No. 639,513. Patented Dec. 19, 1899.

W. H. & E. H. BRISTOL.

METHOD OF MANUFACTURING BELT FASTENERS.

(Application filed May 26, 1899.)

(No Model.) 2 Sheets—Sheet 1.

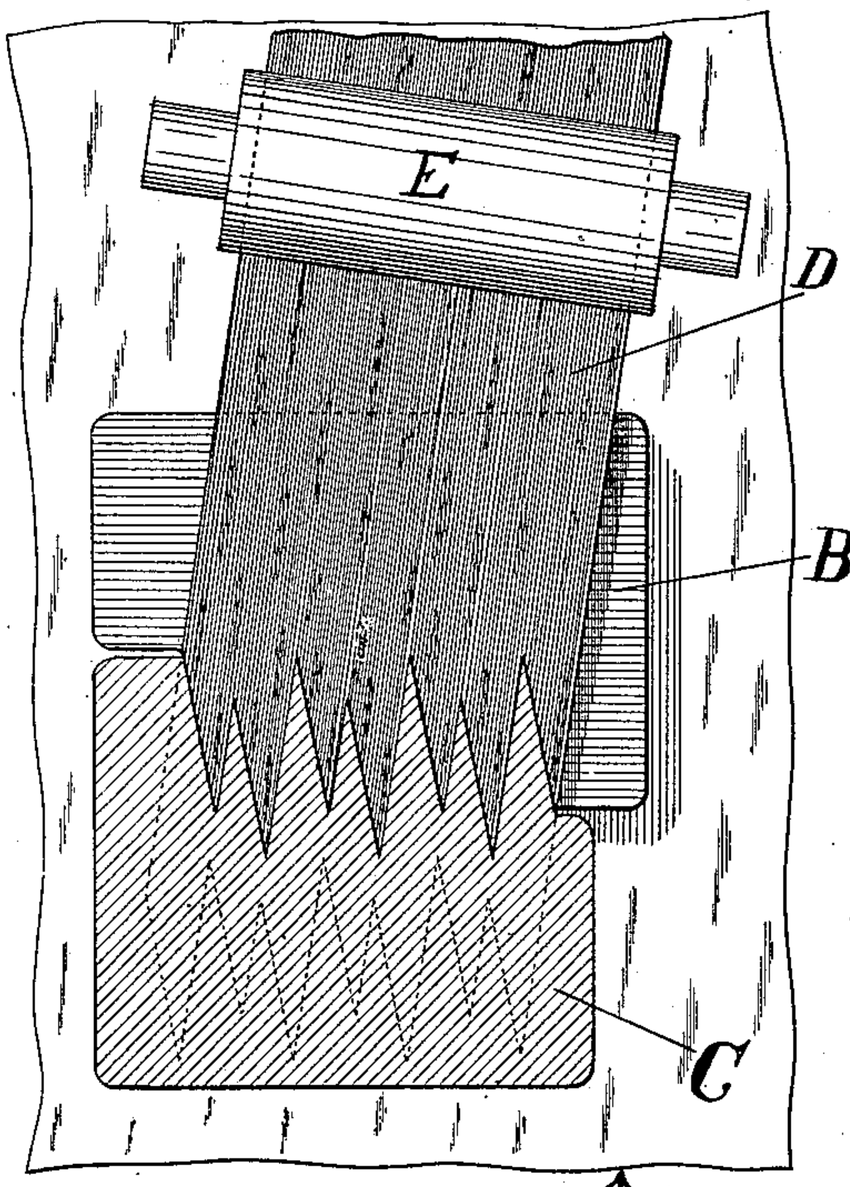

Fig. 5.

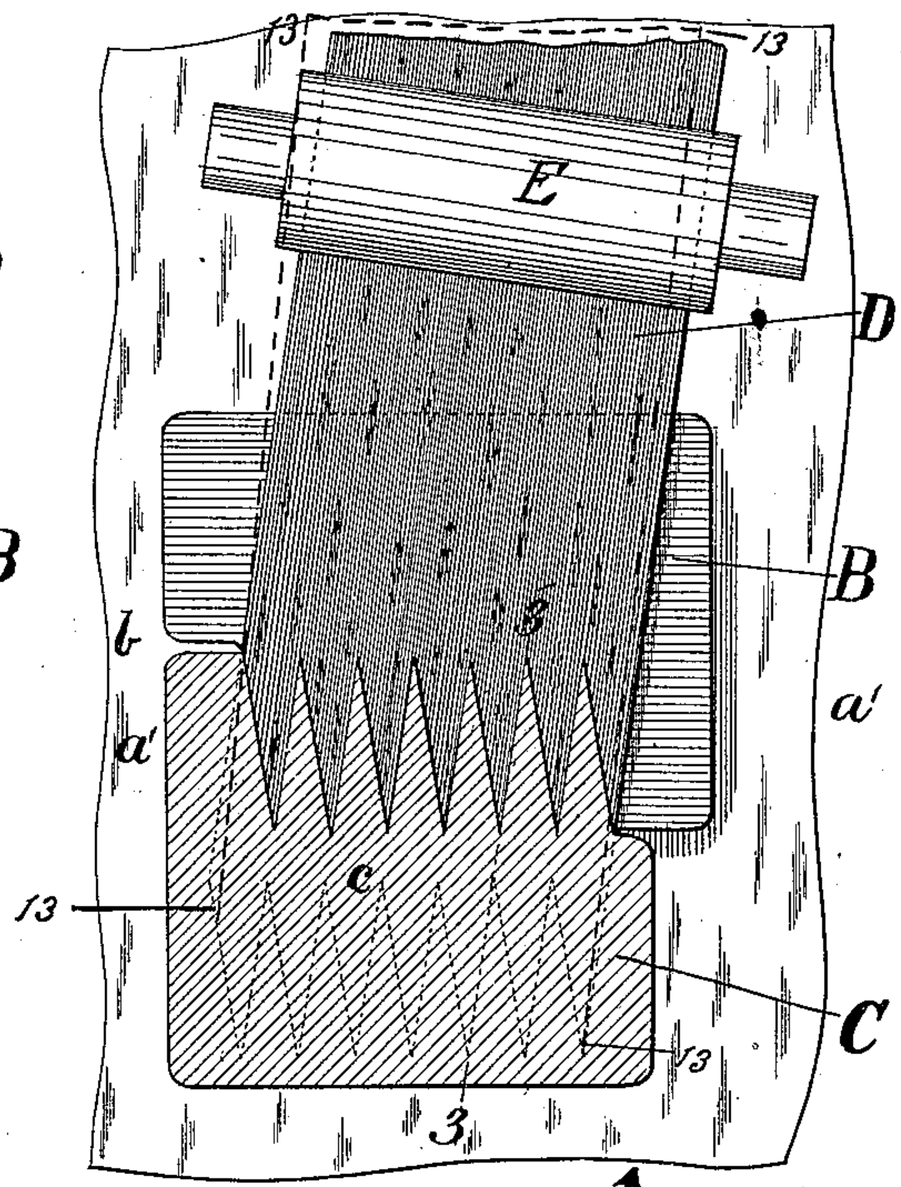

Fig. 1.

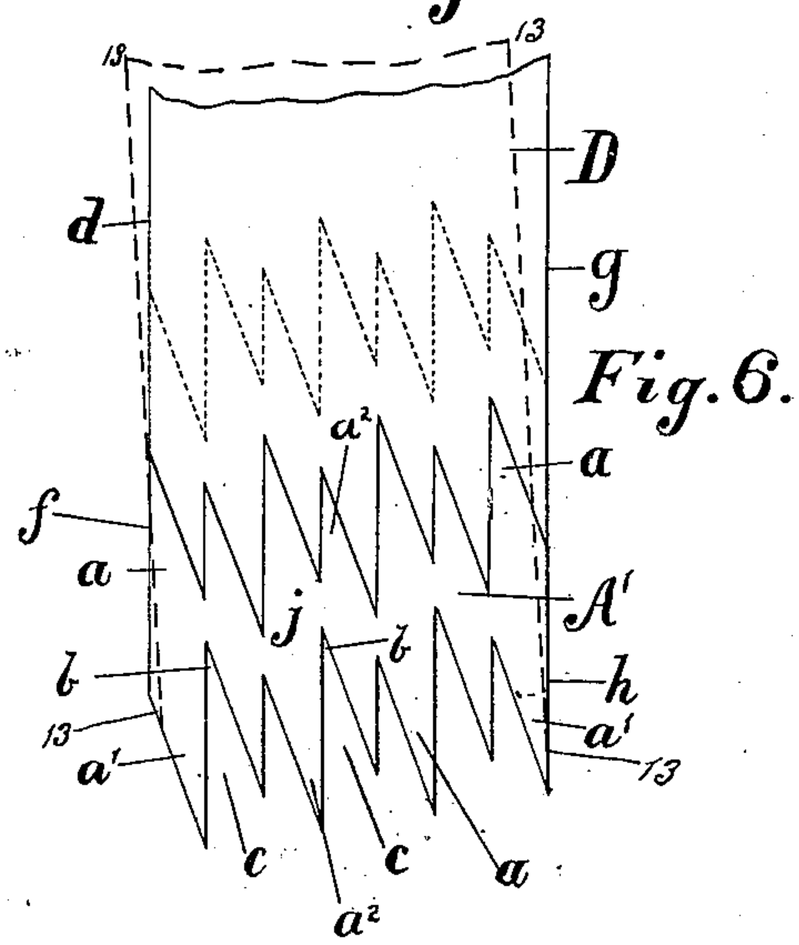

Fig. 6.

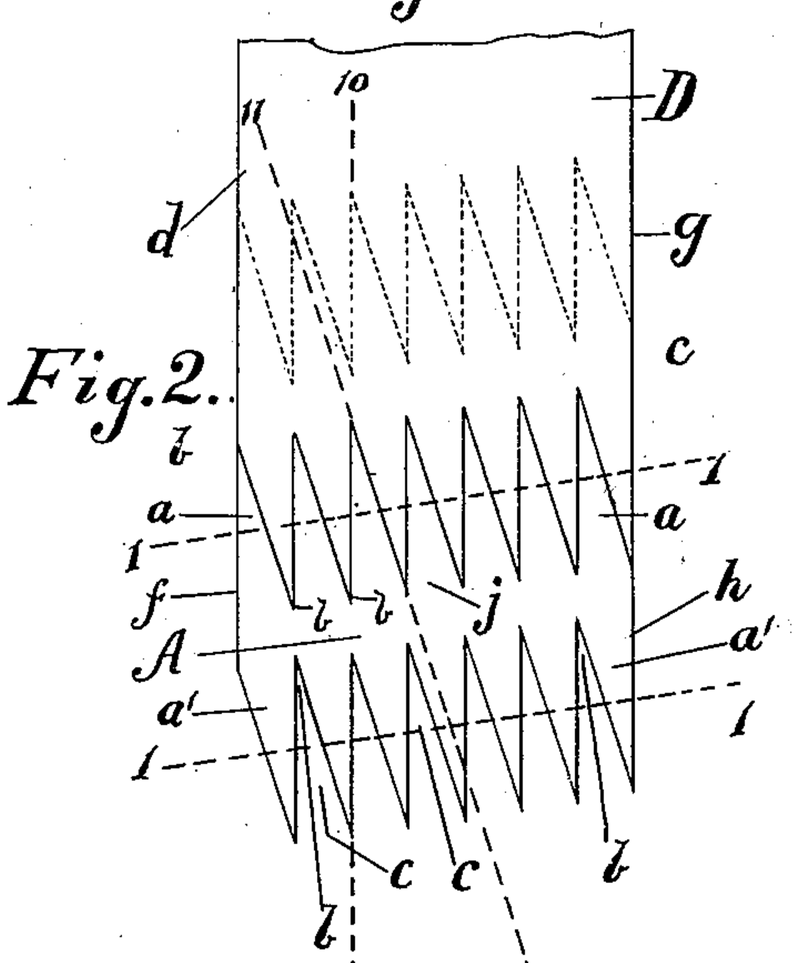

Fig. 2.

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METHOD OF MANUFACTURING BELT FASTENERS.

(Application filed May 26, 1899.)

(No Model.) 2 Sheets—Sheet 2.

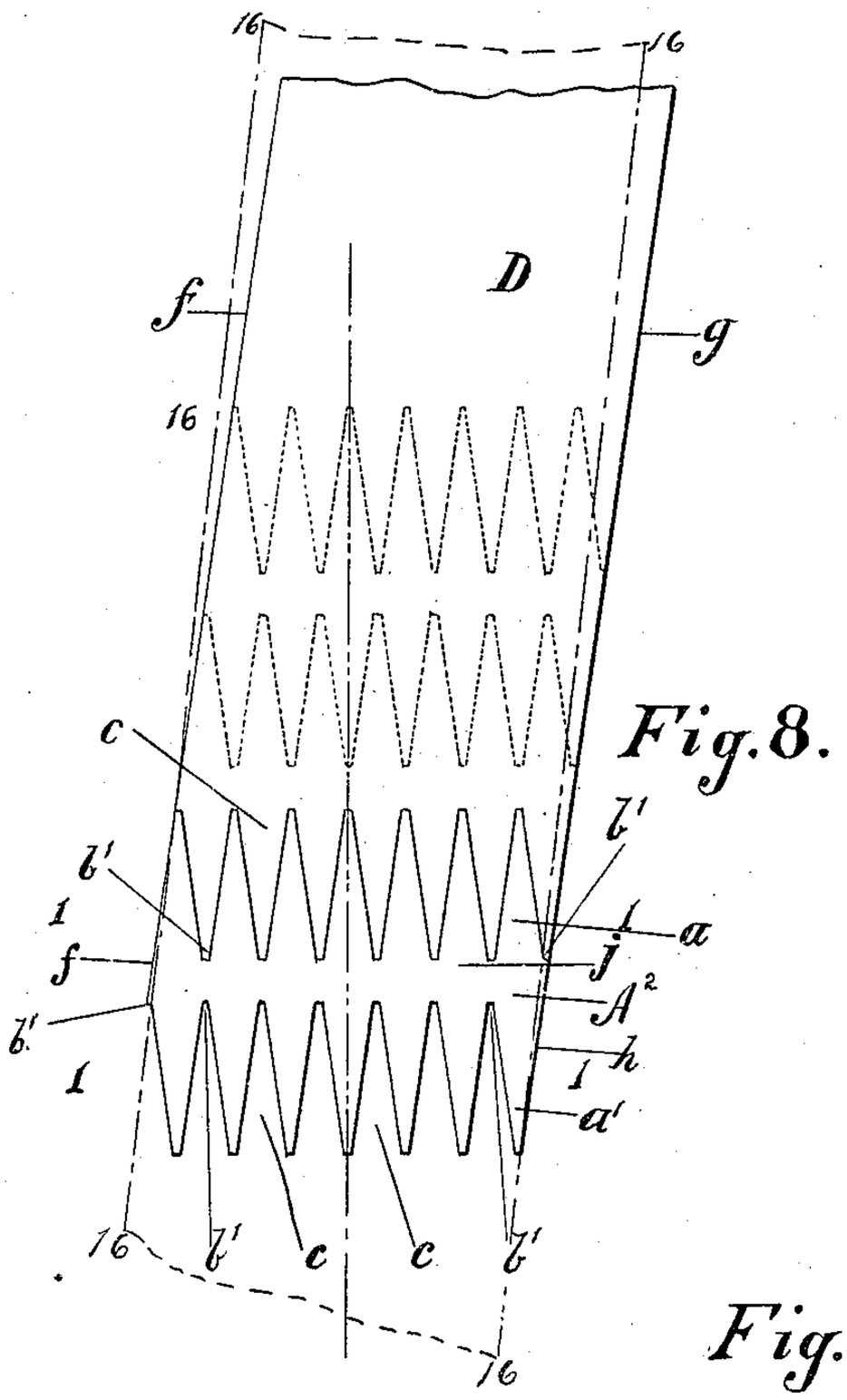

Fig. 8.

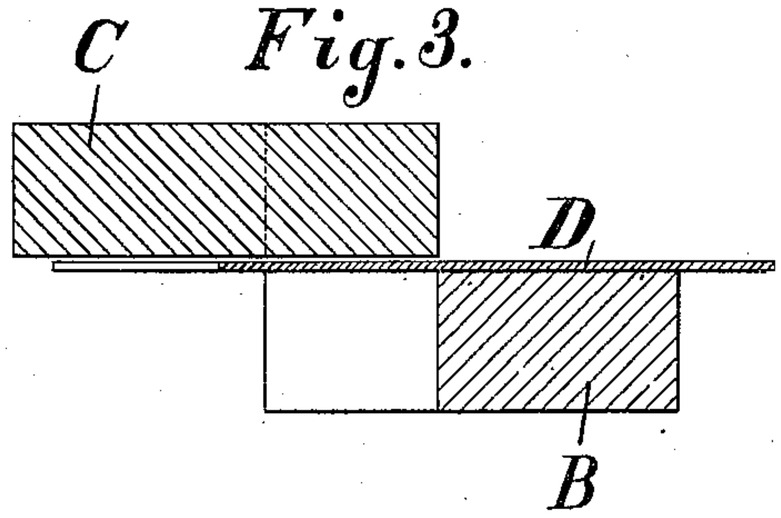

Fig. 3.

Fig. 4.

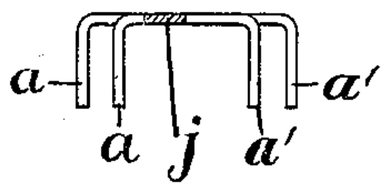

Fig. 7.

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UNITED STATES PATENT OFFICE.

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METHOD OF MANUFACTURING BELT-FASTENERS.

SPECIFICATION forming part of Letters Patent No. 639,513, dated December 19, 1899.

Application filed May 26, 1899. Serial No. 718,459. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. BRISTOL, residing at Hoboken, Hudson county, and State of New Jersey, and EDGAR H. BRISTOL, residing at Naugatuck, New Haven county, and State of Connecticut, citizens of the United States, have invented certain new and useful Improvements in Methods of Manufacturing Belt-Fasteners, of which the following is a specification.

Our invention has reference to the manufacture of belt-fasteners, and has for its object to produce practical belt-fasteners, with absolutely no waste of material, in an economical manner from a strip or ribbon of metal fed intermittently to suitable dies.

To this end our invention consists in a method for continuously manufacturing blanks for fasteners provided with tapering prongs or spurs on opposite sides of a connecting-body, according to which method the strip or ribbon from which said blanks are made is fed at an inclination to the line of points of the die and punch and preferably at an angle to said line corresponding to the angle of the tapered edges of the prongs or spurs, and thus forming the outside edges of the end prongs or spurs on opposite sides of the body by the edges of the strip or ribbon of metal.

The nature of our invention will best be understood when described in connection with the accompanying drawings, in which—

Figure 1 represents a sectional plan illustrating the construction of the die and punch and the means for feeding the strip or ribbon of metal. Fig. 2 is a plan view of a blank as cut by the die and punch, the dotted lines showing the successive cuts in the strip or ribbon. Fig. 3 is a section on the line 3 3, Fig. 1, taken through the punch and die. Fig. 4 is a transverse section of a complete fastener. Fig. 5 is a plan view similar to Fig. 1, showing the construction of the die and punch for producing a modified form of fastener. Figs. 6 and 7 are views similar to Figs. 2 and 4, but illustrating the modified form of blank and fastener. Fig. 8 is a plan view of a second modified form of blank in which the prongs or spurs are directly opposite each other, although produced by the same method of feeding the ribbon or strip.

Similar letters of reference designate corresponding parts throughout the several views of the drawings.

Referring at present to Fig. 2, the letter A designates the blank, which subsequently has its prongs *a a'* bent over at right angles along the lines 1 1 to form a complete fastener, as illustrated in Fig. 4. Heretofore fasteners have had their prongs or spurs arranged directly in line with each other, or, as illustrated in the patent granted to William H. Bristol, No. 408,161, dated July 30, 1889, the prongs or spurs have been arranged to alternate on opposite sides of the body. The fasteners in which the prongs or spurs are absolutely in line with each other have not heretofore been made without waste of some material, which is also true with respect to fasteners of the nature described in the patent just referred to, where all the prongs or spurs have the same shape or outline, including particularly the end prongs or spurs. In the blank for the fastener shown in Fig. 2 it will be observed that the prongs or spurs *a a'* are not directly opposite each other, but are slightly offset in one direction to such a degree as to bring the apexes of the interstices on opposite sides of the body *j* in line with the edge of the strip or ribbon of metal from which the fasteners are cut. To render this clearer, it will be seen from Fig. 2 that the apexes *b* of the interstices *c* between the prongs or spurs are displaced laterally, so that a line 10 10, drawn along the left-hand edge of one of the prongs or spurs *a* and the right-hand edge of one of the prongs or spurs *a'*, which said line is parallel with the edges of the strip or ribbon of metal from which the fasteners are cut and the right-hand edge of one of the prongs or spurs *a'*, will include both apexes *b* on opposite sides of the body, while a line 11 11, drawn along the right-hand edge of one of the prongs or spurs *a*, will fall parallel with the left-hand edge of the prongs or spurs *a'* on the opposite side of the body. By this construction we are enabled, first, to produce fasteners consecutively from a strip or ribbon of metal with absolutely no waste, and,

secondly, to produce fasteners having all their prongs or spurs of perfectly uniform shape throughout, the end spurs being of exactly the same shape and dimensions as the intermediate spurs. In Patent No. 408,161, previously referred to, no attempt was made to preserve uniformity in the prongs or spurs and the incomplete or partial prongs or spurs at the opposite ends of the fastener, which were only one-half of the width of base of the intermediate prongs or spurs, were cut off, so as to produce a fastener equally strong throughout.

To produce fasteners of the character shown in Figs. 1, 2, and 4 of the drawings, we employ a die B and a punch C, of a usual construction, adapted to form the prongs or spurs; but instead of feeding the strip or ribbon of metal D, Fig. 1, at right angles to the lines of points on the die and punch we feed the strip or ribbon at an angle corresponding to the angle of inclination of the edges of the prongs or spurs *a* and *a'*. In consequence of this method of feeding the strip or ribbon of metal the edge *d* of said strip or ribbon of metal forms the edge *f* of the prong or spur *a*, and the edge *g* of the strip or ribbon of metal forms the edge *h* of the prong or spur *a'* on opposite sides or ends of the body. The blank, therefore, when it leaves the machine is symmetrical in all respects as far as the prongs or spurs are concerned, and there is absolutely no waste of material. The strip or ribbon of metal D may be fed in any usual manner—as, for instance, by rolls E, intermittently actuated, so as to give time for the action of the punch and die. The particular means for feeding the strip or ribbon of metal forms no part of our present invention and need not be more fully described or illustrated here, as such feeds are old and well known.

The blank shown in Fig. 6 differs only from that shown in Fig. 2 in that the prongs or spurs of the blank are alternately long and short and that the body is in zigzag form in view of the adjacent apexes on each side of said body being staggered. The method for producing this fastener is the same as that described in respect to the fastener shown in Fig. 2, the strip or ribbon D being fed at an angle, as shown in Fig. 5. In said figure the reference-letters *a a'* designate the long prongs or spurs, and a^2 the short prongs or spurs.

While in the preceding examples we have assumed that the ends of the prongs or spurs, as well as the apexes of the interstices, come to a theoretical point, it will be understood that in practice such is not generally the case and that the points are made more or less blunt. The degree of bluntness of the points will determine the angle of the lines connecting the centers of the blunt points of the interstices with respect to the center line of the body. By making the points sufficiently blunt it will be readily understood by reference to Fig. 8 that the parallel lines 11 11 of Fig. 2 will fall together and form one continuous line, thus bringing the points of the prongs or spurs *a a'* on opposite sides of the body directly opposite to each other, as well as the apexes of the interstices. In other words, if the feed of the strip or ribbon of metal were such as to cause the true apexes of the interstices to meet, as indicated by dotted lines in Fig. 8, a blank would be formed having its prongs or spurs directly opposite each other, but having no connecting-body, so that the prongs or spurs would be practically separated or isolated from each other; but if the apexes formed by the cutting edges of the die and punch are made blunt then the blank is formed with a body with the same feed. The blank produced is shown in Fig. 8, where the meeting sides of the prongs or spurs *a a'*, and consequently the apexes *b'*, do not terminate in points, but are somewhat blunt. The width of the body *j* will depend on the degree of bluntness of the prongs or spurs and will be twice the distance from the theoretical apex to the actual apex of the opposite interstices *c*. As before, the edges of the strip or ribbon of metal form one edge of the end prongs or spurs *a a'* at opposite ends and on opposite sides of the body of the blank, and therefore said edges of said prongs or spurs have the same inclination as those of the intermediate prongs or spurs and the fastener needs no trimming whatsoever.

While we have heretofore described the feed of the metal strip or ribbon D as directly in line with the angle of the edges of the prongs or spurs, so as to obtain a perfectly uniform fastener as far as the prongs or spurs are concerned, it is evident that the angle of the feed of the metal strip or ribbon can be changed without materially affecting the commercial value of the fastener. For instance, if, as shown in dotted lines 13 13 in Fig. 1, the strip or ribbon of metal were fed in the direction of such lines instead of being fed as shown by the full lines in said figure then the end prongs or spurs will be slightly cut away, and the amount so cut away will be determined by the angle of the feed. Heretofore, as herein previously described, the feed of the strip or ribbon of metal has been at right angles to the line of points on the die and punch, and therefore the end prongs were very light and weak, and consequently the fastener was weak at the very points where it should be the strongest. The practice has been to cut off these end prongs, and consequently there was some waste of material. We therefore do not wish to restrict ourselves to the feeding of the strip or ribbon of metal at the exact angle of the edges of the prongs or spurs, as it is evident that a slight departure from the same may be made, as before described, and that, in fact, any angle of feed departing from a feed at right angles to the line of points on the die and punch will effect an increase in the width of the end spurs, provided such angle does

not exceed the angle of the edges of the prongs or spurs. It is of course to be understood that the nearer the direction of the feed of the strip or ribbon of metal approaches the angle of said edges of the prongs or spurs the nearer the end prongs or spurs approach the shape or form of the intermediate prongs or spurs; but any angle between the feed at right angles and the inclined feed corresponding to the edges of the prongs or spurs at which the strip or ribbon is fed will cause the end prongs or spurs to have a greater width, and therefore greater strength, than when the strip or ribbon is fed at right angles to the line of points of the die and punch. Therefore by this method of feeding, regardless of the angle of the feed, within limits, an improved form of fastener is produced and one which requires no trimming, while at the same time the end prongs or spurs are substantially as strong as the intermediate prongs or spurs if the angle at which the strip or ribbon of metal is fed is not too small.

In Fig. 8 it is assumed that the blank D is fed at an angle corresponding to the angle of the edges of the prongs or spurs. The feed in this direction naturally leaves projections at the outside apexes b' on opposite ends of the body, which are somewhat objectionable. These may be avoided by changing the angle of the feed, as indicated by dotted lines 16 16 in Fig. 8—that is, by feeding at a smaller angle with the line at right angles to the line of points of the die and punch without waste of material and without appreciably changing the width and strength of the end prongs or spurs.

The object of illustrating the several forms of blanks shown in Figs. 2, 6, and 8 is to show that fasteners of different construction may be produced by the same method. Therefore we do not wish to restrict ourselves to any particular relative length of the prongs or spurs, or to any particular form for the connecting-body from which said prongs or spurs extend, or to the particular form of the apexes, the essential feature of our invention being the production of fasteners with absolutely no waste of material, while preserving a substantially uniform strength of prongs throughout the fastener.

What we claim as new is—

1. The herein-described method for manufacturing blanks for fasteners provided with tapered prongs or spurs on opposite sides of a connecting-body, consisting in feeding the strip or ribbon from which said blanks are made at an angle to the line of points of the die and punch approximating the angle of the tapered edges of said prongs or spurs.

2. The herein-described method for continuously manufacturing blanks for fasteners provided with tapered prongs or spurs on opposite sides of a connecting-body, consisting in feeding the strip or ribbon from which said blanks are made at an angle to the line of points of the die and punch corresponding to the angle of the tapered edges of said prongs or spurs and forming the edges of the alternate end prongs or spurs by the edges of said strip or ribbon, so as to avoid waste of material.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

WILLIAM H. BRISTOL.
EDGAR H. BRISTOL.

Witnesses:
GERTRUDE SNAGG,
GEO. H. BARNES.