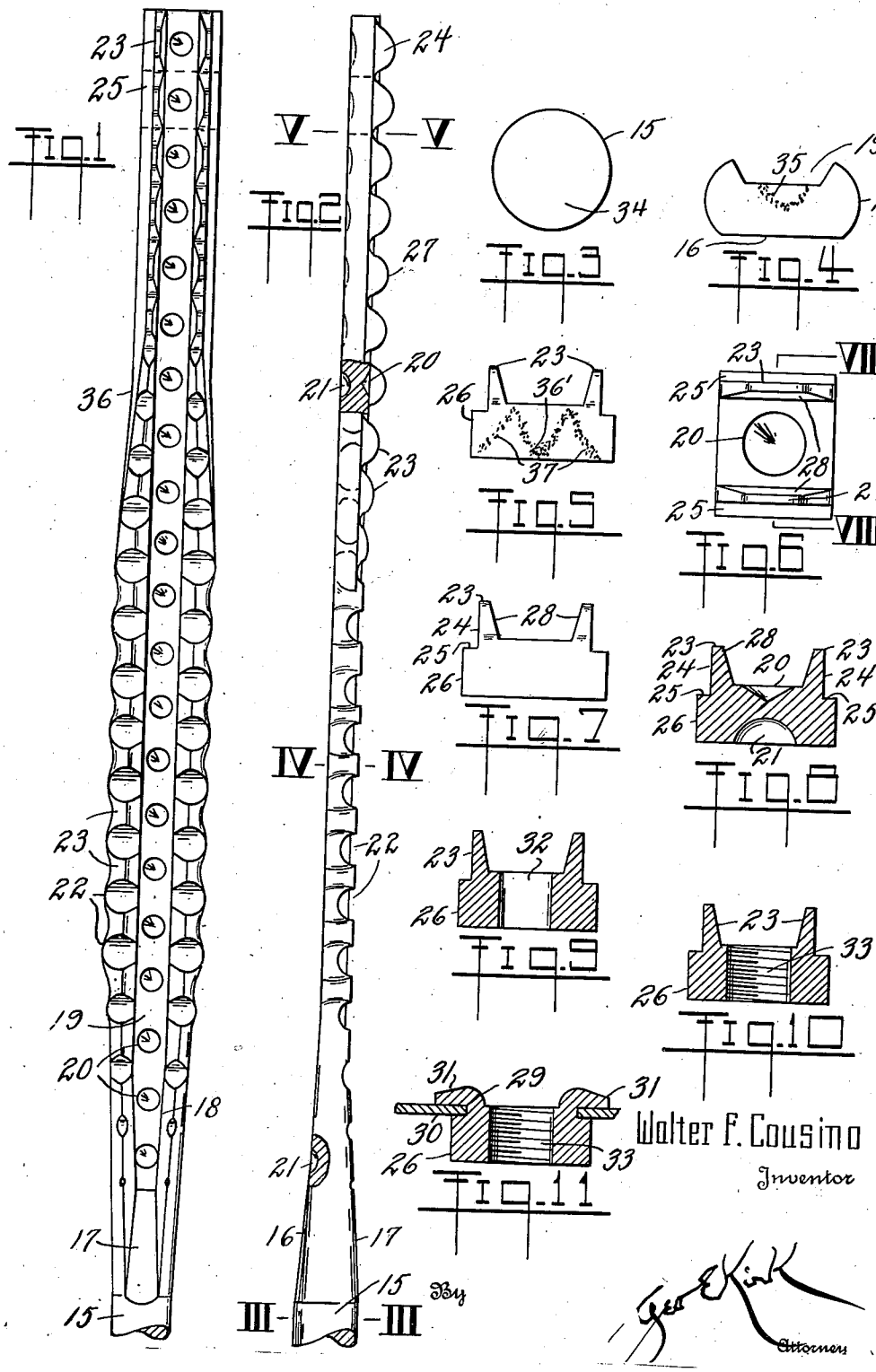
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CLINCH NUT AND METHOD OF PRODUCTION

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## CLINCH NUT AND METHOD OF PRODUCTION

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Original application December 11, 1939, Serial No. 308,598, now Patent No. 2,254,644, dated September 2, 1941. Divided and this application July 24, 1941, Serial No. 403,778

5 Claims. (Cl. 10—86)

This invention relates to reworking lengths of material into specially formed units or blanks.

This invention has utility when incorporated in the article or product and method for handling commercial rod stock as open hearth steel, and developing therealong a different cross-section, even into symmetrical succession and severing therefrom, as units, fin-carrying clinch nut blanks.

Referring to the drawing:

Fig. 1 is a plan view on an enlarged scale of the development of a clinch nut succession from a piece of commercial rod stock as progressed through a punch press;

Fig. 2 is a side view of the reworked stock of Fig. 1, parts being broken away;

Fig. 3 is a view on an enlarged scale, showing the general undisturbed crystalline structure commercial stock, say at the region III—III, Fig. 2, wherein such texture approximates uniformity throughout;

Fig. 4 is a view showing the region of internal distortion from the initial squeezings or reworking of the cold commercial stock for crowdings to depart from the general symmetry as uniform;

Fig. 5 is a view of the further disturbance in the region V—V, Fig. 2, showing the distortion away from or clear of the root of the fin and all in the more thick body instead of creating any weakening cold working or strain distortion in the region local to the root of the fin, to leave undisturbed the crystalline structure at the juncture of the fin with the body of the nut blank;

Fig. 6 is a plan view of a unit severed from the stock of Fig. 2;

Fig. 7 is a view from the left of the unit of Fig. 6;

Fig. 8 is a section on the line VIII—VIII, Fig. 6, through the unit or blank as in the form severed from the stock as reworked;

Fig. 9 is a section of the blank of Fig. 8 as punched at a succeeding step, in the event the blank is to be used for a nut;

Fig. 10 is a section of the blank of Fig. 9 as tapped to receive the screw or bolt; and

Fig. 11 is a section of the tapped blank of Fig. 10 with its fins spread into anchoring position with thin sheet metal stock and thus clinched for holding therewith and, by its polygonal form, keyed against relative rotation.

In carrying out the invention herein, cylindrical rod stock 15 may be introduced into a punch press and there, hot or cold, acted upon at a succession of feeding operations (Figs. 1, 2), say to the extent of a series of blanks. In this handling of the stock 15, major extent slant 16 is desirably from the lower side against minor slant 17 from the upper side and developing outward through graduated portion 18 to upper way 19. In this squeezing progress in the direction of impact of a plunger, there are developed in the stock, supplemental to the uniform cross-section squeezings, departures therefrom by forming seats 20 at the center regions of the blanks to be. These indented regions 20 may be of conical form, while the complementary or opposite regions 21 may be of semi-spherical form and approximate the regions 20 for registry in ultimate punching of the blank, say for clinch nut production. By this economy means there is reduced the amount of stock to be punched out and there is also created transverse disturbance of the internal structure of the body, while leaving the blank toughened in the region of the juncture of the fin with such body.

In the formation of these blanks, say for clinch nuts, sides to the way 19 may have interruptions or depressions 22 therein, thereby to develop alternately with the openings 20, 21. These regions of identity in succession of severing of the blanks leave between the portions 22 fin portions 23 (Fig. 8) upwardly extending, which fin portions 23 have outer edges 24 approximately perpendicular to ledges 25 of body 26 of the blank. The outline of these fins 23 as to the sides of the regions 22 is of curved contour 27. Inner sides 28 of these fins thin out toward the free ends, while the straight sides 24 of the polygon of the blank body 26 insure efficient anchoring in rectangular hole 29 (Fig. 11) of sheet stock 30 as the fins 23 are deformed thereover to form clinch 31. The curved portions 27 are efficient for readily guiding such portions into the opening and means a speed-up in assembly.

In the instance the blank is to be beyond the matter of merely reinforcing a port or opening, the portions 20, 21, may be connected by punching to form opening 32 (Fig. 9). If this keying for the fitting or tube is to be beyond that of a chamfered port for rivet operation, say as threading with a bolt or nut, this punched out portion 32 may be tapped or have threading 33 (Fig. 10).

This commercial stock, say wrought rod 15, as originally worked, has texture symmetry 34 (Fig. 3) generally undisturbed. The squeezes for developing initially the ways 16, 17, 18, 19, 20, 21, 22, may be in the direction of the impact of a punch press and distort the texture direction to develop disturbance line 35 (Fig. 4) at an

angle to that of the impact direction. Lateral squeeze **36** (Fig. 1) has shown disturbance lines **36'** to reside in the blank body **26** remote from the fins **23**. There is also developed region of additional lines of disturbance **37** (Fig. 5). There seems to remain the normal structure at the root for the fin **23**. This normal region retains strength against rupture from the body as the clinch or bend **31**. These internal distortions are reduced according to the less extent of reworking cold. In reworking at or above crystallization then reformation may approximate if not actually eliminate internal stresses and accordingly maintain the structural strength more uniform throughout.

This application is a division of my copending application for United States Letters Patent, Ser. No. 308,598, filed December 11, 1939, for Clinch nut production, issued as Patent No. 2,254,644, Sept. 2, 1941.

What is claimed and it is desired to secure by Letters Patent is:

1. The method of reworking a length of stock comprising flattening therealong; by lateral compression at right angles to said flattening, forming two parallel upstanding fins, and interrupting the continuity of said fins by a succession of depressions to leave the fins of arch shape.

2. The method of reworking a length of stock comprising flattening therealong; by lateral compression at right angles to said flattening, forming two parallel upstanding fins; interrupting the continuity of said fins by a succession of depressions to leave the fins of arch shape; and, along a way and registering between the fins, reducing the thickness of the stock.

3. The method of reworking a length of stock comprising flattening therealong; by lateral compression at right angles to said flattening, forming two parallel upstanding fins; interrupting the continuity of said fins by a succession of depressions to leave the fins of arch shape; along a way and registering between the fins, reducing the thickness of the stock, and transversely severing the stock between the reduced thickness portions to leave a pair of fins in a section for a nut blank.

4. The method of reworking a length of stock comprising flattening therealong; by lateral compression at right angles to said flattening, forming two parallel upstanding fins, interrupting the continuity of said fins by a succession of depressions to leave the fins of arch shape; and along a way and registering between the fins reducing the thickness of the stock, on opposite sides in thereby adapting for subsequent punching through the stock at said reduced thickness portion of the stock.

5. The method of reworking a length of stock comprising flattening therealong; by lateral compression at right angles to said flattening, forming two parallel upstanding fins; interrupting the continuity of said fins by a succession of depressions to leave the fins of arch shape; and, between the fins of a pair, providing preliminary opposing seats adapted to be acted upon subsequently for forming an internally threaded hole through the stock.

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