June 21, 1955 E. GISONDI 2,711,115

SELF-CLENCHING NAILS

Filed Aug. 8, 1952

Fig. 1.

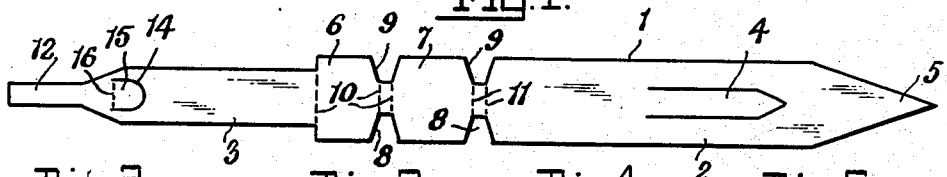


Fig. 2.

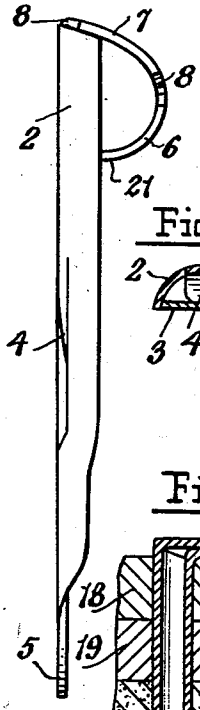


Fig. 3.

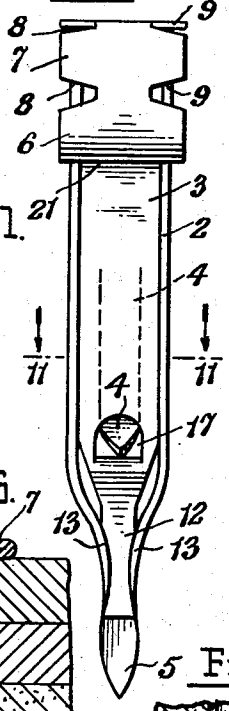


Fig. 4.

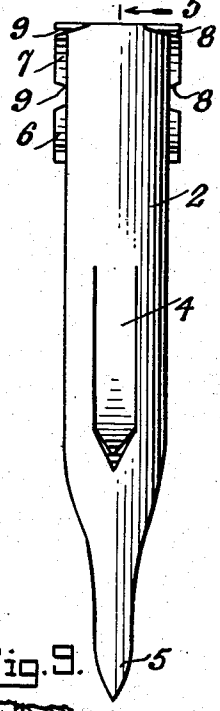


Fig. 5.

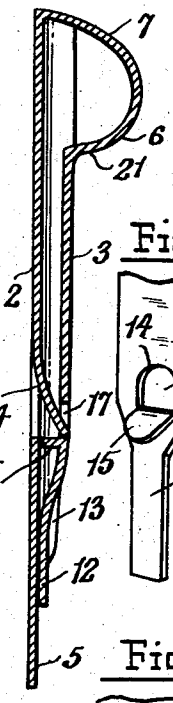


Fig. 11.

Fig. 7.



Fig. 6.

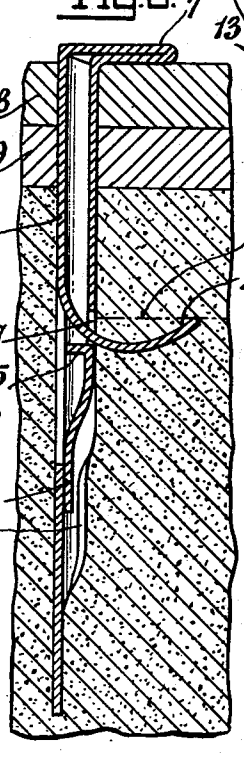


Fig. 9.

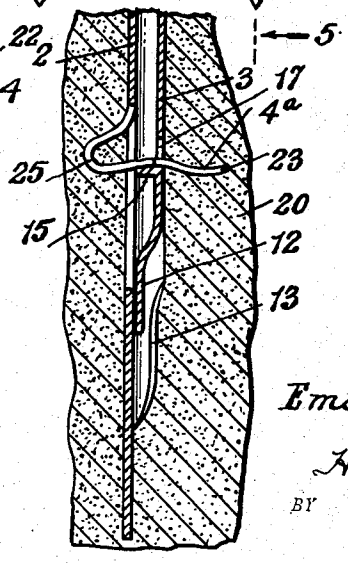


Fig. 10.

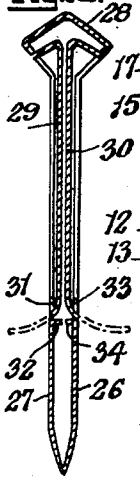
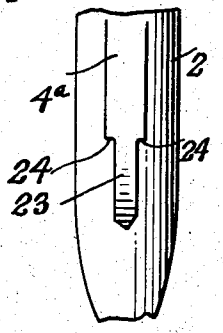


Fig. 8.



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SELF-CLENCHING NAILS

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2 Claims. (Cl. 85—23)

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 one or more clenching elements located either within the body of the material or at the back of the same to thereby act as locking elements for the nail to prevent the nail from being inadvertently displaced or withdrawn. Examples of this general type of nail will be found in my Patents Nos. 2,427,959 and in my copending application Serial No. 235,729, filed July 9, 1951.

It is an object of the present invention to provide a fastener or nail of this character in which a locking or clenching action is secured by the simple drive of the nail into or through the material in which it is placed. The invention contemplates the provision of means in the form of one or more clenching prongs which are projected out laterally from the shank of the nail when the nail is driven and which prong or prongs enter into the material, or clench at the back of the material, to thus provide lateral extensions from the shank of the nail and prevent its withdrawal from the material into which it has been driven.

While numerous types of self-clenching nails have been conceived, many of them have been found unsatisfactory for materials of low density, such as certain types of insulating and wall boards which offer very little resistance to entry and withdrawal of a nail driven into them. Moreover, many types of self-clenching nails attempt to distort parts of their shanks within the material into which the nail is driven, in such a manner that displacement of a substantial portion of the material is required. This often results in the formation of lumps or distortions at the back of the material, and in some cases pieces of the material are broken out with the result that not only is the appearance of the material rendered unsightly, but the nails are not firmly anchored therein.

It is therefore an object of the invention to provide a self-clenching nail of such construction that the clenching element which is forced laterally from the shank of the nail is such that it penetrates the body of the material into which the nail is driven without requiring displacement of more than an insignificant amount of such material. Thus, the nail may not only be more readily driven into the material, but it will become firmly anchored therein without the possibility of destruction of the part of the material that is located adjacent to the driven nail.

The improved nail is one which is particularly adapted for use in building construction, and especially where the material into which the nail is to be driven is in whole or in part of low density nature, such as soft and compressible insulating board and the like. While the nail is thus particularly adapted for use in connection with building structures, 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 like an ordinary nail, but which will effectively lock itself in place by lateraly extended parts, entering either within the body of the material in or through which the nail is driven, or else extending in back of such material.

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, without damaging or defacing the same.

These and other objects are attained by the invention, a more particular description of which will hereinafter appear and be set forth in the claims appended hereto.

In the accompanying drawing, wherein illustrative embodiments of the invention are disclosed,

Fig. 1 is a face view of the blank from which the improved nail is formed;

Fig. 2 is a side elevational view of the finished nail;

Fig. 3 is a front elevational view of the nail;

Fig. 4 is a rear elevational view of the nail;

Fig. 5 is a sectional view, taken on the line 5—5 of Fig. 4, looking in the direction of the arrows;

Fig. 6 is a vertical sectional view through the nail showing the same after it has been driven through several thicknesses of material, and in its locked or clenched condition;

Fig. 7 is a perspective view of a portion of the short leg of the nail showing the lug formed out of the same;

Fig. 8 is a front view of a portion of the longer leg, showing a modified form of clenching prong;

Fig. 9 is a vertical sectional view of the nail having the modified prong of Fig. 8 in its clenched condition;

Fig. 10 is a vertical sectional view through a modified form of nail having two clenching prongs, and

Fig. 11 is a sectional view, taken on the line 11—11 of Fig. 3, looking in the direction of the arrows.

Referring to the drawing, and particularly to Figs. 1 to 7 thereof, 1 indicates the blank from which the nail is formed, the same being stamped from relatively thin sheet metal, such as stainless steel or other metal preferably treated to be rust-resistant. The blank is in the form of an elongated strip, and includes a longer leg section 2 and an integrally formed shorter leg indicated at 3. The parts indicated at 6 and 7, and located between the legs 2 and 3 constitute the head of the nail, which is adapted to collapse under driving force to assume the flattened form seen in Fig. 6 when the nail is driven home into or through sheet material. The collapsing of the head as above described in facilitated by the notches 8 and 9, permitting the head to fold on the lines 10 and 11 when struck by a hammer.

The longer leg 2 is transversely curved or channel-shaped as clearly seen in Fig. 11 and is formed at one end with a pointed terminal indicated at 5. Near said pointed end 5 is provided an elongated tongue 4, stamped out of the body of the leg 2 along the longitudinal center line thereof, said tongue constituting a clenching prong. As will be seen in Figs. 3 to 5 inclusive, the legs 2 and 3 are arranged in overlying relation, with the shorter leg 3 lying within the channel of the longer leg 2. At its free end, the short leg 2 is formed with a narrowed part 12 confined within the inturned parts 13 of the edges of the longer leg 2 adjacent to the pointed end thereof. Adjacent to the narrowed end portion 12 is provided a U-shaped slit 14, resulting in the formation of a lug 15. The lug is bent on the line 16 and lies between the two legs of the nail, fitting within the channel of the longer leg 2. When the lug 15 is bent horizontally, with the nail in a vertical

position, it results in the formation of an aperture or opening 17, located in such a position that the free end of the clenching prong 4 enters into the opening 17 as clearly shown in Figs. 3 and 5. Toward its free end, the prong 4 is curved slightly as seen in Fig. 5 to thereby cause its end to just enter the opening 17 above the lug 15.

In Fig. 6, the nail is shown after the same has been driven through several thicknesses of material. For example, the material shown at 18 and 19 might be wood or asphalt shingles, while the relatively thick layer of material shown at 20 might be insulating board of low density to which it is desired to attach the shingles. Before being driven into the material, the nail appears as shown in Figs. 2 to 5 inclusive, wherein it will be noted that the head is in open loop formation. When driving force, as by a hammer blow, is applied to the head, the nail will be driven into the material until the lower portion 21 of the head contacts the surface of the material and further penetration of the shorter leg 3 will then be halted. Further driving force imposed on the head will collapse the head to the flattened condition shown in Fig. 6, and as the longer leg 2 continues penetration of the material, the longer leg thus moves longitudinally relatively to the short leg. As such movement of the long leg takes place, the clenching prong 4 carried by said leg is forced out through the opening 17 in the short leg and forms a laterally-extended clenching element which enters into the material 20 and securely anchors the nail in place. The lug 15 located adjacent to the opening 17 constitutes a guiding or deflecting element for the tongue or prong 4, causing it to be guided through the opening 17 and readily enter the material 20.

It is to be noted that the clenching prong 4 is of such form and size and will enter the material 20 on a curve and with its pointed end foremost, and will not require displacement of any great amount of the material 20 to effect penetration. Thus, the possibility of the material 20 being distorted or broken by the clenching action of the nail will be prevented.

While I have herein suggested that the clenching prong 4 will become embedded within the material into which the nail is driven, it is to be pointed out that this will occur only when the material is of sufficient thickness to cause the prong to enter within it when the prong is extended laterally from the shank of the nail. In cases where a relatively thin insulating board is used, with such board of a thickness indicated by the dotted line 22 in Fig. 6, the prong 4 will then act as a clenching element at the back or rear of the board rather than be embedded within the body of the board.

While I have herein indicated that the clenching prong or tongue 4 shall project out laterally from only one side of the shank of the nail, it can be arranged to project at a plurality of sides if desired. This result can be attained by a structure of the character shown in Fig. 8, wherein the prong or clenching element 4a is narrowed at its free end as indicated at 23 and is thus provided with the shoulders 24. This arrangement is such that only the narrower portion 23 of the prong 4a will pass through the opening 17 when the nail is under driving force. The shoulders 24 constitute stop means to limit the penetration of the prong 4a through the opening 17, and as the longitudinal movement of the longer leg relative to the shorter leg 3 continues, the wider portion of the prong 4a, or that part located between the shoulders 24 and the base of the tongue, will buckle and distort outwardly through the back of the leg 2 to form the laterally-extended distortion indicated at 25 in Fig. 9. Thus, by this arrangement, a clenching effect is attained not only by the part 23 of the prong 4a but also by the remainder or wider part of the prong buckling in the manner shown at 25.

Also, while I have herein shown the nail as being provided with a single clenching prong, it may be formed with a plurality of such prongs. In Fig. 10 is shown a

nail having a shank composed of a pair of legs 26 and 27 connected together at the top by a loop-shaped collapsible head 28. A prong 29 is formed out of the leg 27, while a similar prong 30 is formed out of the leg 26. Leg 27 is formed with an opening 31 in which the end of the prong 29 enters. A deflecting lug 32 is located at said opening 31. Similarly, an opening 33 and lug 34 adjacent to the same is formed in the leg 26. When the head 28 is collapsed by a hammer blow, the prongs 29 and 30 will be forced downwardly and will be urged out through their respective openings 31 and 33 to form lateral clenching prongs as indicated in dotted lines in Fig. 10.

While I have herein described several embodiments 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 nail of the character described having a shank composed of a pair of overlying legs, one of said legs being longer than the other and being channel-shaped for the greater portion of its length, the legs being connected at one end with a loop portion constituting a head, said loop portion being collapsible when a driving force is imposed upon it to thereby cause the longer leg to be longitudinally moved relatively to the shorter leg, the shorter leg being positioned within the channel of the longer leg and having a space between it and said longer leg and being provided with an aperture extending through it, the longer leg being provided between its ends with a stamped-out prong normally curved to extend across the space between the legs and in a direction toward the shorter leg, said prong having a pointed end normally positioned in the aperture in the shorter leg, the shorter leg being provided with an inturned lug directed inwardly toward the longer leg and closing the space between the legs and being located at the aperture and acting as a deflecting element to cause the prong to be deflected out laterally through the aperture when a driving force is imposed on the longer leg.

2. A sheet-metal nail of the character described having a shank composed of a pair of overlying legs, one of said legs being longer than the other, the legs being connected at one end by a loop-shaped head, said loop being collapsible when a driving force is imposed on it, said driving force causing the longer leg to be longitudinally moved relatively to the shorter leg, the longer leg being channel-shaped, the shorter leg being fitted within and closing the channel in the longer leg, and providing a space in said channel between the short leg and the concave face of the longer leg, a stamped-out prong formed in the longer leg and carried in a direction toward the short leg and housed in the space between the legs, the short leg being formed with an opening positioned at the end of said prong, a lug formed in the short leg at the base of the opening, said lug being extended in a direction toward the long leg beyond the end of the prong and closing the space between the legs, said lug constituting a deflecting element to cause the prong to be deflected out laterally through the opening when a driving force is imposed on the longer leg.

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