

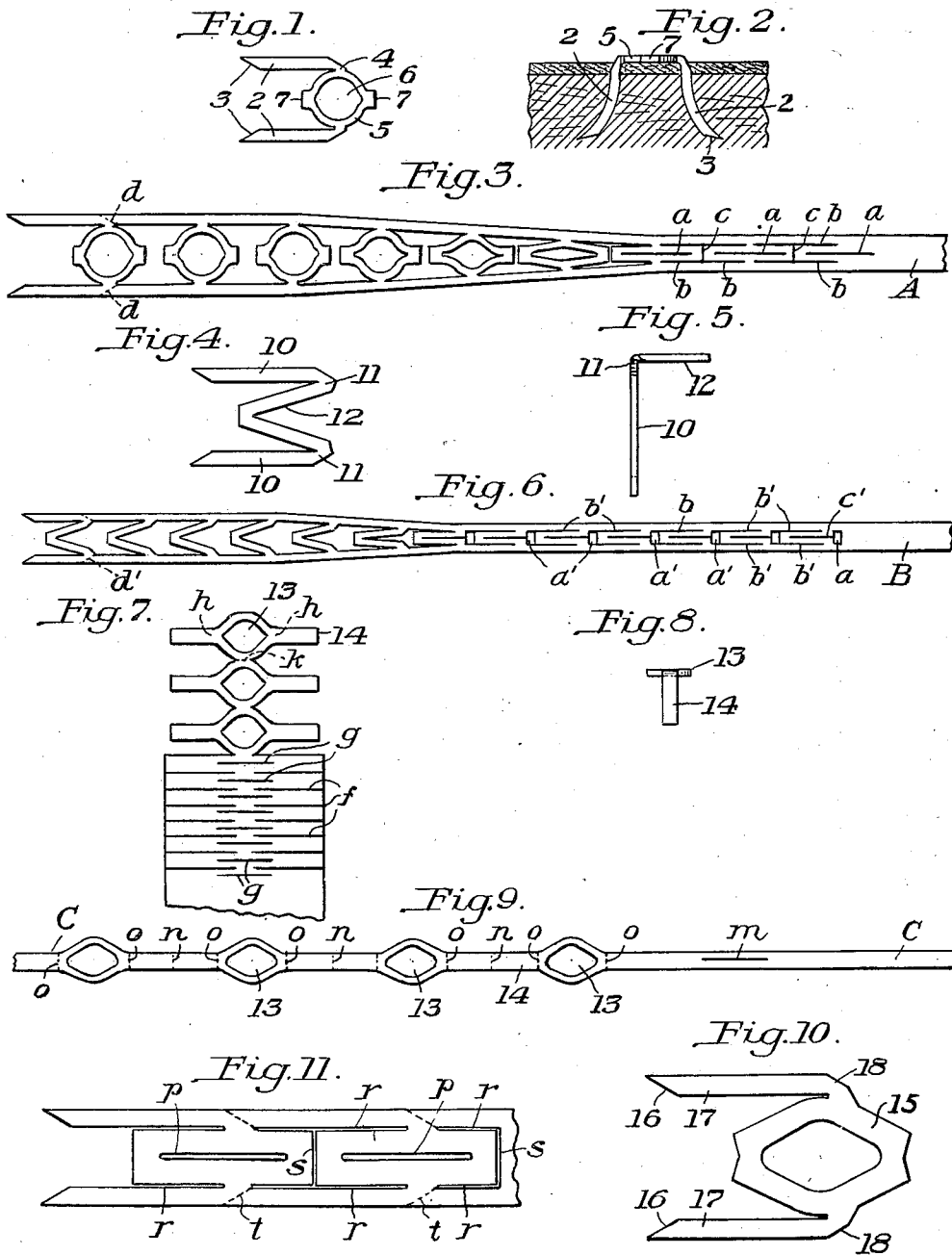
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J. C. LANG

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STAPLE AND METHOD OF MAKING SAME

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INVENTOR

Joseph C. Lang

by his attorneys

Christy, Parnell & Strickland

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STAPLE AND METHOD OF MAKING SAME

Joseph C. Lang, Pittsburgh, Pa., assignor to Bocji Corporation, Pittsburgh, Pa., a corporation of Delaware

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This invention pertains to staples and their manufacture and is for an improved staple and economical and useful way of producing the same.

Ordinary wire staples are unsatisfactory for many uses to which they might otherwise be put due to the fact that the bridge of the staple will cut through the underlying paper or other material into which it is driven, or the bridge has insufficient extended or projected area to satisfactorily accomplish the purpose for which it is intended. One method of avoiding this difficulty is to provide a tilt top staple of the type disclosed in La Place application Serial No. 386,497 filed April 2, 1941, now issued as Patent No. 2,329,440, Sept. 14, 1943, and an improvement in such staples is disclosed in my copending application Serial No. 489,641, filed June 4, 1943. The staples shown in these two prior disclosures effectively provide a large extended area, but they are relatively expensive for the reason that they are stamped from ribbons of sheet metal of a width equal to the full width of the finished staple.

According to the present invention the staple, which may be either a tilt-top staple or a more conventional flat bridge staple is formed from a flat ribbon or strip of metal, but in the process of forming, an expanding operation is effected whereby the head or bridge is expanded considerably beyond the width of the original blank. The staples thus have a substantial overall projected area in the bridge portion thereof while they are lighter in weight than a corresponding solid cut metal staple of like overall area, and there is a very substantial economy of metal.

Likewise the expanded head type of staple and staple strip lends itself to certain improvements in drivers because the openings developed by expansion can be utilized in feeding or indexing devices.

My invention may be more fully understood by reference to the accompanying drawing in which,

Fig. 1 is a plan view of a tilt top staple embodying my invention.

Fig. 2 shows this staple in its driven form.

Fig. 3 shows the development of the staple from strip stock.

Fig. 4 shows in elevation another form of staple in which the bridge is especially formed to be rotated in driving.

Fig. 5 is a side view showing the driven form of this staple.

Fig. 6 shows the development of the staple of Fig. 4 from strip stock.

Fig. 7 is a plan view showing the development of another form of staple.

Fig. 8 shows the driven form of the staple of Fig. 7.

Fig. 9 shows an alternative development of a staple like that shown in Fig. 8.

Fig. 10 is a plan view of another modified form of staple having an expanded head, this form resembling Fig. 1.

Fig. 11 shows the manner of slitting the strip to produce the staple of Fig. 10.

Referring first to Figs. 1, 2, and 3, the staple has two legs 2 with beveled points 3 on their free ends. The tops of the legs are joined by inwardly turned or offset parts 4 to opposite sides of a head portion 5 which is circular or oval with a central opening 6 and a small projection 7 at the middle of each side. As formed, the legs and the head are in a plane, but in the process of driving, the head is turned relatively to the legs through an angle of 90° so that while the legs penetrate the surface into which the staple is driven, the head will be flat against said surface.

As shown in Fig. 3, these staples are successively and progressively formed from a narrow thin strip of metal A. At regular intervals, a longitudinal slit is formed on the center line of the strip. These slits are marked a.

Between each two slits a there is punched an H-shaped slit having side slits b spaced inwardly from but parallel with the edges of the strip and a cross slit c.

The staple is expanded gradually opening up in succession each slit a. This can be accomplished, as is well understood in the art by a succession of punches that tend to widen the slit, spreading the overall width of the strip. As a final operation the legs of one staple are sheared from the head of the next, the legs being cut on the lines d. As is well understood in the art, a gang of punches simultaneously operate on the strip so that as a completed staple is being severed, the initial slitting of the strip is taking place at a preceding station, and the stages of expansion are effected in the intervening stations.

The staple when finished has a width more than twice the width of the original strip. Its head has a large overall area, and, when driven, the head is turned at right angles to the legs. This is clearly shown in Fig. 2.

The staple shown in Fig. 4 is initially in the

form of a letter M. It has two legs 10 connected by portions 11 to a V form of bridge 12. As shown in Fig. 5, when this staple is driven, the part 12 is turned at right angles to the legs 10, the metal being twisted about the parts 11 as an axis.

As shown in Fig. 6, this staple is developed from narrow strips of metal, B. This is accomplished by punching openings *a'* therein at regular intervals and forming parallel slits *b'* extending longitudinally from said openings at each side of the center of the strip. Extending in the opposite direction from the opening almost but not quite to the next preceding opening is a single slit *c'* on the center line of the strip.

After being punched and slit in this manner, the strip is expanded by a succession of suitably formed punches until it has reached its ultimate shape, when it is severed along the lines *d'* to form the beveled shoulders of one staple and the points of the next.

Fig. 7 illustrates the application of my invention to the forming of a different type of staple. In this form a flat strip of metal has slits *f* cut transversely therein from the edges toward but not to the center. These slits on opposite edges are in alignment and they are separated from the next adjacent slit the width of a single staple. On the center line of the strip midway between slits *f* and extending equidistantly from the center of the strip are slits *g*. The metal is expanded by opening up the slits *g* to form an expanded open bridge 13 for the staple. At each end of this bridge the projecting strips 14 form the two staple legs. These legs may be bent down on the line *h* to form the completed staple, shown in elevation in Fig. 8. The expanded strip of staples may be adapted for use in stapling machines of the type using a connected strip of staples, separation of course occurring on the line *k*.

Fig. 9 illustrates another way of forming the staple of Fig. 8, using a long flat wire C. This wire is formed with longitudinally extending slits *m* therein at regular intervals. These slits are then expanded to form the expanded bridge portions 13. Midway between the bridge portions, the strip is severed transversely on lines *n* to form individual staples, the legs being formed by turning down the strip portions 14 on lines *o*. This method is especially adapted for use in so called wire stitching machines.

Figs. 10 and 11 illustrate a modification of the form shown in Figs. 1 to 3, wherein the head of the staple is larger and sturdier but the forming operation is basically the same. The staple is formed from flat strip material by making regularly spaced slits. There is an H shaped slit formed by parallel longitudinal slits *r* and a cross slit *s*. The slit *p* is expanded causing the head 15 of the staple to assume the form shown in Fig. 10. Cuts on the lines *t* form the points 16 on the legs 17 and the beveled shoulders at 18. This staple is a tilt-top staple.

The several embodiments herein illustrated and described show staples having expanded heads or bridge portions designed to give a large holding area with great economy of metal, and lend a unique and important improvement to the art of stapling. It will be understood that the several forms illustrated are merely typical and that various other shapes and modifications are comprehended by my invention. The term "expanded" as used herein and in the following

claims means and is limited to a structure formed by slitting or severing the metal and then opening or spreading the metal that has been so slit or severed to thereby increase the overall surface dimension of the metal, this being the general meaning of the term in the sheet metal art.

This application is co-pending with a companion application Serial No. 554,349, filed September 16, 1944, also disclosing a staple and process of forming the same, wherein the strip metal is slit and stretched transverse to the direction of the slit to form a connected series of staple blanks, the strip thereafter being cut transversely of its length into individual blanks.

I claim:

1. The method of making staples from a strip of sheet metal which comprises slitting the metal to define leg portions and a head portion, slitting the metal which constitutes the head portion of the staple, and then stretching the metal lying between the leg portions to slit to expand the head portion thereof.

2. The method of making staples which comprises slitting a strip of flat sheet metal to define the two leg portions of the staple and to define a head portion, forming a longitudinal slit in the head portion by opening said slit in the head portion and increasing the distance between the legs, then stretching the head portion, and thereafter severing the staple from the strip.

3. The method of making staples which comprises slitting a strip of metal longitudinally at regular intervals parallel with the side edges of the strip and at each side of the longitudinal center of the strip, slitting of the strip at regular intervals along the longitudinal center thereof in staggered relation to the slits along the edges, and then stretching the strip laterally whereby there is produced a succession of staple blanks having expanded heads and leg portions at each side of the heads, and then severing the successive staple blanks.

4. The method of forming staples from a strip of sheet metal which comprises progressively slitting the sheet metal at regular intervals along its longitudinal axis, also slitting the metal at regular intervals at each side of its longitudinal axis and in staggered relation to the first slits, cutting a slit crosswise of the strip to connect the said last-named slits on opposite sides of the strip, said connecting slits being between successive slits on the center line, and then stretching the strip which is so slit in a direction transverse to its length to form a connected succession of staple blanks having spaced legs and expanded head portions.

5. The method of making expanded staples from a narrow strip of sheet metal which comprises progressively slitting the strip at regular intervals with substantially H-shaped slits, also progressively slitting the strip at regular intervals with longitudinally extending slits on the center line of the strip, said last-named slits being symmetrically alternated in overlapping relation with the H-shaped slits, and progressively stretching the slitted portions of the strip transversely of the longitudinal axis thereof to form a connected series of staple blanks.

6. The method of forming staples which comprises slitting a strip of metal transversely at regular intervals from the edges toward the center, also slitting the strip transversely from the center toward the edges with the first and second slits alternated the two series of slits being of such length that they overlap, then stretch-

ing the last-named slit to thereby form a staple having an expanded head with a leg portion at each end of said head.

7. The method of making a strip of connected staple blanks from a narrow strip of metal which comprises slitting the metal along its center line at regular intervals and slitting the metal at each side of the center line at regular intervals, with the second slits being staggered in relation to the first, and with the second slits being connected by a transverse slit, and then stretching the metal to expand the slits along the center line to form expanded head portions for the staples with parallel leg portions at each side of each such head portion, the overall width of the expanded strip being greater than the width of the strip initially.

8. The method of forming a strip of M-shaped staple blanks, each blank having two leg forming portions and a bridge portion, which comprises perforating a narrow strip of metal at regular intervals along its length, forming a slit on the center line of the strip extending in the one direction from each perforation toward, but not into the next adjacent perforation, forming slits at each side of the center line extending from each perforation in the opposite direction from said first slit toward, but not to, the next adjacent perforation the two series of slits overlapping, and then stretching the strip which is so slit transversely of its length to produce a connected series of M-shaped staple blanks.

9. The method of making staple blanks from a flat sheet metal strip which comprises forming pairs of slits in the strip at intervals therealong parallel and adjacent to the edges thereof alternated with slits lying along the center, at least two ends of said pairs of slits overlapping at least one end of the slits lying along the center, stretching the strip transversely of such center slits to produce a succession of staple blanks each of which has two leg portions resulting from the pairs of slits and an expanded head portion resulting from a slit lying along the center.

10. As a new article of manufacture, a staple having two leg portions and an intervening head portion, said head having been formed by providing a slit in a strip of metal and then separating by stretching and spreading one side of the

slit from the other, whereby waste in forming the staple is substantially eliminated, the grain structure in the major portion of said head extending at an angle to the grain structure in said legs.

11. As a new article of manufacture, a staple having two leg portions and an intervening head portion, said head having been formed by providing a slit in a strip of metal and then separating by stretching and spreading one side of the slit from the other, said legs having been formed by providing parallel slits adjacent the edges of said strip and then separating by stretching and spreading one side of said last named slits from the other, whereby waste in forming the staple is substantially eliminated, the grain structure in the major portion of said head extending at an angle to the grain structure in said legs.

12. As a new article of manufacture, a staple having two leg portions and an intervening head portion, said head having stretched apart integral portions, whereby a staple of substantial width is formed from a strip of sheet metal of relatively narrow width without waste, the grain structure in the major portion of said head extending at an angle to the grain structure in said legs.

13. As a new article of manufacture, a staple-like fastener having a bridge and legs, the fastener being constituted of stretched strip metal with the legs comprising the original marginal edges of the strip, the bridge including stretched apart integral portions that lie apart a distance greater than the original width of the strip, the grain structure in the major portion of said head extending at an angle to the grain structure in said legs, whereby waste in forming the staple is substantially eliminated.

14. As a new article of manufacture, a staple-like fastener having legs and a bridge portion, the legs being comprised of edge portions of a piece of strip metal, the bridge being comprised of a central portion of said strip of metal which has been slit and separated by stretching to expand it transversely of the length of the strip, the grain structure in the major portion of said head extending at an angle to the grain structure in said legs, whereby waste in forming the staple is substantially eliminated.

JOSEPH C. LANG.