Feb. 11, 1930. H. W. PLEISTER ET AL 1,746,963

NAIL EXPANSION

Filed April 8, 1927 2 Sheets-Sheet 1

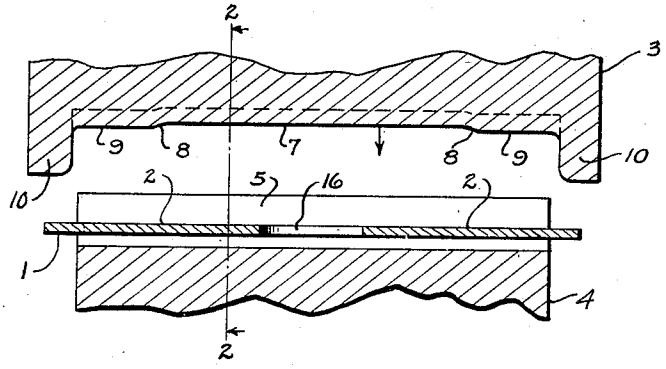


Fig 1

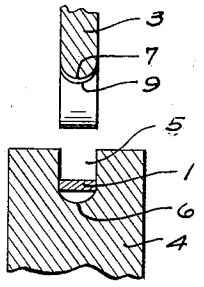


Fig 2

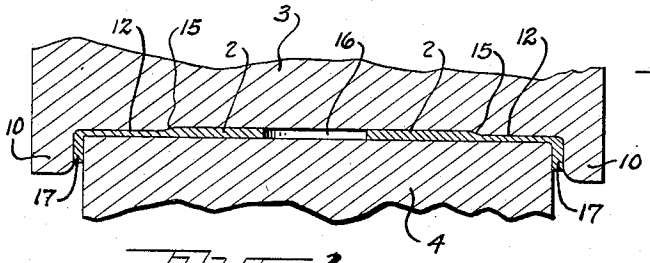


Fig 3

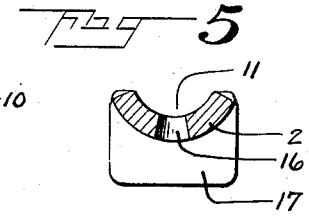


Fig 5

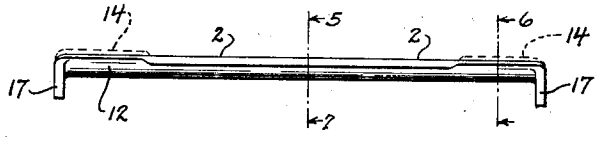


Fig 4

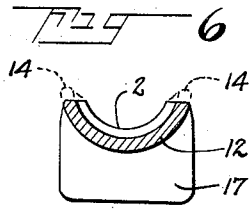


Fig 6

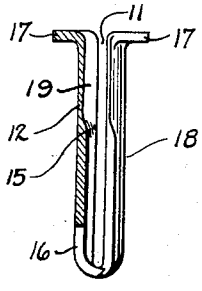


Fig 7

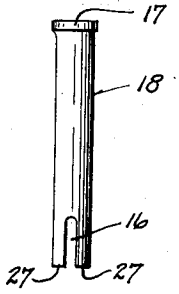


Fig 8

Henry W. Pleister
John Kanotsky
INVENTORS
BY Alan W. Johnson
ATTORNEYS.

Feb. 11, 1930. H. W. PLEISTER ET AL 1,746,963

NAIL EXPANSION

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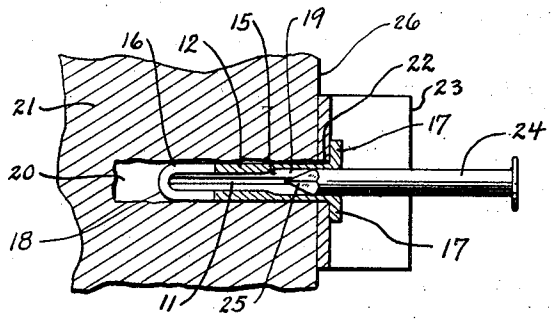


Fig 9

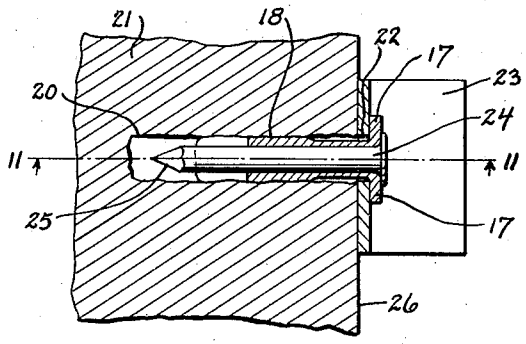


Fig 10

Fig 11

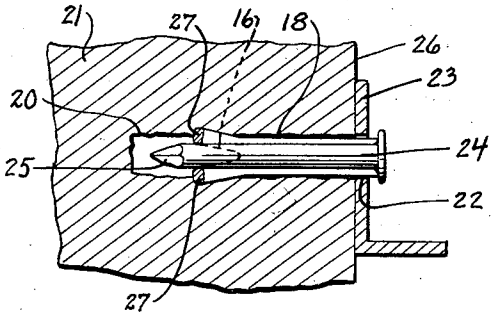


Fig 12

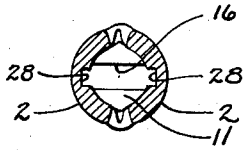
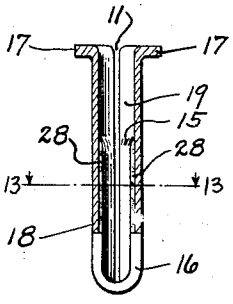


Fig 13



Henry W Pleister
John Kantzler
INVENTORS

BY Clarke & Johnson
ATTORNEYS.

Patented Feb. 11, 1930 1,746,963

UNITED STATES PATENT OFFICE

HENRY W. PLEISTER, OF WESTFIELD, AND JOHN KARITZKY, OF GARWOOD, NEW JERSEY; SAID KARITZKY AND SAID PLEISTER ASSIGNORS TO HENRY B. NEWHALL, OF PLAINFIELD, NEW JERSEY

NAIL EXPANSION

Application filed April 8, 1927. Serial No. 182,072.

Our invention relates generally to nail fasteners such as illustrated, described and claimed in United States Letters Patent 1,501,054, patented July 15, 1924, the same covering an invention of John Karitzky, one of the joint inventors in this application.

Our invention more particularly relates to nail fasteners formed from strips of sheet metal, and the method of manufacturing them, whereby they are provided with an enlarged open throat, to insure that the entering nail will not expand the sheet metal nail fastener until it has progressed a predetermined distance along the axial bore, the distance being sufficient to prevent any substantial expansion of the sides of the shield adjacent to the wall of the support; thereby avoiding cracking or marring the wall adjacent the hole.

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

In the drawings we have shown different embodiments of our invention, but it is, of course, to be understood that our invention is not to be confined to these particular embodiments shown by way of illustration.

Fig. 1 is a diagrammatic vertical section showing dies about to compress a sheet metal blank;

Fig. 2 is a transverse vertical section on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a vertical section, similar to Fig. 1, illustrating the action of the dies upon the blank;

Fig. 4 is a side elevation of the shaped blank after being removed from the dies shown in Fig. 3;

Fig. 5 is a transverse vertical section, on an enlarged scale, on the line 5—5 of Fig. 4;

Fig. 6 is a transverse vertical section, on an enlarged scale, on the line 6—6 of Fig. 4;

Fig. 7 is a side elevation, partly broken away, to show the interior construction of the complete finished sheet metal shield;

Fig. 8 is a front elevation, taken 90° from the position shown in Fig. 7;

Fig. 9 is a horizontal section through a support, and a shield, the shield about to be expanded;

Fig. 10 is a horizontal section, similar to Fig. 9, showing the nail completely driven into the shield which is expanded;

Fig. 11 is a vertical section, on the line 10—10, of Fig. 10;

Fig. 12 is a vertical section through a modified form of sheet metal shield, provided with longitudinally extending grooves;

Fig. 13 is a horizontal section on the line 13—13 of Fig. 12.

When the support in which the sheet metal shield is expanded, is of more or less friable material, or material which will crack or chip around the opening in which the shield is mounted, the surface of the support will be marred resulting in a poor and unworkmanlike job, unless an escutcheon or a similar plate is used to hide the marred face of the support. Such plates, of course, are an additional expense and, in some locations, it is not feasible to use them.

By our invention we form a very cheap sheet metal shield, to be expanded by a nail or similar expanding member, which can be expanded in a support without cracking or marring the surface adjacent the hole. It is, therefore, clear that by our invention a neat workmanlike job is obtained without employing an escutcheon plate, or any other member for no cracks or chips will be formed around or adjacent the hole in the support.

We cut off a blank 1 from a bar, strip, or sheet of zinc, soft steel, aluminum, brass, lead, or in fact any suitable metal which can be worked and bent. This blank 1, is worked in any suitable manner, so that the sides 2—2 of the blank will be formed of metal of different thicknesses. This may be done in various ways as by a hammer and other proper tools, or it may be done between an upper die 3 and a lower die 4, Fig. 1. The lower die 4 is provided with a recess 5 of the same width as the width of the blank 1, the lower portion 6 of the groove 5 being rounded.

The upper die 3 is provided with a main

convex surface 7, tapering at 8—8 to form supplemental die surfaces 9—9, in a different plane from the main surface 7. The ends of the die 3 are provided with arms 10—10.

When the blank 1 is in the position shown in Figs. 1 and 2, and pressure is exerted upon the blank by moving one or both of the dies towards each other, it will be clear that as the main convex surface 7 and the supplemental convex surfaces 9—9 are brought to bear upon the blank 1, the blank will be arched or bent as shown in Fig. 5, forming one-half of an axial bore 11. At the same time excessive pressure will be exerted upon the portions 12—12 of the sides 2—2, due to the fact that the convex surfaces 9—9 are raised above the level of the convex surface 7. This causes the metal in the ends 12—12 of the blank 1 to flow, or be displaced, as shown by the dotted lines 14—14 in Figs. 4 and 6. The inclined surfaces 15—15 will be formed on the blank 1 due to the action of the inclined convex surfaces 8—8 in the upper die 3.

As we have illustrated our invention, the blank 1 is provided with a slot or weakening portion 16 before it is placed within the dies, though such a slot may be formed by the dies if desired. At the same time that a portion of the ends 12—12 of the blank are being pressed or swaged to make them thinner, the arms 10—10 of the upper die 3 bend the very ends 12—12 of the blank, forming the flanges or stops 17—17, as shown in Fig. 3.

After the blank is removed from the die, it will be semi-cylindrical in cross section, as shown, in Fig. 4. Preferably, though not necessarily, the surplus or displaced metal 14—14 is removed from the thin sides 12—12 of the blank prior to bending it, as shown in Figs. 4 and 6, though this surplus metal may be left on the blank if desired. The blank is then bent midway of its length to form the complete sheet metal shield 18, Fig. 7, having the axial bore 11, a portion of the bore being enlarged to form an open throat 19.

In use the sheet metal shield 18 is mounted in a hole 20, drilled or otherwise formed in any support 21, the shield being preferably passed through a hole 22 in the work 23, until the flanges or stops 17—17 are brought up flush against the work. A nail 24 is then inserted in the open throat 19 of the axial bore 11, but due to some of the metal having been displaced, the axial bore at this point will be substantially the diameter of the nail, so that there will be no expansion of the sides of the shield 18 until the end 25 of the nail reaches the inclined surfaces 15—15 of the axial bore. After passing these inclined surfaces, the two sides 2—2 will be wedged apart to form a firm bond or grip with the interior surface of the hole 20. No expansive strains or stresses, however, will be thrown on the surface 26, adjacent the hole, for the reason that the sheet metal expansion shield does not begin to expand until the end 25 of the nail reaches the inclined surfaces 15—15 which are well within the hole, and removed from the surface 26. Consequently there will be no cracking or marring of the surface, (see Fig. 10).

The expansion, which has just been described, is what is known in this case as a primary expansion. As the end 25 of the nail passes into and through the slot 16 at the bent end of the sheet metal shield 18, the bent portions or arms 27—27, (see Figs. 8 and 11) are wedged apart in a direction 90° from the primary expansion, previously referred to, thereby forming a secondary expansion, and greatly increasing the bond or hold of the shield in the wall or support.

We have shown a modification of our invention in Figs. 12 and 13, in which the sides 2—2 of the shield are provided with longitudinally extending grooves 28—28 extending from the inclined surface 15 to the slot 16. These grooves assist in the expansion of the metal of the shield, permitting it to be more readily forced into any minute or other voids or irregularities in the surface of the hole 20.

Having thus described our invention in connection with different illustrative embodiments thereof, the details of which we 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 we claim is:—

1. A new article of manufacture comprising a sheet metal nail expansion shield bent back on itself midway of its ends to form an open end and two sides of equal length, each side being formed of metal of different thicknesses and different densities and the thinner and denser portion of the sides being adjacent their outer ends.

2. A new article of manufacture comprising a sheet metal nail expansion shield having a plurality of integral sides, each side being of different densities and the greater density being adjacent the outer ends of the side.

3. A new article of manufacture comprising a sheet metal nail expansion shield having a plurality of integral sides, each side being of different thicknesses and different densities and the thinner and denser portion of each side being adjacent its outer end.

4. A new article of manufacture comprising a sheet metal nail expansion shield having a plurality of integral sides, each side being of different strength, thicknesses and densities and the strongest, thinnest and most dense portion of each side being adjacent its outer end.

HENRY W. PLEISTER.
JOHN KARITZKY.