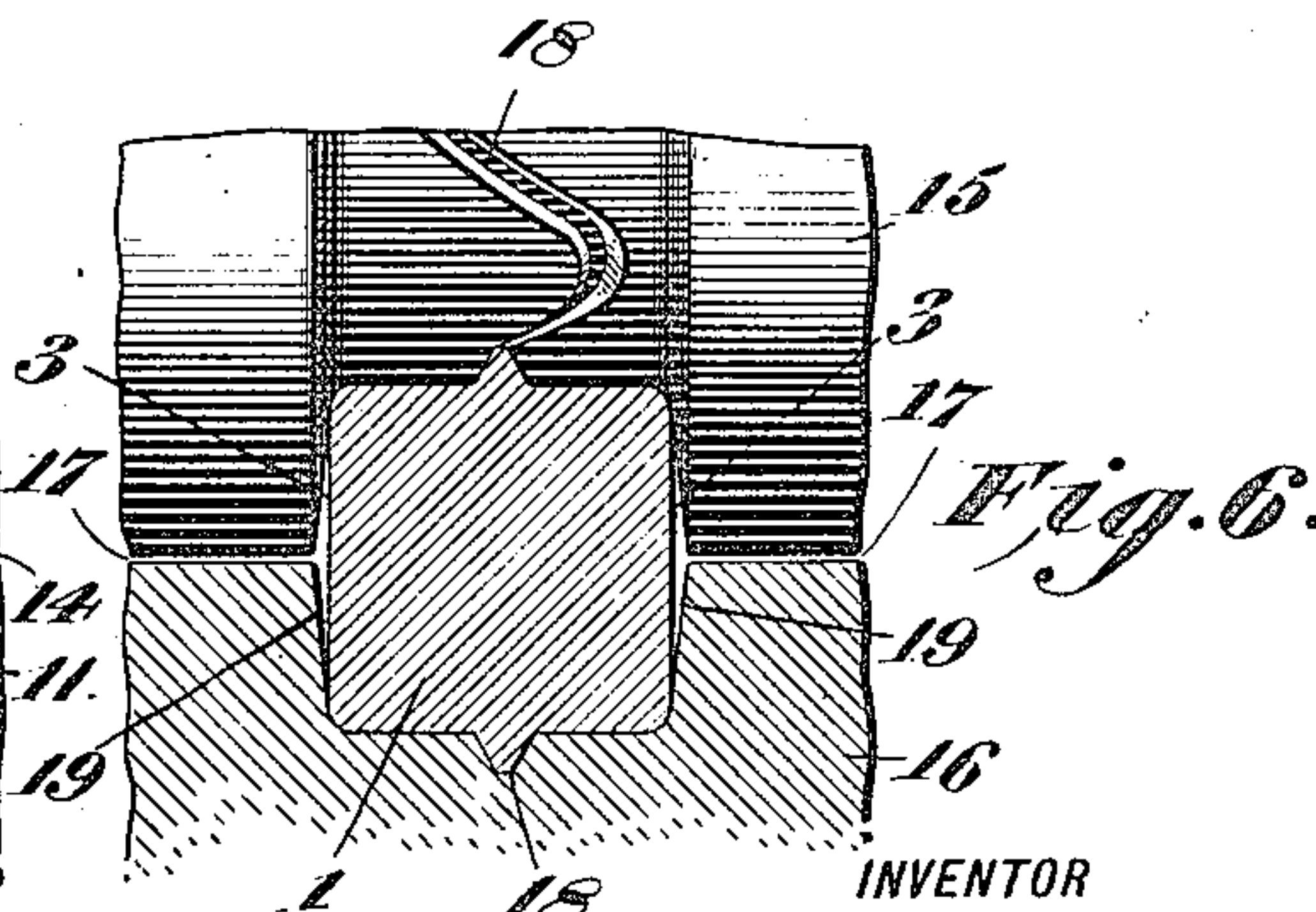
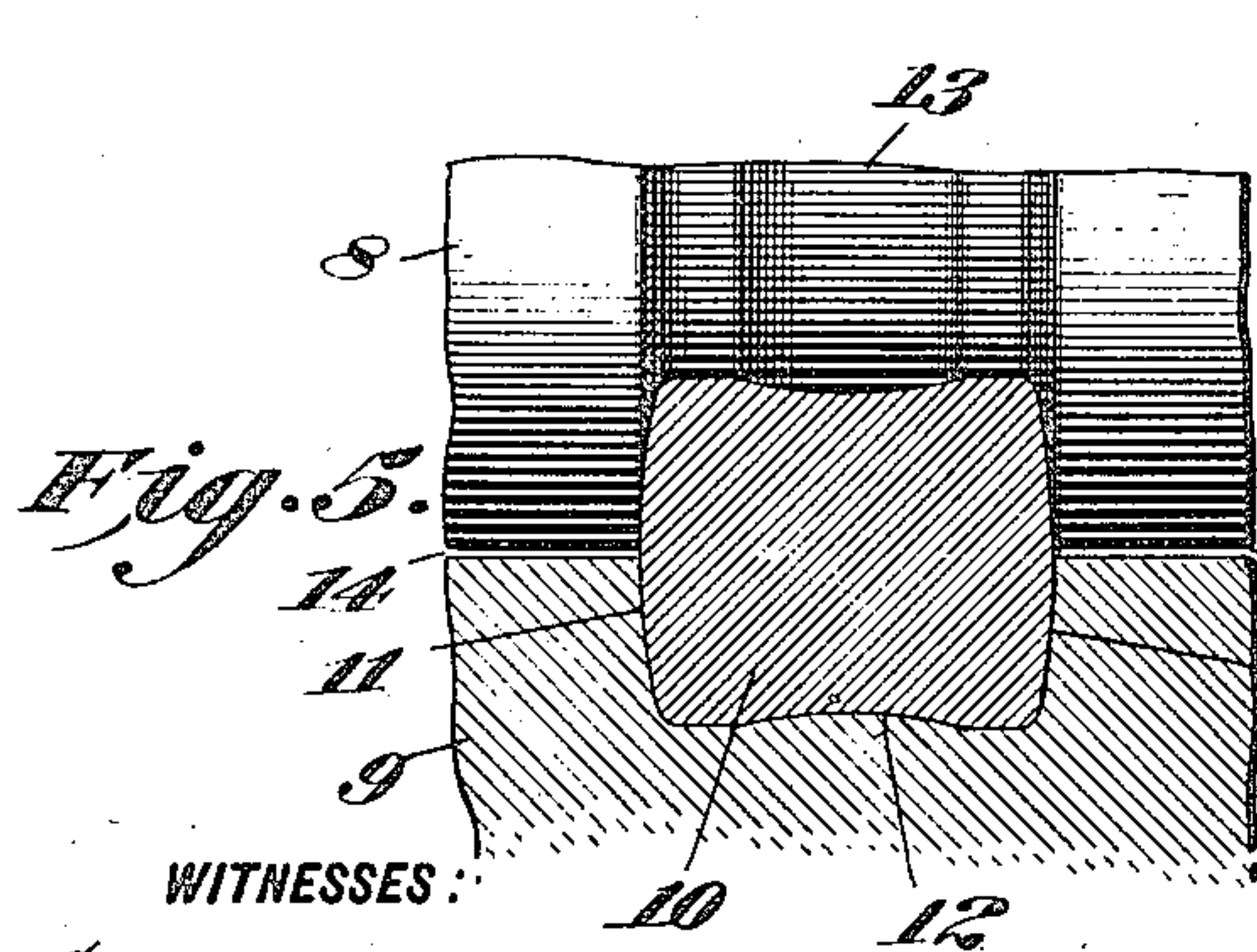
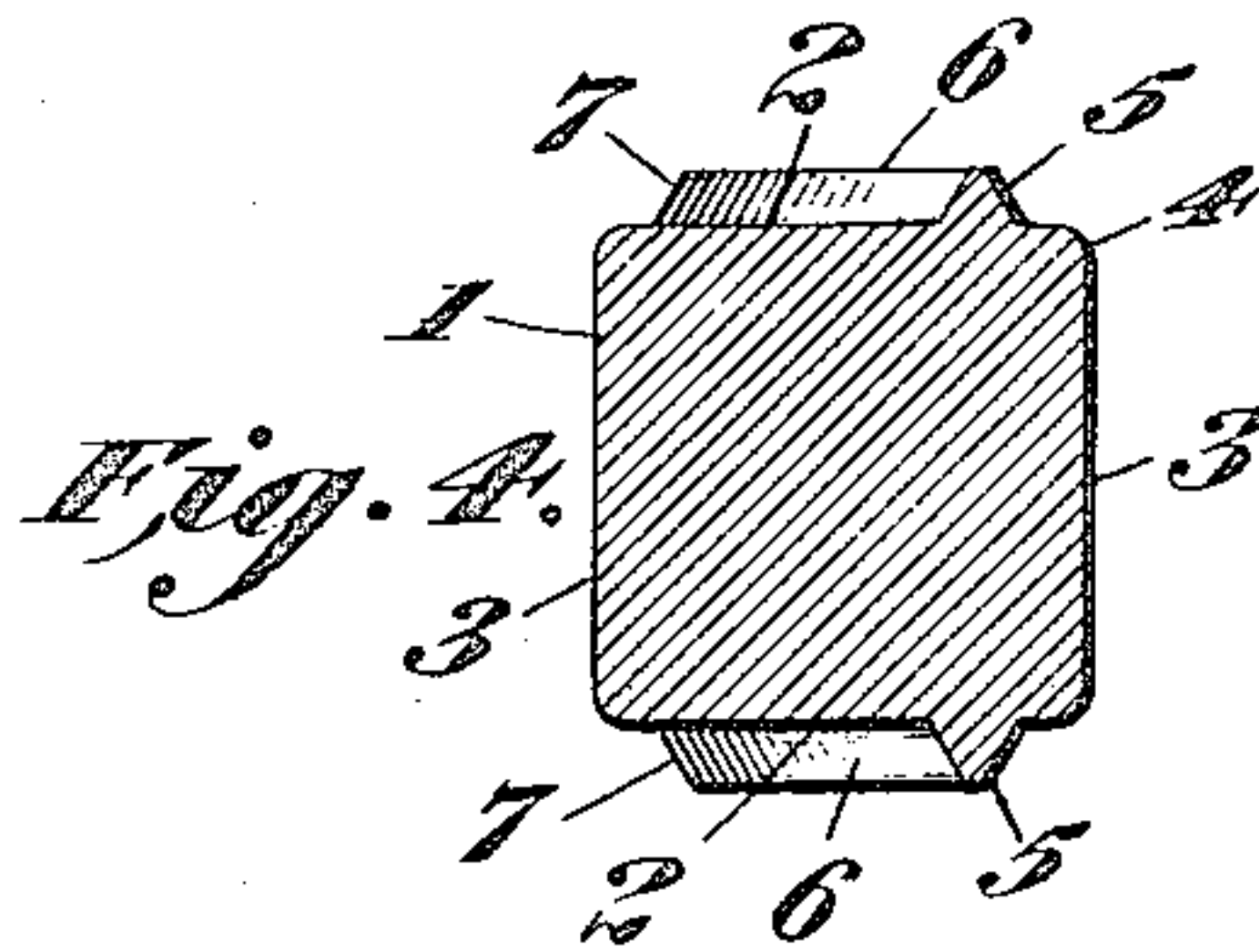
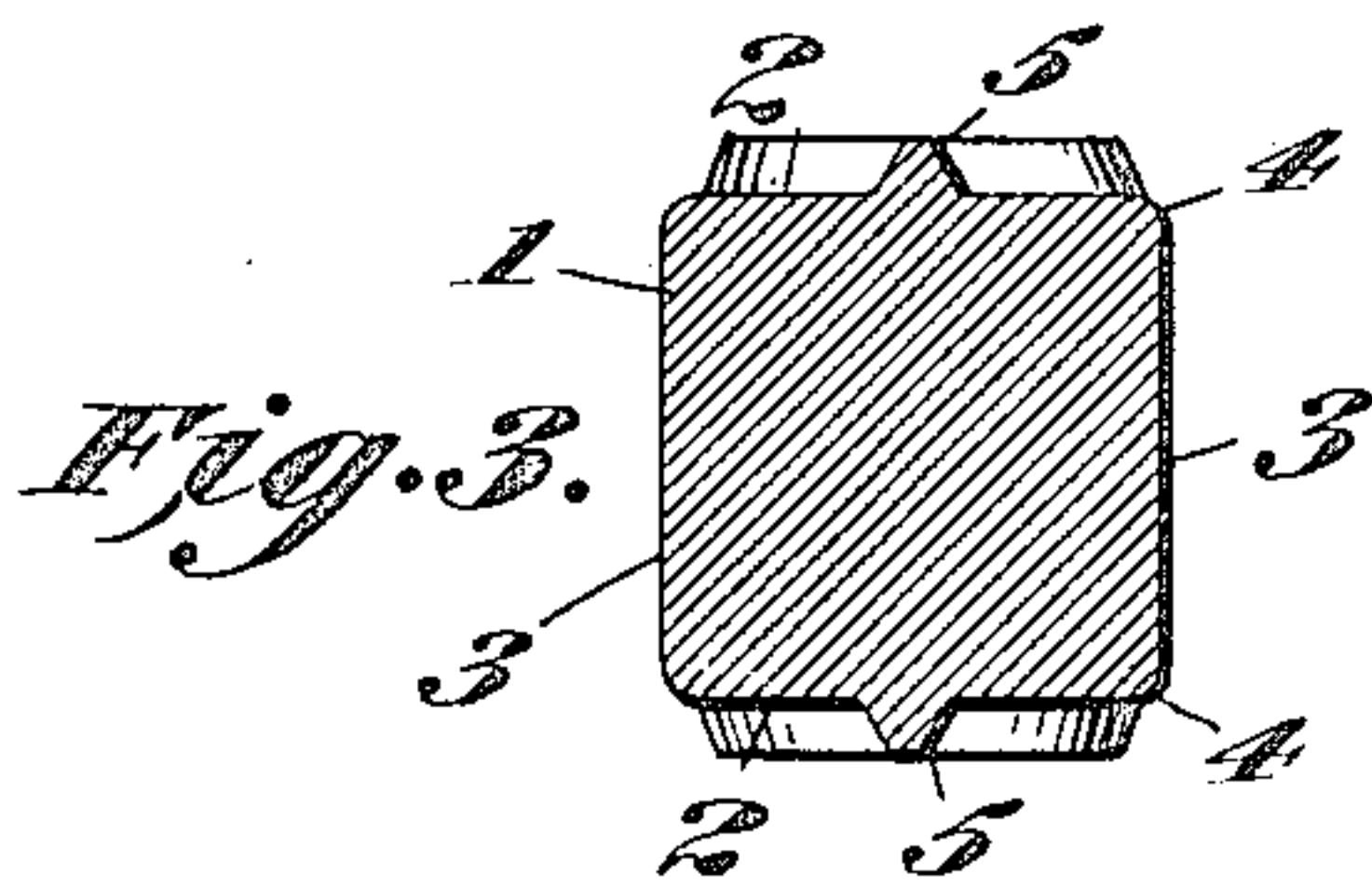
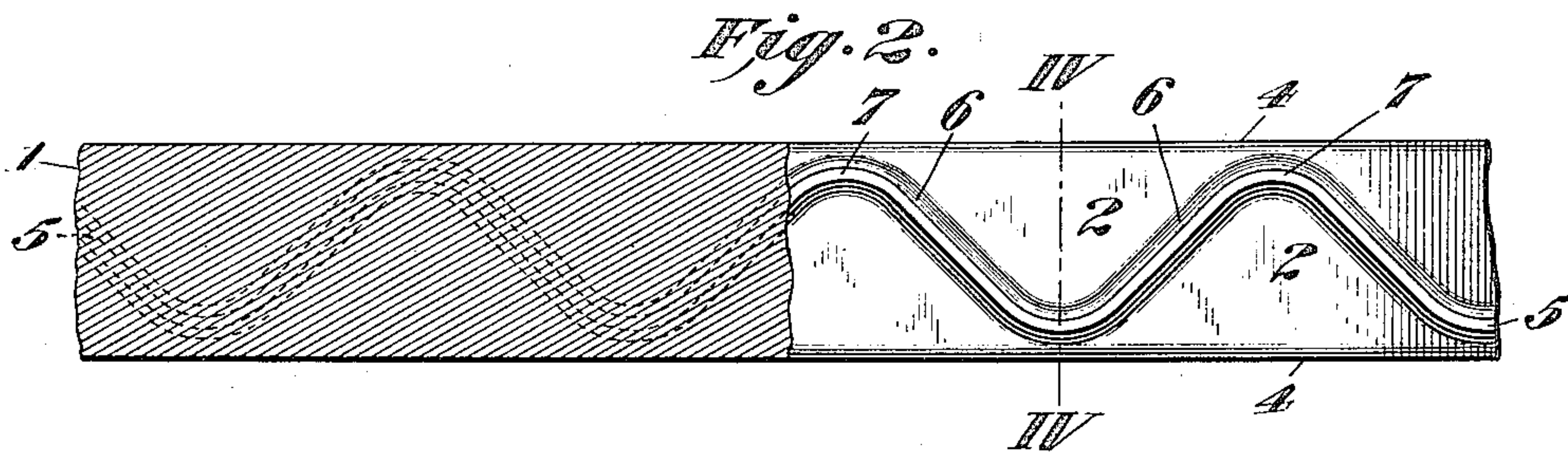
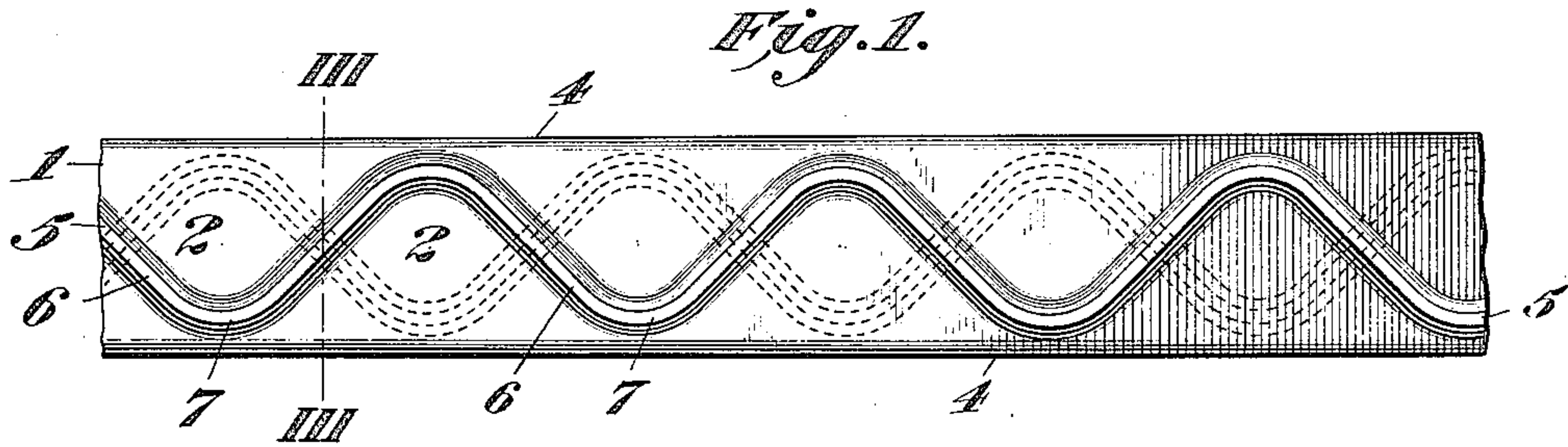


E. E. SLICK.
METHOD OF MAKING REINFORCING BARS.
APPLICATION FILED JAN. 22, 1914.

1,154,664.

Patented Sept. 28, 1915.



WITNESSES:
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UNITED STATES PATENT OFFICE.

EDWIN E. SLICK, OF WESTMONT BOROUGH, PENNSYLVANIA.

METHOD OF MAKING REINFORCING-BARS.

1,154,664.

Specification of Letters Patent.

Patented Sept. 28, 1915.

Original application filed August 28, 1913, Serial No. 787,067. Divided and this application filed January 22, 1914. Serial No. 813,627.

To all whom it may concern:

Be it known that I, EDWIN E. SLICK, a citizen of the United States, residing in the borough of Westmont, in the county of Cambria and State of Pennsylvania, (whose post-office address is Johnstown, Pennsylvania,) have invented certain new and useful Improvements in Methods of Making Reinforcing-Bars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the method of making a ribbed reinforcing bar, the projecting ribs of which are preferably located on opposite sides of a bar of approximately rectangular cross-section, and by reason of this construction, my bar is well adapted to be produced or rolled in a very simple manner, the finishing pass in the roll being what is known as a box pass, that is, one of approximately rectangular cross-section with two of the sides of the rectangle parallel to the axes of the rolls, with the two other sides approximately at right angles to the roll axes. I prefer to form my bar with ribs on two opposite surfaces thereof and extending longitudinally of the bar in a zig-zag or sinuous manner. The direction of the ribs may be curved in general, or they may be formed by a series of straight lines, or by a combination of straight lines and curves, the general zig-zag effect, however, being maintained. As viewed in plan with the ribbed surfaces in substantially horizontal planes, one form of my bar may have the rib on the upper surface extending in a zig-zag manner, as described, while the rib on the lower surface may have its apices arranged so that the projection plan view of my bar would show these two ribs crossing each other at intervals. In another form of my bar the ribs on the opposite surfaces may be parallel with each other as viewed in plan and plan projection, and in still other forms the position of the ribs with respect to each other in longitudinal location, may be anywhere between these two extremes.

This invention is a division from my application filed August 28th, 1913, Serial No. 787,067.

Having thus given a general description of my invention, I will now, in order to

make the matter more clear, refer to the accompanying drawing forming part of this specification in which like characters refer to like parts.

Figure 1 is a top plan view of one form of my bar showing the upper rib in full lines and the lower rib on the opposite side of the bar by dotted lines. Fig. 2 is a combined horizontal longitudinal sectional plan through the body of my bar and a plan view of the top of the same, the left-hand portion of said view being the section showing the lower rib in dotted lines, while the right-hand portion of said figure is a top plan view showing the upper rib in full lines. Fig. 1 shows the ribs on opposing sides having their apices staggered and midway between the apices on the opposite side of the bar, while Fig. 2 shows the form in which the ribs are substantially opposite to and parallel with each other, although any variation of the longitudinal location of the ribs between the positions shown in Figs. 1 and 2 may be had, as will be readily understood. Fig. 3 is a cross-sectional elevation of the form of bar illustrated in Fig. 1 taken on the line III—III of said figure. Fig. 4 is a transverse cross-sectional elevation of the form of bar illustrated in Fig. 2, taken on the line IV—IV of said figure. Fig. 5 is a view of the leading pass of the rolls adapted to give the preferred form to my bar preparatory to producing the ribs on the same. The upper portion of said figure shows the top roll in elevation, and the lower portion of the figure shows the bottom roll in vertical longitudinal section, the shape of the roll pass and the configuration of the bar therein being shown in cross-section. Fig. 6 is a view of a preferred form of finishing pass adapted to complete the manufacture of my bar in which view the upper roll is shown in side elevation, the lower roll in vertical longitudinal cross-section, and the finished form of bar is shown in the finishing roll pass in transverse section.

Referring now to the numbers of reference on the drawings:—1 indicates my bar in general, 2 the surfaces thereof from which the ribs project, 3—3 are the other or approximately flat surfaces of my bar, while 4—4 indicate the corners of the body portion of the bar which in this case are shown as slightly rounded, although I wish it understood that these may be beveled or an-

gular as desired. The projecting rib in general is indicated as 5, the portions of said ribs which are straight are indicated as 6, while the apices of the zig-zags are indicated as 7 shown as curves, although these apices may be straight or angular as desired.

Referring now to Fig. 5, the upper roll is indicated as 8 with side collars thereon as shown, the lower roll is indicated as 9, while the shape of the leading pass of said rolls and the section of the bar produced thereby is indicated as 10. I prefer to so form this leading pass that the sides of the bar which contact with the roll collars are slightly convex as indicated at 11, while the other pair of opposing sides of said bar are slightly concave as indicated at 12, these concavities being formed by the beads 13 of the rolls. The rolls 8 and 9 are spaced apart a slight distance as indicated by the parting 14. The greatest horizontal dimension of the bar 10 is somewhat greater than the greatest vertical dimension of the body portion of the finished bar which is indicated as 1 in Fig. 6 and the other figures, the idea of this being to have the bar, as it comes from the leading pass, contain sufficient material to permit it to be compressed and elongated by rolling, and at the same time have the ribs 5 formed thereon. The concavities 12 formed in the sides of the bar 10 of the leading pass are so fashioned and proportioned that when the bar is shaped by compressive rolling action in the finishing pass, these concavities will become straightened out and form substantially flat surfaces, as shown by the sides 3 of the bar in Fig. 6 and the other illustrations. I also make the cross-sectional area of the bar 10 in the leading pass, greater than that of the finished bar 1, in order to insure that it contains sufficient material from which to produce the finished form, but at the same time I am careful to so regulate these proportions that the bar of the leading pass does not contain any excess which would form a fin or overflow when finishing.

The bar may be rolled from a billet or bloom in various passes preparatory to entering the leading pass shown in Fig. 5, but as this may be done in any of the various manners known in the art, I have not illustrated nor described the same. After the blank is formed in the leading pass as shown in Fig. 5, it is given a one-quarter turn on its axis and introduced into the finishing pass shown in Fig. 6 where my bar is given its final shape.

Referring now to Fig. 6 the upper roll shown in elevation is indicated as 15 with the side collars thereon as shown, the lower roll is indicated as 16 and the cross-section of the finished bar is indicated as 1. The rolls are provided with grooves 18 which are preferably of blunt triangular or trapezoidal

cross-section, although their sides may be more nearly perpendicular than shown, if so desired. The parting between rolls 15 and 16 is indicated as 17 and the groove 18 is cut in the finishing rolls in a zig-zag manner corresponding to that of the general arrangement of the rib desired. The sides of the collars of the rolls of the finishing pass are formed slightly sloping as indicated at 19 in order to provide a clearance at this place and to allow the concavities 12 of the bar of the leading pass to be forced outwardly by rolling compressive action until they assume the approximately straight surfaces indicated as 3. In order to clearly illustrate this clearance 19 the slopes of the collars have been exaggerated in the drawings.

My bar is well adapted for use as a reinforcing bar for concrete or other primarily plastic materials and has the advantage that it may be produced by a comparatively simple process of rolling in passes which are what is known as box or open grooves in which the rolling compressions are principally in the direction at right angles to those surfaces of the rolls which are substantially parallel to the axes thereof.

Although I have shown and described my invention in considerable detail, I do not wish to be limited to the exact and specific details shown and described, but may use such substitutions, modifications or equivalents thereof, as are embraced within the scope of my invention, as pointed out in the claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. The method of making a ribbed bar of general rectangular cross-section, which consists in first forming in a box pass a wider bar with slightly concave sides, then axially revolving same about one-quarter turn, then subjecting it to rolling compressive action in the direction of its greater width to form a bar of dimensions desired and at the same time forming zig-zag ribs on its two opposite surfaces.

2. The method of making a ribbed bar by rolling, which consists in forming a blank of greater width and substantially the same thickness, with the ends of its cross-section slightly convex and the sides of the same slightly concave, then compressing said ends toward each other in a box pass and at the same time forming ribs thereon.

3. The method of rolling a ribbed bar, which consists in forming a blank whose cross-section is of greater width than, and of substantially the same thickness as, the finished bar, the sides of said blank being formed slightly concave, then compressively rolling the same to reduce said width and at the same time form ribs thereon.

4. The method of rolling a ribbed bar in
box passes, which consists in forming a
blank whose cross-section is of greater width
than, and of substantially the same thickness
5 as the finished bar, the sides of the cross-
section of said blank being slightly concave
and the ends thereof slightly convex, then
compressively rolling the same to reduce

said width and at the same time form zig-
zag ribs on two opposite sides thereof.

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In testimony whereof I hereto affix my
signature in the presence of two witnesses.

EDWIN E. SLICK.

Witnesses:

GEO. E. THACKRAY,

A. DIX TITTLE.