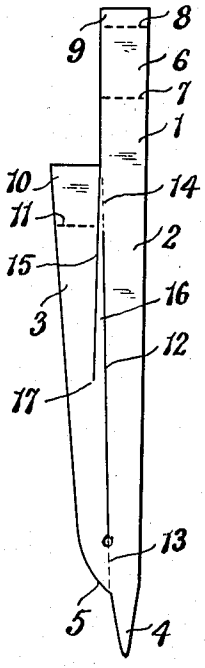


Fig. 2.

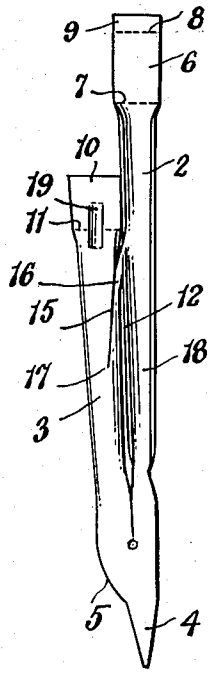


Fig. 3.

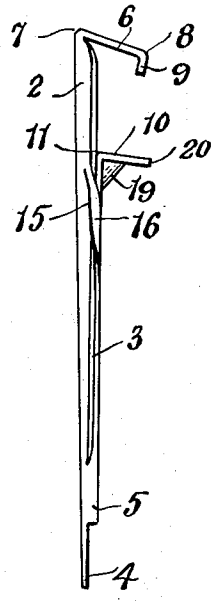


Fig. 4.

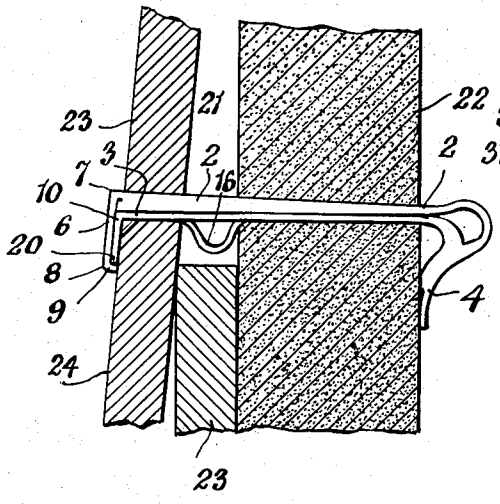


Fig. 5.

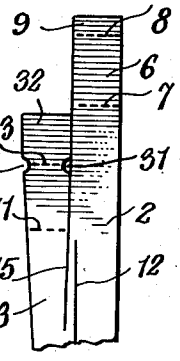
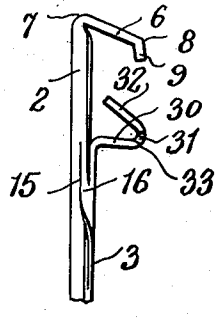


Fig. 6.



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SELF-CLENCHING NAIL

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4 Claims. (Cl. 85—11)

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This invention relates to fastening devices, and more particularly to self-clenching nails which, when driven into or through one or more layers of material, will have parts, located at the back of the materials and also within the body of the materials, bent over or distorted to thereby act as locking elements for the nail to prevent the nail from being inadvertently displaced or withdrawn. Examples of this type of nail will be found in my Patents Nos. 2,427,959, dated September 23, 1947; 2,534,663, dated December 19, 1950, and in my co-pending application Serial No. 132,160, filed December 9, 1949. In the above patents and application were shown nails which had clenching or locking elements located only adjacent to the entering ends of the nails and the present invention contemplates the provision of a nail in which an additional locking element is provided.

It is an object of the present invention to provide a fastener or nail of this character in which a bending-over or clenching action at the back of the material through which it is driven is automatically secured by merely driving the nail completely into position to bring an outer head thereon into contact with the outer face of the material. In addition, the invention contemplates the provision of means by which a double-locking or double-clenching effect is attained by means distortible either within the material or between layers of the material, so that said means will cooperate with the back-clenching elements to more effectively and permanently secure the nail in place.

The improved nail is particularly adapted for use in building construction, but this is only one of the many uses to which it may be put, since it will be obvious that it may be employed for any purpose requiring a secure, self-clenching or self-locking nail, which can be driven in like an ordinary nail, but will effectively lock itself in place by spread, distorted and reinforced parts both in the material, between layers of the material, and also at the back of the material through which the nail is driven.

An object of the invention is to provide a nail of this character which can be stamped from sheet metal and which will require a minimum of such material and can be fabricated by simple stamping and forming operations, but which will, nevertheless, be strong and readily penetrable through various building and other materials, wiithout damaging or defacing the same.

These and other objects are attained by the invention, a more particular description of which

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will hereinafter appear and be set forth in the claims appended hereto.

In the accompanying drawing, wherein an illustractive embodiment of the invention is disclosed, Fig. 1 is a face view of the blank from which the improved nail is formed.

Fig. 2 is a similar view showing the legs of the nail channeled;

Fig. 3 is a side elevation of the completed nail;

Fig. 4 shows the nail as it appears in its driven and clenched position;

Fig. 5 shows a portion of a modified form of blank; and

Fig. 6 shows the head end of a nail constructed from the blank of Fig. 5.

Referring to the drawing, 1 indicates the blank from which the nail is formed, the same being stamped from relatively thin sheet material, such as stainless steel or other metal treated to be rust-resistant. The blank is in the form of an elongated strip, and includes a leg section 2 which constitutes the longer leg of the two legs possessed by the nail. The shorter leg is indicated at 3 and in the blank it is arranged alongside of the long leg 2 and is adapted to be folded to overlie the long leg by folding of the blank on the longitudinal fold line 14 consisting in part of the lengthy slit 12 and a lower fold line 13 located below the lower end of the slit 12 and near the lower end of the blank.

The longer leg 2 of the nail has its lower end terminating in a point 4 which extends below the lower end 5 of the short leg 3. At its opposite or head end, the long leg 2 is provided with a head 6 in the form of a laterally-bent lug projecting out from the top of the leg 2, as clearly seen in Fig. 3, and caused to so project by folding of the blank 1 on the transverse fold line indicated at 7. At its outer end the head 6 is folded down on the fold line 8 to provide a dependent lip 9.

The short leg 3 is provided at its top or head end with a head 10, which is produced by folding the leg 3 on the transverse fold line 11 so that the head 10 will project outwardly from the leg 3 in position in line with the head 6 on the longer leg 2. The head 10 of the short leg 3 is reinforced or strengthened by means of a reinforcing rib 19.

From the head end of the short leg 3 to a point approximately mid-way of the slit 12, extends a longitudinal slit 15 at a slight angle to the slit 12. It will be noted that the arrangement of the two slits 12 and 15 is such that there is defined by these slits a strip or tongue 16 located between them, and serving as a connecting link between the two legs 2 and 3. This ar-

rangement is such that this strip or tongue 16 operates as a locking element for the nail midway between its head end and its entering end, in a manner to be described.

In the production of the nail from the blank 1, the legs 2 and 3 are oppositely channeled from a point below their heads to near their forward ends, and the blank is then folded on a line 13, 14 and the slit 12, so that the short leg 3 will overlie and fit into the channel 18 of the long leg. This folding operation results in the strip 16 extending along and forming part of the longitudinal edges of the two legs 2 and 3 as seen in Fig. 3. The head 10 of the short leg 3 is bent outwardly as shown in Fig. 3 and the head 6 is similarly bent outwardly and has the lip 9 bent downwardly.

In Fig. 4, the nail is shown as it appears after having been driven through several layers of sheet material. At 22 is shown an inner layer, which may be of a relatively soft or low density fibre board constituting a sheathing on the side wall or other part of the building. At 23 is shown shingles or siding which it is desired to attach to the sheathing 22. These shingles or siding are usually perforated for receiving the nails, but the nails can, of course, be driven through unperforated materials when necessary.

As the nail is driven through the materials, the pointed end 4 passes therethrough and the shank of the nail enters the material until the head 10 on the short leg 3 reaches the outer face 24 of the outer layer 23. This limits the extent of penetration of the short leg 3, and as the driving continues by blows applied to the head 6 of the long leg 2, the long leg continues penetration of the materials and its forward end, then protruding at the back of the layer 22, distorts and bends over or clenches, forcing over also, the protruding end portion of the short leg 3, as shown in Fig. 4. It will be noted that as the head 6 is driven home, it will be caused to overlie and cover the head 10 on the short leg, and the downturned lip 9 on the head 6 will fit over and cover and conceal the forward edge 20 of the head 10.

The relative movement of the long leg 2 to the short leg 3 will cause the strip or tongue 16 to become distorted or to buckle, substantially as shown in Fig. 4, and thus this strip will become a locking element. As a result, the nail will be locked at two points, namely, at the pointed end which clenches over as shown in Fig. 4, and by the distortion or buckling action of the strip or tongue 16. In cases where the buckling is unrestrained, such as when the part of the nail on which the strip or tongue 16 is located, is situated in a space between the shingles, siding or other layers, as indicated at 21 in Fig. 4, this buckling action being unrestrained by pressure of surrounding material, will result in a very effective lock. In the event that the strip portion 16 is located within the material 22, the strip will buckle or distort, and while such action may be resisted by the surrounding material, the distorting action of this strip will nevertheless be quite sufficient to form an effective locking element on the nail between its head and entering end.

It will be seen from the foregoing, that a nail is provided in which a simple driving movement serves to not only cause the nail to penetrate the one or more layers of material through which it is driven, but which causes the parts or legs of the nail which protrude at the back of the materials to be bent or clenched over and firmly held in such bent-over condition. In addition, the intermediate locking tongue 16 becoming distorted by the driving action of the nail provides a double lock which resists withdrawal of the nail.

In the embodiment of the invention shown in Figs. 5 and 6, the head for the short leg 3 is modified in that the same includes the part 20 formed in the manner of the head 10, but is provided with an extension 32 folded on the line 33 to extend inwardly and angularly toward the leg 2 as clearly seen in Fig. 5. This arrangement provides a double-thickness head on the short leg which lends stiffness and resistance at this point when the nail is driven home. Notches 31 on opposite ends of the fold line 33 facilitate the folding of the blank on this line.

Having described one embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. A self-clenching nail having a shank composed of a pair of overlying legs, one leg being shorter than the other, and each leg being provided at one end with a head, the longer leg having a pointed end, the legs being integrally connected together adjacent to said pointed end, the legs being also connected together adjacent to the head of the shorter leg, the latter connection being in the form of a strip defined by a pair of longitudinally extending slits, one of said slits extending downwardly from the head of the shorter leg, the second slit having its upper end terminating adjacent to the head on the shorter leg, said slit having its lower end terminating below the lower end of the first slit and adjacent to the pointed end of the longer leg, one end of the strip being connected to the shorter leg at a greater distance from the head end of the nail than the distance between the connection of the opposite end of said strip to the longer leg and the head on said longer leg, said strip constituting a buckling element to form a locking member when the longer leg is driven for its full length through material after the shorter leg has completed its driving movement therethrough.

2. A self-clenching nail comprising, a body having a long leg and an overlying short leg, each of said legs being provided at one end with a head, the legs being connected together adjacent to their front ends, said legs being connected together along one longitudinal edge by a strip of material defined by spaced longitudinal slits and which strip is caused to buckle or distort laterally of the legs and between the ends of the legs to form an intermediate locking projection, one end of the said strip being connected to the longer leg at a point closer to the head on said leg than is the connection between the opposite end of said strip to the shorter leg, the long leg having a driving movement supplemental to the driving movement of the short leg and after the short leg has been driven to its extent in material, whereby the front ends of the legs will become clenched in the rear of the material through which they are driven.

3. A self-clenching nail having a short leg and a long leg connected together at the front end of the nail, each of the legs having a head at its rear end, both legs being channeled and the short leg disposed within the channel of the long leg, the legs being connected together by a thin longitudinally extending strip of material extending between them along the co-extensive longitudinal side edges of the legs, one end of said

strip being connected to the long leg at a distance from the head thereon and the second end of the strip being connected to the short leg at a greater distance from said head.

4. A self-clenching nail having a short leg and a long leg joined together in a pointed end, the long leg having its head end extending beyond the head end of the short leg whereby a driving force imposed on the head end of the long leg will cause a continuation of penetrating movement of said long leg through the material into which the nail is driven after the short leg has been driven to its limit through said material, and a clenching action of the pointed end of the nail protruding at the back of the material will occur, the legs being connected together along one of their longitudinal edges by an integral strip having one end attached to the short leg and its opposite end attached to the long leg

and which strip is caused to transversely buckle within the material by the inward driving action of the long leg, whereby the nail will be clenched at the back of the material by the pointed end of the nail and also clenched within the body of the material by the buckling of said strip, said strip having one end connected to the long leg at a point closer to the head end of the nail than the connection between the opposite end of the strip and the short leg.

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