

June 13, 1944.

H. S. HELLER

2,351,045

STAPLE

Filed June 25, 1942

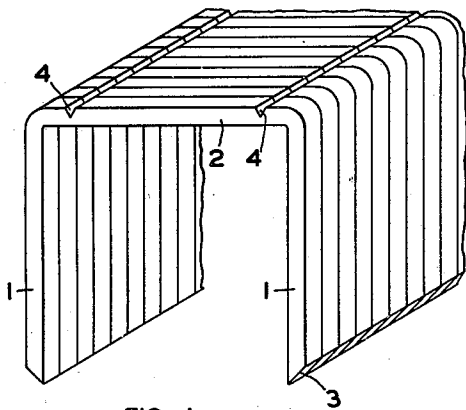


FIG.-1

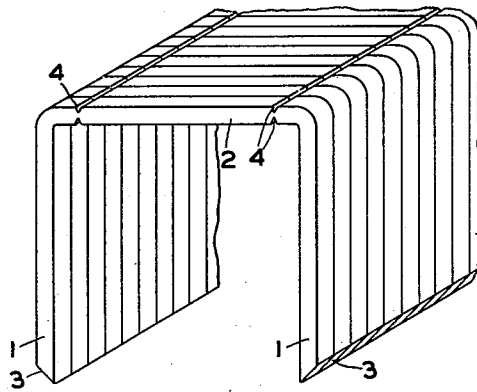


FIG.-2

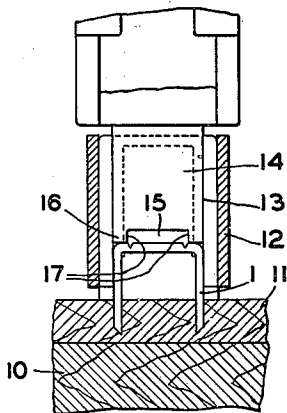


FIG.-3

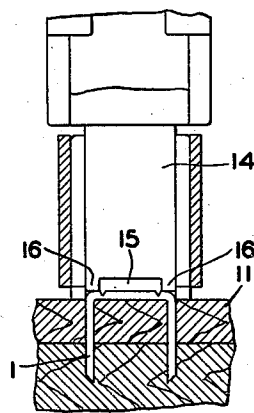


FIG.-4

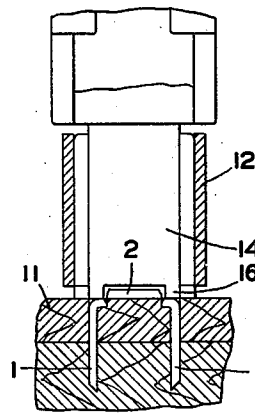


FIG.-5

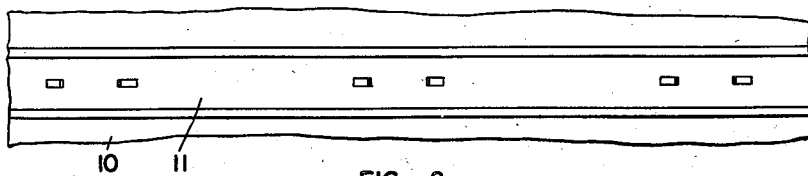


FIG.-6

INVENTOR
HAROLD S. HELLER
BY *Hyde and Meyer*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,351,045

STAPLE

Harold S. Heller, Cleveland Heights, Ohio

Application June 25, 1942, Serial No. 448,361

1 Claim. (Cl. 85—49)

This invention relates to staples, and more particularly to wire staples of the kind used in hand operated stapling machines.

One object of the invention is to provide an improved staple which may be made from a long length of any form of wire of uniform cross section from end to end, and which hence is relatively inexpensive, but which staple has its cross bridge or crown piece weakened at two points near to but spaced slightly from the ends of the staple legs, so that upon driving the staple by pressure or impact applied at the upper ends of its legs, the legs, together with a short portion of the crown for each thereof, are driven in to the work sufficiently to sever the crown at the weakened portions.

A further object is to provide an improved staple of generally U-form which may be made of wire and which in use is converted in effect into two headed brads wholly free of attachment to each other and driven into the work in definite spaced relation to each other.

A further object is to provide an improved, staple capable of use in two ways, either as an ordinary staple for use with ordinary stapling machines in the usual way, or with a special stapling device or in a special way in such manner as to convert the staple into two headed brads always driven into the work in the same spaced relation to each other.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawing, Fig. 1 is a perspective view, illustrating a gang of one form of staple embodying the invention;

Fig. 2 is a similar view illustrating another form of staple;

Fig. 3 is a sectional elevation, illustrating an early stage of the staple driving operation;

Fig. 4 is a similar view, illustrating a later stage of the operation;

Fig. 5 is a similar view showing the driving operation completed; and

Fig. 6 is a plan view of the completed work.

My improved staple has been so constructed and arranged that it may be used alternatively in either of two ways, first, when driven with an ordinary stapling machine of the proper size, as an ordinary U-form staple with its leg ends clinched or not, as may be most desirable, and, second, when driven with a machine specially designed for the purpose, as a special staple converted by the driving operation into two headed brads free of connection with other and yet

located on the work in definite spaced relation to each other on account of their earlier physical connection or attachment. The desired result may be accomplished in several ways, so long as certain of the problems arising in this kind of work are taken into consideration.

The staples shown in Figs. 1 and 2 are of the usual U-form each comprising two parallel legs 1 connected by a cross bridge or crown piece 2. Such staples are usually made from a long piece of wire fed to a forming machine in which short pieces of appropriate length are cut off from the longer piece and formed into individual staples. The wire may be of any suitable cross section, such as round, square or rectangular, and in the drawings is shown as of square cross section. The leg ends of the staple may be left square, especially when the wire is of relatively small diameter, or they may be suitably pointed, as by bevelling, at 3. This may be accomplished either at the time of cutting off the piece of wire from the long length, by a nicking operation, or the ends may be ground off or otherwise shaped, as desired.

For use in stapling machines, staples of this kind are usually secured together in multiple form as a gang, and the drawing illustrates the staples so arranged. A plurality of staples is laid side by side in parallel relation and while so held are secured to each other by a suitable adhesive. The gang then forms a unit, numbers of which may be boxed together as a convenient sales package and also for more convenient feeding of the staples to the machine by which they are driven.

The present staple is specially formed in such manner that the driving operation in the particular machine for which it is specially designed in effect converts the staple into two headed brads, one brad formed from each leg and a short portion of the crown piece contiguous thereto, the brads being driven into the work to such an extent that the heads are countersunk therein. For this purpose the crown piece of the staple is weakened at two points, marked 4 in the drawing, located intermediate the ends of the crown portion and near to but closely spaced from the legs. In other words, as a general rule these weakened points will be nearer to the legs than to the center of the bridge piece or crown. Weakening may be accomplished in any suitable manner, such as by nicking or indenting the wire without actual removal of metal, as by the impact of a V-shaped forming tool. But, if desired, the operation may be performed by actually cutting out a small

amount of the metal, either by a cutting tool or by the use of an edged grinding tool. Further, the operation may be performed upon the staples individually, either during the course of individual formation thereof, or after they are shaped, or, the weakening operation may be performed upon the staples while they are ganged, either when held together in parallel relation prior to the application of adhesive or after the adhesive has been applied and is either in the process of drying or is wholly dry. Weakening may be accomplished either entirely on one side of the wire, such as on its upper side as shown in Fig. 1, or may be partly from one side and partly from the other, as shown in Fig. 2, where oppositely disposed registering grooves are formed in the upper and lower surfaces of the wire.

The staple described is used in the manner shown in Figs. 3 to 6 inclusive. 10 illustrates, for example, the wooden frame of a window or door screen to which a strip of molding 11 is to be secured, as for the purpose of fastening the wire screen (not shown). The staple driving tool includes a frame 12 provided with a guiding channel 13 in which is movable a driving tool 14, of generally plate form, the advance end of which is provided with a recess 15 separating two arm portions 16, the inner edges 17 of which serve as shearing edges and are spaced from each other the same distance as the weakened portions 4 of the staples.

Fig. 3 illustrates an early stage of the driving operation. The driving tool has engaged the leading staple of a gang and has advanced it to such an extent that its legs have penetrated the molding 11. It will be observed that the pressure or impact of the driving tool is applied only to the ends of the legs and to the very short portions of the bridge or crown piece extending out to the weakened portions 4.

The driving operation continues by further advance of the driving tool until the parts reach the position of Fig. 4 in which the lower surface of the crown has engaged the face of the work. Now the crown can advance no further, at least without indenting the work itself. Since the wire is of relatively small diameter it is easier to sever the wire than to drive the crown into the work. Thus, the continued pressure or impact of the driving tool against the ends of the staple legs permits the parts to move to the position shown in Fig. 5, where the end portions of the crown have been severed from the middle portion thereof and the two headed brads thus formed have been completely driven into the work with the brad heads countersunk therein.

When the driving tool is retracted and the stapling machine separated from the work the severed portion of the crown drops away.

The completed work presents the appearance shown in Fig. 6, with the molding 11 fastened to the base 10 by a series of headed brads ar-

ranged in groups of two distributed at intervals and with each two brads of a group uniformly spaced with reference to each other.

Of course, the ordinary stapling machine or tool used with staples of this kind has no recess 15 in the leading edge of its driving tool. Therefore, the present staples, when fed to such a machine receive driving pressure uniformly distributed over the full length of the crown piece and when the crown piece reaches the work no shearing effect is produced. Accordingly the present staple, when fed to and driven by an ordinary machine acts just like any other staple without severance or breaking of the crown piece. Accordingly, the present staple may be used in two ways, either as an ordinary staple or in such manner as to convert it in effect into two headed brads with the heads thereof countersunk into the work.

It of course should be realized that the staple of the present invention may be driven with other implements than the particular driving tool described, and even with ordinary tools, such as a hammer. By starting the staple into the work by light hammer impacts and continuing them until the staple is driven to a point where the crown contacts the surface of the work, the driving operation may be completed with blows of the hammer applied and confined to the upper ends of the staple legs and extending along the crown to but not beyond the weakened points, which accomplishes severance of the crown piece at the two weakened points and countersinking of the brad heads into the work in the same manner before described.

Other advantages of the invention will be apparent to those skilled in the art.

What I claim is:

40 A staple of the type adapted for temporary gang assembly in strip form for use in a hand stapling machine, said staple comprising a section of material bent into channel-like form to provide a pair of laterally spaced legs and a cross piece or crown connecting said legs at their upper ends, each of said legs having a length of the general order of that of said crown and the length of said crown being such that said legs can be simultaneously driven into the work by the driving blade of a hand stapling machine, said crown being weakened at two points close to but spaced from said legs, the two weakened points of said crown enabling the middle portion thereof, between said weakened points, to be severed and thereby removed as the end portions of the crown are sunk into the work, with the spaced legs, by driving impact simultaneously applied to the crown end portions, said crown end portions extending toward each other and serving as heads for the spaced and now separated legs.

HAROLD S. HELLER.