Oct. 22, 1929. H. W. PLEISTER 1,733,083

NAIL EXPANSION AND METHOD

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Fig 1

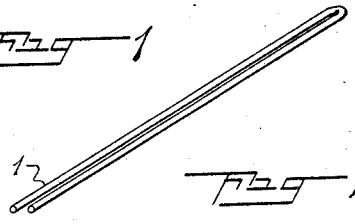


Fig 2

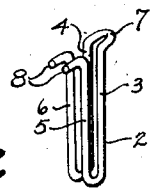


Fig 3

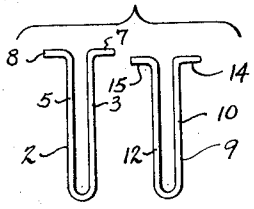


Fig 4

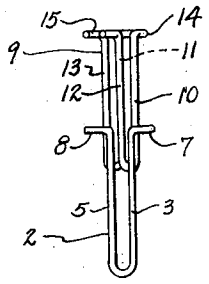


Fig 5

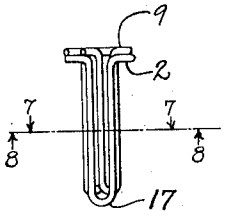


Fig 6

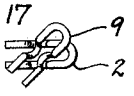


Fig 7

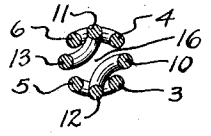


Fig 9

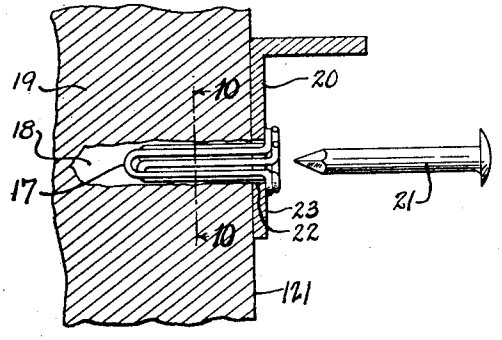


Fig 8

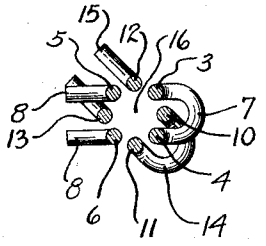
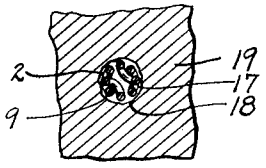


Fig 10



Henry W Pleister INVENTOR

BY Clarke Johnson

ATTORNEY

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Fig 11

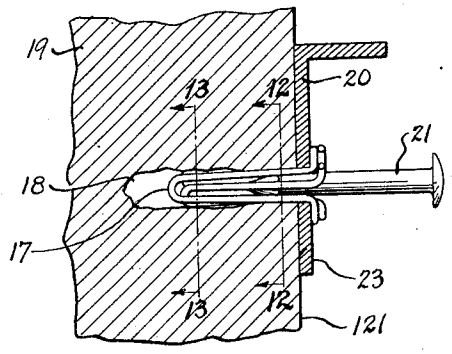


Fig 12

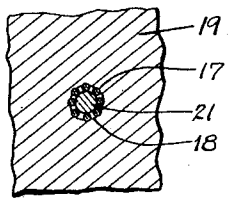
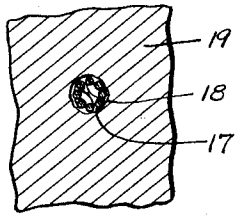


Fig 13



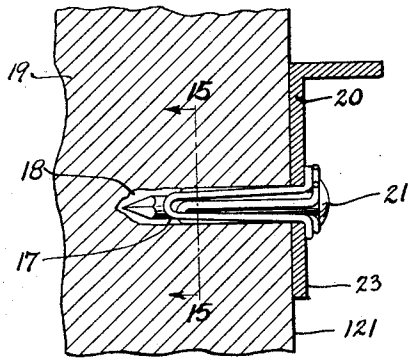
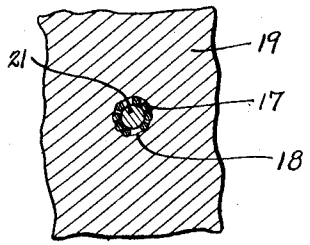


Fig 14

Fig 15



Henry W. Pleister INVENTOR.

BY Clarke Johnson ATTORNEY

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NAIL EXPANSION AND METHOD

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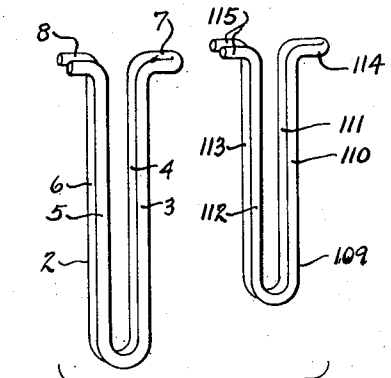


Fig 16

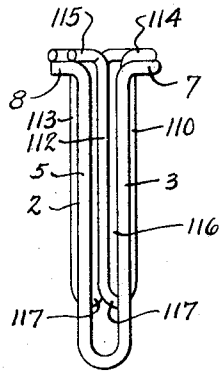


Fig 17

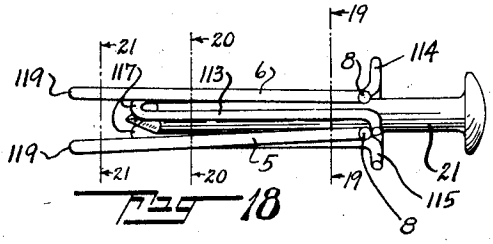


Fig 18

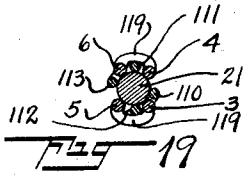


Fig 19

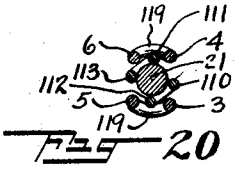


Fig 20

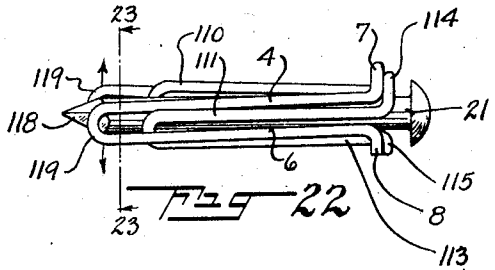


Fig 22

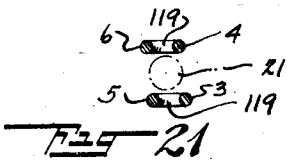


Fig 21

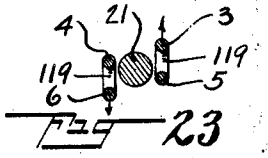


Fig 23

Henry W Pleister INVENTOR.

BY Alan W Johnson ATTORNEY

Patented Oct. 22, 1929 1,733,083

UNITED STATES PATENT OFFICE

HENRY W. PLEISTER, OF WESTFIELD, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO HENRY B. NEWHALL CORPORATION, OF GARWOOD, NEW JERSEY, A CORPORATION OF NEW JERSEY

NAIL EXPANSION AND METHOD

Application filed May 20, 1926. Serial No. 110,308.

My invention relates to expansion members and more particularly to a nail expansion and the method of making it.

My invention further relates to a wire expansion shield formed of a plurality of nested wire units. My invention further relates to such a wire shield in which the units are of different sizes and so nested that their strands substantially enclose the axial bore of the shield.

My invention further relates to certain methods, combinations, details of construction and articles of manufacture which will be more fully hereinafter described and pointed out in the claims.

My invention may be considered in connection with, and is a modification of, U. S. Patent 1,567,273 issued December 29, 1925 to Henry B. Newhall as the assignee of John Karitzky.

In the accompanying drawings the same reference numerals refer to similar parts in the several figures.

Fig. 1 is a perspective view of a length of wire bent back on itself, showing the first stage of manufacturing one of the units of my complete wire shield;

Fig. 2 is a perspective view of one of the units formed by bending the double strand of wire shown in Fig. 1 upon itself, and also bending out the ends of the wire in opposite directions to assist in forming a head for the complete shield;

Fig. 3 is a side elevation of two units of unequal size, employed to make my complete wire shield;

Fig. 4 is a side elevation showing the manner of nesting the smaller unit within the larger unit to make the complete wire shield;

Fig. 5 is a side elevation of the complete wire shield formed by nesting two of the units;

Fig. 6 is a plan view of Fig. 5;

Fig. 7 is a horizontal section, on the line 7—7 of Fig. 5 looking down in the direction of the arrows;

Fig. 8 is a horizontal section on the line 8—8 of Fig. 5, looking up in the direction of the arrows;

Fig. 9 is a vertical section showing my wire shield mounted in a wall or other suitable support and about to be expanded by a nail;

Fig. 10 is a horizontal section on the line 10—10 of Fig. 9 looking in the direction of the arrows;

Fig. 11 is a vertical section, similar to Fig. 9, showing the nail partially inserted in the wire shield and giving the shield its primary expansion;

Fig. 12 is a horizontal section on the line 12—12 of Fig. 11, looking in the direction of the arrows;

Fig. 13 is a horizontal section on the line 13—13 of Fig. 11, looking in the direction of the arrows;

Fig. 14 is a vertical section showing the nail driven home in the wire shield and giving the shield both its primary and secondary expansion;

Fig. 15 is a horizontal section substantially on the line 15—15 of Fig. 14;

Fig. 16 is a perspective view of two units of a modification, in which one of the units is considerably shorter than the other;

Fig. 17 is a side elevation of the modified wire shield formed by the two wire units of Fig. 16;

Fig. 18 is a plan view of the wire shield of Fig. 17 with a cooperating nail shown in position to cause the secondary expansion;

Fig. 19 is a vertical section on line 19—19 of Fig. 18;

Fig. 20 is a vertical section on line 20—20 of Fig. 18;

Fig. 21 is a vertical section on line 21—21 of Fig. 18;

Fig. 22 is a plan view, taken 90° from the position of the wire shield in Fig. 18, illustrating a third expansion of the outside wire unit in the direction of the arrows;

Fig. 23 is a vertical section on line 23–23 of Figs. 22, the arows in this figure illustrating the direction of the third expansion.

In my invention a cheap grade of commercial soft wire 1 (Fig. 1) is cut to the particular length desired for the unit 2. This wire 1 is then bent upon itself, as shown in Fig. 1, to form two strands. This double strand of wire is then bent, midway between its ends,

so that a wire unit 2 is formed having the strands 3, 4, 5 and 6; the ends of the strands 3 and 4 being bent out to form the integral head portion 7. The ends of the other strands 5 and 6 are bent at right angles to the strands to form the integral head portion 8, 8.

Another identical, but smaller unit 9 (Fig. 3) is made by bending up a somewhat shorter length of wire 1. This second unit 9 has the similar strands 10, 11, 12 and 13 with a similar integral head portion 14 and head members 15, 15. The two units 2 and 9 are resilient members and are nested as shown in Fig. 4 by bringing the smaller unit 9 at an angle of substantially 45° to the unit 2 so that the strands 10, 11, 12 and 13 will alternate with the strands 3, 4, 5 and 6 of the larger unit 2, the strands of each unit lying within the openings between the adjacent strands of the other unit, as shown in Figs. 4, 5, 7 and 8.

This gives a simple and compact wire shield in which the units are held together by their own resiliency, and the axial bore 16 of the complete wire shield 17 is substantially enclosed by the eight strands 3, 4, 5 and 6 of the major unit 2, and the strands 10, 11, 12 and 13 of the minor unit 9. This gives double the gripping surface on the interior surface of the hole 18 in the wall or other suitable support 19. It will also be noted that the eight different strands of wire 3, 4, 5 and 6 and 10, 11, 12 and 13 form a substantially continuous cylindrical wire shield, thereby insuring that the nail 21 will follow the axial bore 16 throughout its length without attempting to work out between any two of the wire strands of the unit.

My complete wire shield may be sold separately as shown in Fig. 5, or the cooperating nail 21 may be pressed into the shield, so that the shield and nail may be sold as a single article of manufacture, the resiliency of the shield firmly holding the nail within the axial bore 16 and preventing any accidental disengagement through handling or transportation.

In use a much smaller hole 18, to carry a given load 20, may be drilled in brick, masonry, concrete, stone or any other suitable material, for the reception of my complete wire shield 17 (Fig. 5). To support any suitable work, such as the bracket 20, the wire shield is inserted through a hole 22 in the work, and thence seated within the hole 18 until the integral head of the shield abuts the outer face 23 of the work 20. The nail, or other expanding member 21, is then brought into position as shown in Fig. 9, so that it can be forced into the axial bore 16 of the wire shield. When the nail is partially driven in as shown in Fig. 11, the outer ends of the different strands 3, 4, 5 and 6 of the major unit 2 and the outer ends of the strands 10, 11, 12 and 13 of the minor unit 9 are spread apart thereby firmly gripping the interior surface of the hole 18 and performing the primary expansion. By further driving in the nail 21 the inner end of the different units 2 and 9 will be forced apart in a different direction, thereby insuring the secondary expansion.

In the modification of my invention illustrated in Figs. 16 to 23, I insure a third expansion of the wire shield, thereby giving the shield a greater holding power or bond with the walls of the hole in which it is mounted; and, also reducing the liability of the brick, concrete, masonry or other support cracking under the powerful expansion exerted by the nail, and by the weight of the full load carried by the shield.

In the modification of my invention shown in these Figs. 16 to 23, the larger wire unit 2 is formed in the same manner and has the same strands 3, 4, 5 and 6, with the same head portions 7 and 8, 8 as in the first form.

The wire unit 109 is the same as the other unit 9, except that it is considerably shorter than the unit 2. It is provided with the strands 110, 111, 112, 113 and the head portions 114 and 115, 115. The two units 2 and 109 are resilient members and are nested as shown in Fig. 17 by bringing the unit 109 at an angle of substantially 45° to the unit 2 so that the strands 110, 111, 112 and 113 will alternate with the strands 3, 4, 5 and 6 of the larger unit 2, the strands of each unit lying within the openings between adjacent strands of the other unit, all as in the other form. In this modification, however, the unit 109, as previously noted, is much shorter than the other unit 2.

In this form there are three distinct expansion actions as the nail 21 is driven into the wire shield. First, there is the primary expansion, for example, in a radial direction, due to the nail passing along the axial bore 116, the same as in the other form. When the nail 21 reaches the end 117, 117 of the smaller unit 109 there will be a secondary radial expansion, in a different direction from the primary expansion, see Fig. 18. In the position shown in Fig. 18, the ends 119, 119 of the large wire unit 2 will be substantially in line with each other (see Fig. 21). Upon further driving of the nail 21 the strands 110, 111, 112 and 113 of the inner unit 109 cooperating with diagonally opposite strands 3, 4, 5, and 6 of the outer unit 2, will cause the ends 119, 119 of the outer unit 2 to be forced out of line (Fig. 21) and move in opposite directions with relation to each other, as shown in Fig. 23 and in Fig. 22. This insures a third expansion tangentially to the surface of the nail and in opposite directions, as indicated by the arrows in Figs. 22 and 23.

By these three expansions I obtain a nail expansion of the maximum holding power for a given size shield. As the second and

third expansions are well back in the hole, removed from the surface 121 of the wall or other suitable support, there is less danger of cracking or marring the surface. Further, by employing both the second and the third expansions there are more points of maximum outward pressure of the shield against the walls of the hole, thereby insuring greater holding power and less liability of cracking the material of the wall at the inner end of the hole where those expansions occur.

It will be noted that my expansion shield can be made at minimum cost, that it is simple and will give the maximum efficiency for a given size shield. It is further to be noted that the different wire units 2, 9 and 109 are each open constructions which will freely allow galvanizing by the hot process, the units being assembled, preferably, after they have been galvanized.

My wire shield may be formed by hand with a pair of pliers, but preferably it will be made in large quantities in a wire forming machine, the units being afterward assembled by hand.

Having thus described this invention in connection with illustrative embodiments thereof, to the details of which I do not desire to be limited, what is claimed as new and what is desired to secure by Letters Patent is set forth in the appended claims.

What I claim is:—

1. The method of manufacturing a wire nail expansion consisting in bending two strands of wire each on itself to form two, two strand elements, then bending each of these double strand elements upon themselves to form two four strand units, and then nesting one unit within the other to form an eight strand wire shield, the units being held together by spring pressure.

2. The method of manufacturing a wire nail expansion consisting in bending two strands of wire each on itself to form two, two strand elements, then bending each of these double strand elements upon themselves to form two four strand units, and then nesting one unit within the other at substantially 45° to form an eight strand wire shield, the units being held together by spring pressure.

3. A new article of manufacture comprising a wire expansion shield having an axial bore and formed of two units, each unit having four integral strands bent with relation to each other, and one unit being nested and held in the other unit to form a complete wire expansion shield of eight strands extending around and substantially enclosing the axial bore of the shield.

4. A new article of manufacture comprising a wire expansion shield having an axial bore and formed of two units, each unit having four integral strands bent with relation to each other, and one unit being nested and held in the other unit to form a complete wire expansion shield of eight strands extending around and substantially enclosing the axial bore of the shield, the wire shield being provided with an integral head.

5. The combination of a nail expansion comprising a wire expansion shield having an axial bore and formed of two wire units each unit having four integral strands bent with relation to each other, one unit being shorter than the other, and nested within it with a nail to expand the wire shield.

HENRY W. PLEISTER.