Feb. 22, 1966 M. S. BRADWAY 3,236,142

STAPLES WITH FIN-LIKE PROJECTIONS

Filed April 22, 1965

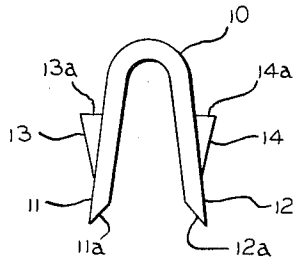

FIG. 1

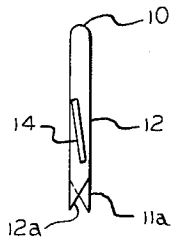

FIG. 2

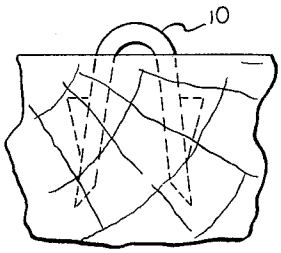

FIG. 3

FIG. 4

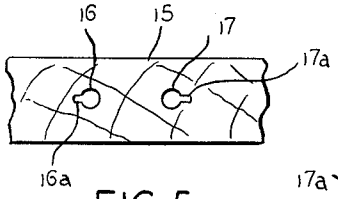

FIG. 5

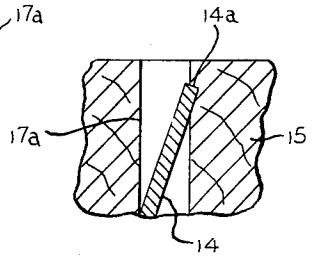

FIG. 6

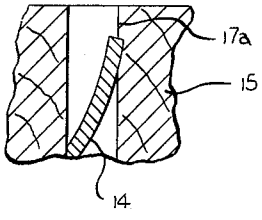

FIG 7

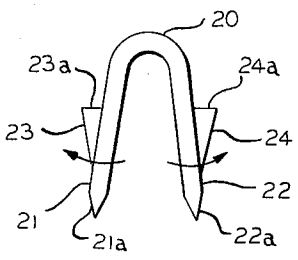

FIG. 8

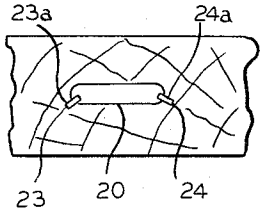

FIG. 9

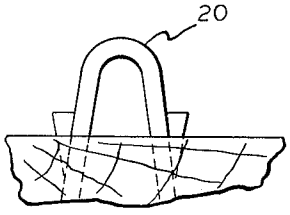

FIG. 10

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STAPLES WITH FIN-LIKE PROJECTIONS

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3 Claims. (Cl. 85—49)

This application is a continuation-in-part of applicant co-pending application Serial No. 231,072, filed October 17, 1962 which is now abandoned.

The present invention is directed to the art of staples, such as, for example, those used with fence posts and the like.

The major purpose of the present invention is the creation of a staple with simple and inexpensive means for increasing the holding power of such staples through use of novel fin-like projections which develop rotating and distorting forces in the staple and fins to create the increased holding power when the staples are embedded in wood or other materials, other objects and purposes being more fully apparent in the course of the ensuing specification and claims, when taken with the accompanying drawings, in which:

FIGURE 1 is a front view of a typical staple formed in accordance with the present invention;

FIGURE 2 is a side view of the staple illustrated in FIGURE 1;

FIGURE 3 is a front view of the staple illustrated in FIGURE 1 and showing its position when embedded in wood;

FIGURE 4 is a perspective view of one element utilized in the staple illustrated in FIGURES 1 and 2;

FIGURE 5 is a diagrammatic illustration of the hole forming action of the staple of FIGURES 1, 2, 3 and 4 when driven into a wood or wood-like material;

FIGURE 6 is a diagrammatic view illustrating an operative condition of the element illustrated in FIGURE 4;

FIGURE 7 is a diagrammatic view similar to FIGURE 6 but illustrating another operative condition of the element illustrated in FIGURE 4;

FIGURE 8 is a front view of a modified form of the invention;

FIGURE 9 is a diagrammatic illustration of the action of the staple illustrated in FIGURE 8 when driven into some wood or wood-like material; and

FIGURE 10 is a front view of the staple herein illustrated and described when partially driven into its holding material.

Like elements are designated by like characters throughout the specification and drawings.

With particular reference now to the drawings and in the first instance to FIGURE 1, the numeral **10** designates the bight portion of a more or less conventional inverted U-shaped type of staple. As illustrated in the drawings the staple is formed from a wire-like metal material of generally circular cross section having spaced and depending legs **11** and **12**, which as shown may diverge slightly from the top to the bottom of the staple, although they may be disposed essentially parallel, all as is well known in the staple art. The material of the staple is of one of the conventional staple materials which are somewhat springy and resilient. Spring steel is one example, although materials less resilient may be used. The bottoms of the staple legs **11** and **12** are provided with the customary points **11***a* and **12***a* which may be beveled as is illustrated in FIGURES 1 and 2.

In accordance with the invention, small fins **13** and **14** are positioned on each of the staple legs **11** and **12**.

Fins **13** and **14** have a thickness less than the thickness of the staple legs **11** and **12** and are preferably positioned approximately midway of the entire length of the staple legs, as is illustrated in the drawings. Fins **13** and **14** are provided with shoulders **13***a* and **14***a*, respectively,

which shoulders extend generally transversely to and outwardly from the axes and material of the legs **11** and **12**. Fins **13** and **14** are more or less triangularly formed as is particularly seen in FIGURE 4 and may be substantially flat. The outer edges converge with the axes of the legs from the outermost corners of the shoulders to points nearer the pointed ends of the legs. These fins **13** and **14** are positioned so that they are inclined to the plane defined by the axes of the staple legs **11** and **12**, as is particularly seen in FIGURE 2. The inclination of the fins **13** and **14** is relatively shallow with respect to such a plane and may be on the order of approximately 10 to 20 degrees. The inclination is such that the general plane defined by the fins passes through substantially the entire leg from the top to the bottom thereof.

The fins are sufficiently thin that they are capable of some distortion with respect to their original positions when the staple is driven into an embedding object as illustrated in FIGURE 3.

When the points on the lower ends of the staple legs are made by beveling, as illustrated in FIGURES 1 and 2, it is preferable to position each fin so that its inclination is opposite to the general direction of the inclination of the bevel, as is seen particularly in FIGURE 2, Thus, when the staple is driven into some wood-like material, as illustrated in FIGURE 3, the beveled surfaces at the points of the staples may tend to force the staple legs one way, while the inclination of the fins **13** and **14**, being opposite to the inclination of the bevel, tends to stabilize or counteract this effect, thus tending to hold the entire staple body in a direction normal to the surface of the material in which the staple is being embedded.

The fins **13** and **14** may be fixed to the staple legs as through some welding process or in some instances, the fins, being relatively thin, with respect to the thickness of the staple legs, may be simply stamped from the material of the staple legs through the use of suitable dies.

When the staple is driven into its embedding material, as in FIGURE 3, the stape legs create the entry holes **16** and **17**. At the same time fins **13** and **14** create small lots which extend outwardly and more or less radially from the entry holes **16** and **17** for the staple legs. In some cases, as for example, with soft woods, the action of the fins may be to form enlarged slots as is illustrated in FIGURES 6 and 7, due to the fact that the downward movement of the fins more or less compresses the wood fibers. When the staple is embedded in its holding material, as for example, the wood illustrated at **15** in the drawings, the shoulders **13***a* and **14***a* of the fins tend to be opposed to the side surfaces of the entry slots. Thus, any force tending to pull the staple outwardly from its embedding material tends to pull the shoulders of the fins into a tight "biting" relation to the embedding material, as is illustrated in FIGURE 6. The fins **13** and **14** are sufficiently thin that they may become distorted somewhat, during entry into the holding material and/or during application of a withdrawal force, as is illustrated more or less diagrammatically in FIGURE 7. Thus, with or without distortion of the fins, the fins tend to bite into the embedding material and oppose withdrawal of the staple from the material.

In FIGURE 8, for example, a stape similar in general outline to that illustrated in FIGURES 1 and 2 is shown with the bight portion of the staple being designated at **20** and the legs thereof designated at **21** and **22**. The points of the staple are rounded and are designated at **21***a* and **22***a*. Fins **23** and **24** are positioned on the legs **21** and **22**. These fins are, as shown, substantially identical to the fins **13** and **14** illustrated in FIGURES 1 and 2 and are provided with the characteristic shoulders **23***a* and **24***a* extending outwardly from the legs, and with the outer edges of the fins tapering or converging to a point

of coincidence with the legs. Fins **23** and **24** are each inclined to the plane defined by the axes of the staple legs and to the axis of the leg on which they are formed. The fins may be inclined in the same directions or in opposite directions. Fins **23** and **24** should be positioned above the points of the legs or generally medially thereof, so as to allow entry of the pointed ends of the staple legs into an embedding material before the fins **23** and **24** start into such material. Fins **23** and **24** are inclined slightly to the axes of the legs and to the plane defined by such axes on the order of 10 to 20 degrees as with the case of the fins illustrated in FIGURE 2.

The inclination and thickness of the fins in all cases are such that as the staple is driven into its embedding material and the fins commence entry into the embedding material, as is illustrated in FIGURE 10, the inclination of the fins **13** and **14** or **23** and **24** imparts a twisting force to each of the legs **11** and **12** or **21** and **22**, respectively. This twisting force is such as to twist each of the legs **21** and **22** against the bight portion, as is particularly illustrated in FIGURE 9, wherein the fins **23** and **24** are shown twisted so that the top portions thereof, or the shoulders **23***a* and **24***a* are disposed out of their customary position. Thus, the legs are rotated against the resistance and resilience of the bight portion of the staple. When the staple is fully embedded, the resiliency of the staple material tends to cause a counter rotation of the legs so as to attempt to restore the initial position of the staple legs. This counter rotation force tends to force the fins tightly against the walls of their entry slots so as to cause the shoulders thereof to bite into the walls of their entry slots, all as is represented in FIGURE 6.

The outer edges of the fins, which lead from the outer extremities of the shoulders to points of coincidence with their associated legs, may be sharpened so as to enhance their entry into the holding material.

Any deformation of the staple legs themselves, as the staple is being driven into the embedding object, will further enhance the holding action of the fins **13** and **14**, or **23** and **24**, inasmuch as deformation of the legs tends to create a nonlinear entrance hole for the staple legs, all of which enhances the holding action of the fins when a removal force is applied to the staples.

The fins are preferably less than one-half the thickness (or diameter) of the staple legs. In those cases where the legs of the staple are slightly divergent in the initial, unembedded position, as illustrated in FIGURES 1 and 8, spreading of the legs at or near the bight portion, as often occurs during the driving process when the bight portion is adjacent the surface of the embedding material, tends to cause an outward expansion of the embedded fins into the holding material. This further aids the holding power of the staple.

Whereas, I have shown and described an operative form of the invention, it should be understood that this

showing and description thereof should be taken in an illustrative or diagrammatic sense only. There are many modifications in and to the invention which will fall within the scope and spirit thereof and which will be apparent to those skilled in the art. The scope of the invention should be limited only by the scope of the hereinafter appended claims.

I claim:

1. A staple including a body of resilient wirelike material formed into a generally inverted U-shaped form with a pair of legs extending from a bight portion, the outer ends of the staple legs being pointed, each of said staple legs having fins positioned generally medially thereof, each of said fins having a thickness less than the thickness of said legs, each of said fins having a shape such as to present a shoulder extending outwardly from the material of the legs while facing in the direction of said bight portion and an outer edge converging from said shoulder to a point of coincidence with said legs at a point nearer the pointed ends of said legs than said bight portion, each of said fins being inclined to the general plane defined by the axes of the staple legs, said fins having a thickness and inclination such as to cause a partial rotation of said legs and develop twisting forces in said bight portion when said legs are driven into a holding material, the resiliency of said body being such as to cause resisting rotational forces in said legs but in the opposite direction from said twisting forces and thereby cause said fins to dig into said holding material when said legs and fins are in said holding material.

2. A staple as recited in claim **1** wherein said body and legs are shaped to cause outward expansive forces to be imparted to said legs when the legs are driven into a holding material.

3. A staple as recited in claim **1** wherein said fins are inclined to said plane by an amount such that the general plane defined by each fin passes through substantially its entire associated leg from the top to the bottom thereof.

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CARL W. TOMLIN, *Primary Examiner.*