

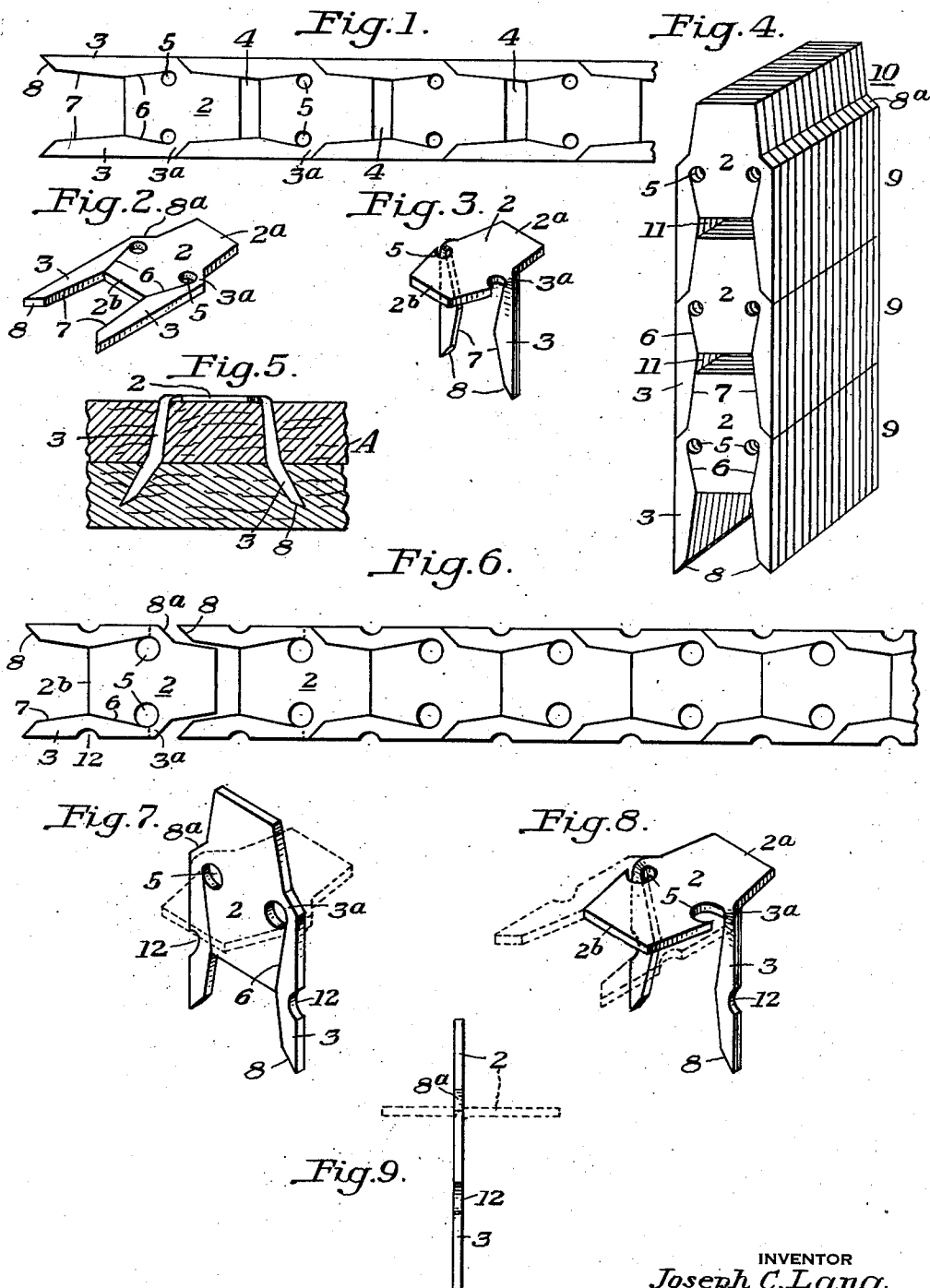
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STAPLE

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STAPLE

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This invention relates to improvement in staples, and more particularly staples of the kind sometimes referred to as "tilt-top" staples, and is for an improvement in the invention disclosed in the application of Desmond R. La Place, Serial No. 386,497, filed April 2, 1941, now issued as Patent 2,329,440, granted September 14, 1943.

In the said application there is disclosed a staple having two generally parallel legs with an ovalar disk-like head, the tops of the legs being joined to the sides of the disk-like head through laterally inwardly turned pivot or trunnion portions. Originally the head and the legs are in the same plane. This is to enable the staples to be compactly packaged and easily handled in the magazine of a driving tool. As the staple is being driven, the disk-like head is rotated through an arc 90° to the legs so that instead of standing edgewise, it rests flat on the surface to be driven. Such a staple is especially useful for holding down roofing paper, paper siding, or in other places where it is desired to have a relatively large projected area on the staple to prevent it from cutting through or easily tearing the surface material which it engages.

The present invention is an improvement, first in that it provides a staple wherein the metal which joins the head and legs is bent instead of twisted. This makes the staples less subject to breakage when they are being driven. Next it provides a staple which may be blanked from a ribbon of sheet metal with a minimum wastage of material. In addition to these advantages, the staples of the present invention may be closely nested for packaging.

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

Fig. 1 is a plan view indicating the manner of blanking out the staples from a ribbon of metal.

Fig. 2 is a perspective view of a single staple in its original form.

Fig. 3 is a view similar to Fig. 2 showing the position of the parts in a staple after being fully driven.

Fig. 4 is a perspective view of a package or "biscuit" of staples made according to Fig. 2, showing the manner in which several rows of staples may be stacked or nested.

Fig. 5 shows the manner in which the staple actually penetrates the wood into which it is driven.

Fig. 6 is a plan view similar to Fig. 1 showing a modified construction.

Fig. 7 is a perspective view of a single staple of the form shown in Fig. 6.

Fig. 8 is a perspective view similar to Fig. 7, but with the staple parts in the position which they assume after the staple is driven.

Fig. 9 is a side elevation of the staple shown in Figs. 6 and 7.

Referring first to Figs. 1 to 5 inclusive, the staples are intended to be blanked or stamped from a ribbon of metal of a width equal to the width of the finished staple and of approximate thickness and indefinite length. Each staple has a generally flat oblong head portion 2 and two leg elements 3. As originally blanked from the strip, the head and legs are formed first by completely cutting out or punching rectangular openings 4 in the blank at regular intervals and punching two small holes 5 in the strip, one at each side of the longitudinal axis of the strip and close to midway between the openings 4, although as shown in Fig. 1, slightly to the left of the exact mid-position. The strip is cut along lines 6 leading from the two corners of the rectangular openings 4 to each of the holes 5. The metal is likewise cut along lines 7 from the other two corners of openings 4 in a direction toward the left as viewed in Fig. 1 to a point close to but spaced from the next pair of holes 5 on the left, and at this point the kerf lines turn sharply toward the edges of the strip, as indicated at 8.

Thus, it will be seen that in forming the staple from strip stock, the legs of one staple are cut in part from the metal at each side of the strip, forming one end, 2a of the head of the preceding staple, and the upper parts of the legs of each staple are separated from the head portion 2b by kerfs or slits 6. The top parts of the legs 3 merge into the sides of the heads through narrow portions 3a formed between the holes 5 and the inclined shoulders 8a formed by the kerfs or slits 6, the forming of the sloped shoulders on one staple producing the points of the legs of the next succeeding staple.

The longitudinal axis of the legs are parallel, as are the outer side edges of the legs, but the legs are of upwardly increasing width to a point intermediate their length and from the point of maximum width, taper upwardly toward the narrow connecting portions 3a. This shape of leg is strong and increases the holding power of the fully driven staple.

As shown in Fig. 4, the staples may be arranged in rows 9 and the rows nested to form a biscuit or unit charge 10. The staples nest closely, one on top of another because they fit together in the same way as they are cut from the strip, i. e., with the points of the legs on the sloped

shoulders 8a of the underlying staples and the head portion 2a between the legs of the staple above. In the package or biscuit, the staples are adhesively joined, as is well understood in the art, and the purpose of blanking out the staples with rectangular openings 4 is to provide, in the package or biscuit of staples, a clearance space 11 between the tops of the heads of one row of staples and the lower edge of the heads of the next succeeding row. This enables a support or separation in the driving tool to separate and hold the rows of staples which is being used from the remainder of those in the biscuit.

When the staple is used in a driver of appropriate design, the legs of the staple are confined in the staple guides at each side of the driver. The head parts, being narrower, are clear of the guides. An appropriate driver of the general type required is shown in La Place application Serial No. 386,498, filed April 2, 1941. Pressure is first applied to the upper edge of the head 2. This causes the head to rotate to the position shown in Fig. 3, and during this turning of the head there will be some, but little, penetration of the legs into the surface into which the staple is being driven. After the head has been turned to the position shown in Fig. 3, the driving takes place in the usual way and when the staple is fully driven the head is flat on the surface into which the staple has been driven and cannot then pivot to turn back up into its original plane. It will be noted that due to the diagonal disposition of the connector portions 3a, the metal folds over when the head rotates, instead of twisting as in the La Place application first referred to. This is due to the fact that while the straight outer edges of the legs are in the staple guides of the driving tool, the diagonal portions 3a clear the guides and can bend as a part of the head. The holes 5 facilitate the bending as well as facilitating the forming of the kerfs 6.

Due to the shape of the legs, particularly the gradual increase in the width of the legs from the points upwardly to an intermediate point, there is a tendency for the legs to spread apart as the staple is driven, so that, having once been driven, it holds very effectively. This is illustrated in Figure 5, where A designates a body of wood into which the staple is driven.

The head of the driven staple provides a large projected area for holding roofing or other paper on a structure, and the two pointed fastener will better resist forces, such as wind, tending to pull the paper off. The legs, being cut surfaces, will hold more than the usual wire nails of corresponding length, and the shape of the legs increases their holding power.

In the modification shown in Figures 6 to 9 inclusive, the staple is much the same as previously described, and corresponding reference numerals designate corresponding parts. In this form, the staple is blanked without forming the open spaces 4, producing a longer head. These staples can be used in single rows, or if they are put up into a biscuit or stacked package similar to Figure 4, notches 12 may be formed in the exterior of the legs at their widest points. These notches are provided for engagement with a magazine element that engages in the notches of one row of staples to break it loose from another row and thereafter support the separated row out of contact with the other rows so that it may be consumed. In both of the illustrated forms of the invention the two legs extend along each side of the head, being in tangential relation

to the head, but at their upper ends the legs join directly to and merge into the head, the portions 3a designating the point where the head and legs merge. In both forms the metal between the leg and the head defined by the cut or kerf 6 forms a bifurcation between the leg and the head. When the top of the staple is rotated from the plane of the staple to its flat position as shown in Figs. 3 and 8, the axis of rotation extends transversely from the inner end of this bifurcation across the legs of the staple whereby the rotation and bending takes place without twisting of the metal. The bending of the metal, instead of twisting, as disclosed in La Place Patent 2,329,440 is of great importance because it enables the staple to be made from a cheaper quality of steel and avoids the likelihood of breakage which is likely to occur where the metal is twisted. While the openings 5 at the inner end of the bifurcation are desirable to facilitate slitting of the metal to form the slits or kerfs 6, they are not necessary to a satisfactory functioning of the tilt-top staple.

While I have shown and described certain embodiments of my invention, it will be understood that various changes and modifications may be made within the contemplation of my invention and under the scope of the following claims.

I claim as my invention:

1. A sheet metal staple of the tilt-top type having a head portion and having two legs, one of which is attached to each side of the head portion intermediate the top and bottom thereof, the top of each leg being downwardly and outwardly sloped, there being a perforation through the staple downwardly and inwardly from each of said sloped portions, the perforations being at the juncture of the legs and the head.

2. A sheet metal staple having a head portion and having two legs, one of which is attached to each side of the head portion, the top of each leg being downwardly and outwardly sloped, there being a perforation through the staple downwardly and inwardly from each of said sloped portions, the perforations being at the juncture of the legs and the head, the lower portion of the head being separated from the legs by slits extending from the perforations to the lower edge of the head, the lower edge of the head being intermediate the top and bottom of the legs.

3. A sheet metal staple having a head portion and having two legs, one of which is attached to each side of the head portion, the top of each leg being downwardly and outwardly sloped, there being a perforation through the staple downwardly and inwardly from each of said sloped portions, the perforations being at the juncture of the legs and the head, the lower portion of the head being separated from the legs by slits extending from the perforations to the lower edge of the head, the lower edge of the head being intermediate the top and bottom of the legs, the slits converging downwardly whereby the head is narrower at its lower edge than at the transverse line where it is joined to the legs and the legs are wider at the point which coincides with the bottom edge of the staple than they are at the upper ends of said slits.

4. A sheet metal staple having a head portion and having two legs, one of which is attached to each side of the head portion, the top of each leg being downwardly and outwardly sloped, there being a perforation through the staple downwardly and inwardly from each of said sloped portions, the perforations being at the juncture of the legs

and the head, the lower portion of the head being separated from the legs by slits extending from the perforations to the lower edge of the head, the lower edge of the head being intermediate the top and bottom of the legs, the slits converging downwardly whereby the head is narrower at its lower edge than at the transverse line where it is joined to the legs, and the legs are wider at the point which coincides with the bottom edge of the staple than they are at the upper ends of said slits, the legs of the staple decreasing in width from such side part toward the lowermost ends thereof whereby the legs have a maximum width in the vicinity of the lowermost edge of the head portion.

5. A sheet metal staple having a head portion and having two legs, one of which is attached to each side of the head portion, the top of each leg being downwardly and outwardly sloped, there being a perforation through the staple downwardly and inwardly from each of said sloped portions, the perforations being at the juncture of the legs and the head, the lower portion of the head being separated from the legs by slits extending from the perforations to the lower edge of the head, the lower edge of the head being intermediate the top and bottom of the legs, the slits converging downwardly whereby the head is narrower at its lower edge than at the transverse line where it is joined to the legs and the legs are wider at the point which coincides with the bottom edge of the staple than they are at the upper ends of said slits, the legs of the staple decreasing in width from such side part toward the lowermost ends thereof whereby the legs have a maximum width in the vicinity of the lowermost edge of the head portion, the upper part of the head of each staple above the legs having inwardly converging sides, the slope of which corresponds to the shape of the space between the legs below the bottom edge of the head whereby one staple may be nested above another with the upper portions of the heads fitting closely between the legs of the staple nested above it.

6. A sheet metal staple having a head portion and having two legs, one of which is attached to each side of the head portion, the top of each leg being downwardly and outwardly sloped, there being a perforation through the staple downwardly and inwardly from each of said sloped portions, the perforations being at the juncture of the legs and the head, the lower portion of the head being separated from the legs by slits extending from the perforations to the lower edge of the head, the lower edge of the head being intermediate the top and bottom of the legs, the slits converging downwardly whereby the head is narrower at its lower edge than at the transverse line where it is joined to the legs and the legs are wider at the point which coincides with the bottom edge of the staple than they are at the upper ends of said slits, the legs of the staple decreasing in width from such wide part toward the lowermost ends thereof whereby the legs have a maximum width in the vicinity of the lowermost edge of the head portion, the upper part of the head of each staple above the legs having inwardly converging sides, the slope of which corresponds to the shape of the space between the legs below the bottom edge of the head whereby one staple may be nested above another with the upper portions of the heads fitting closely between the legs of the staple nested above it, the legs of each staple having a notch at the

outer edge thereof intermediate the top and the bottom.

7. A sheet metal staple having a head portion and having two legs, one of which is attached to each side of the head portion, the top of each leg being downwardly and outwardly sloped, there being a perforation through the staple downwardly and inwardly from each of said sloped portions, the perforations being at the juncture of the legs and the head, the lower portion of the head being separated from the legs by slits extending from the perforations to the lower edge of the head, the lower edge of the head being intermediate the top and bottom of the legs, the slits converging downwardly whereby the head is narrower at its lower edge than at the transverse line where it is joined to the legs, and the legs are wider at the point which coincides with the bottom edge of the staple than they are at the upper ends of said slits, the legs of the staple decreasing in width from such wide part toward the lowermost ends thereof whereby the legs have a maximum width in the vicinity of the lowermost edge of the head portion, the upper part of the head of each staple above the legs having inwardly converging sides, the slope of which corresponds to the shape of the space between the legs below the bottom edge of the head, whereby one staple may be nested above another with the upper portions of the heads fitting closely between the legs of the staple nested above it, the overall length of the head being slightly less than the overall length of the staple, whereby, when the staples are so nested, there is a space between the top edge of the head of one staple and the bottom edge of the staple nested above it and the lower ends of the legs of one staple rest on said inclined shoulders of the staple below it.

8. A sheet metal staple having an oblong head portion and a leg attached to each side of the head intermediate the top and bottom, the legs extending along the side edges of the lower portion of the head and projecting beyond the bottom edge of the head, the head being separated from the legs by slits which define the contour of the lower portion of the head and the upper portion of the legs, said slits terminating adjacent the top of the legs in perforations.

9. A sheet metal staple having two legs separated by an intervening head portion, the lower part of the head being defined by slits which extend between the legs and the head to an intermediate point on the head, said slits terminating at their upper ends in perforations in the staple, the metal above said perforations forming connections between the legs and the head.

10. A staple blanked from sheet metal and having a head portion and two legs all in the same plane, the head being adapted to be turned through an arc of 90° during driving, said staple having the legs thereof joining the head at opposite sides of the head, the lower side edges of the head being separated from the legs by slits cut between the legs and the head, these slits terminating at and defining the points of juncture between the head and the legs.

11. A staple blanked from sheet metal and having a head portion and two legs all in the same plane, the head being adapted to be turned through an arc of 90° during driving, said staple having the legs thereof joining the head at opposite sides of the head, the lower side edges of the head being separated from the legs by slits cut between the legs and the head, these slits terminating at and defining the points of juncture

between the head and the legs, there being perforations at the inner ends of the slits, the upper side edge portions of the head being of a shape to fit within the lower portions of the legs of a like staple.

12. A staple blanked from a ribbon of sheet metal having a wide flat head and leg portion attached to the head, one at each side thereof intermediate the top and bottom edges of the head with the grain of the metal running lengthwise of the head and legs and wherein the legs of one staple are complements of the head of another, whereby when such staples are nested in end to end relation the upper portions of the head of one staple fit closely between the legs of another, the outer edges of the legs being straight and being the original edge portions of the strip from which the staple is blanked, the inner edges of the legs being sloped in opposite directions from an intermediate point whereby the legs are widest at said intermediate point and taper in width toward their upper and lower ends, the heads being generally hexagonal in

shape, there being perforations through the head of each staple at the points of juncture between the head and the leg to provide a bendable connection between the head and the leg.

13. A staple of the tilt-top type formed of sheet metal and having an enlarged head portion disposed between a pair of legs, the legs and head being in a common plane, the legs being tangentially disposed with respect to the head and being joined at their upper ends directly to the head and merging into the head, the metal between the inner edge of each leg and the head forming a bifurcation to provide the separation between the head and the leg, the head being adapted to be rotated when it is driven to a position 90° from the plane of the legs, the axis of rotation extending transversely from the beginning of the bifurcation where the leg and the head merge across the leg, whereby upon the turning of the head of the staple the metal at the upper part of the leg is bent and twisting of the metal is avoided.

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