

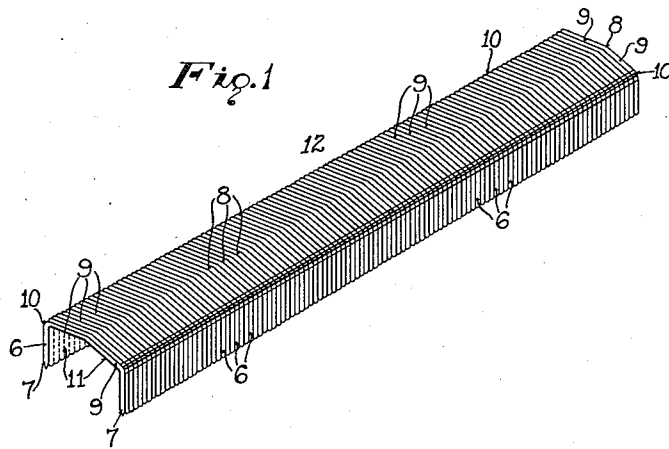
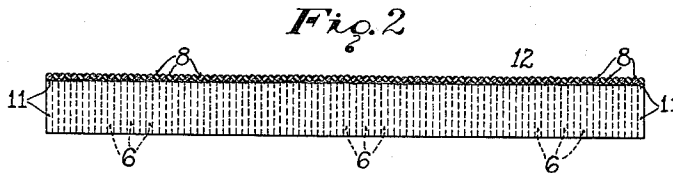
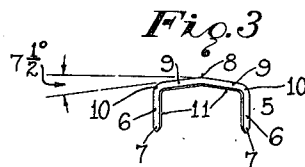
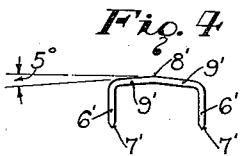
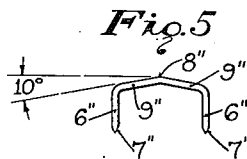
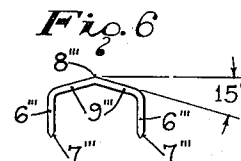
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2,052,553

STAPLE

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UNITED STATES PATENT OFFICE

2,052,553

STAPLE

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5 Claims. (Cl. 85—49)

This invention relates to staples, and while capable of general use, is more particularly adapted for embodiment in individual and strip or bar form staples made of relatively thin wire or other suitable metal and employed in stitching or stapling machines.

It has heretofore been proposed to provide relatively thin flat-topped staples of wire or other metal detachably connected together in strip or bar form for use in stitching or stapling machines. While these staples have been generally efficient and in great demand, it sometimes happens that during driving thereof, they fail to enter the object or material or are driven therein in such manner as to form imperfect stitches or fasteners which, in some cases, have broken heads or top portions and ragged or sharp projections capable of causing injury to persons handling the stitched or stapled objects or material.

I have discovered that the foregoing imperfections are due to inherent characteristics of said staples which, being made of relatively thin metal and having flat tops or heads, are unable, in all cases, to withstand the driving effort exerted on them. The staples being thus constructed, the driving force sometimes buckles the flat tops thereof and causes the legs to bend or buckle. This results in jamming of the machine, or failure of the staple to be driven, or driving of the staple in such manner as to form an imperfect stitch or fastener. Also, the driving force of the machine is mainly applied on the legs only of the staples, and if the object or material into which they are to be driven offers undue obstruction, the legs of the staples will frequently bend or buckle, the flat tops of the heads of the staples will sometimes be deformed or broken, and results such as above pointed out will therefore be produced.

One object of the present invention is to provide staples which overcome the above mentioned defects and disadvantages and insure the production of neat, efficient and uniformly perfect stitching or stapling when employed in machines for such purposes.

Another object of the present invention is to provide staples which have heads or tops crowned in such manner that the strength of the staple is increased to an extent sufficient to withstand breaking or bending thereof.

Another object of the present invention is to provide relatively thin staples which have tops or heads crowned in such manner that they may be driven in and, if desired, clinched against,

an object or material in substantially flush position relative thereto but with sufficient space left between the same and the staple crown to enable the staples, stitches or fasteners to be readily pulled or extracted if so desired.

Strips or bars of relatively thin flat-topped staples have heretofore been packed and sold as refills for stitching and stapling machines. The staples of each such strips or bars are detachably connected together with adhesive or other means suitable to prevent undue obstruction to separation of each staple from the strip or bar during the staple driving operation. It frequently happens that the strips or bars of flat-topped staples are subjected to rough handling during packing, shipping, and storing of the staples and loading of the same into machines. This results in breaking of the staple strips or bars with resulting lack of uniformity of the packaged product and waste of the staples by both packers and users thereof.

A further object of the present invention is to provide staples in strip or bar form which are crowned, aligned, and detachably connected together in such manner as to produce a staple strip or bar of strength sufficient to avoid breakage thereof during packing, shipping and handling of the same.

A still further object of the present invention is to provide staple strips or bars comprised by relatively thin round wire staples and crowned in such manner as to afford strength against breakage of the strips or bars and facilitate neat, close and efficient packing of the same for commercial use.

A still further object of the present invention is to provide relatively thin one piece crowned wire staples which are supplied to the trade in strips or bars likewise crowned and affording increased binding areas between the staples, increased strength of the strips or bars as well as the staples, and a medium for efficiently and neatly stitching or fastening together objects or materials.

These and other objects of the present invention will appear from the following description thereof, and in order to more clearly understand said invention, reference may be had to the accompanying drawing which illustrates several embodiments of the same.

In said drawing:

Fig. 1 is a detail perspective view of a strip or bar of staples embodying the present invention;

Fig. 2 is a vertical longitudinal sectional view of the strip or bar shown in Fig. 1;

Fig. 3 is an end view of said strip or bar; and

Figs. 4, 5 and 6 are elevations of staples constituting other embodiments of said invention.

Referring to the drawing, wherein like reference characters designate like parts throughout the several views, 5 indicates broadly an individual staple having legs 6 the ends of which are pointed or sharpened, as indicated at 7 (Fig. 3).

The staple 5 may be made of any suitable relatively thin metal, but as herein shown is preferably made of round steel wire having a diameter of approximately .019 of an inch. In accordance with the present invention, said staple is formed to provide a head that is crowned and has a peak 8 centrally thereof, inclined crown portions 9 preferably of equal length and directed downwardly and outwardly from said peak, and corner portions 10 joining the outer extremities of the portions 9 and the upper extremities of the legs 6.

Staples such as indicated at 5 may in accordance with the present invention be manufactured and used individually, or said staples may be manufactured and supplied to the trade in strips or bars wherein the staples are detachably connected together by adhesive applied interiorly thereof, or exteriorly thereof, or both. As herein shown, a plurality of staples 5 are placed side by side with their legs, crown portions, and peaks in alignment respectively, whereupon a coating 11 of collodion or other suitable adhesive is applied to the staple assembly over the inner sides of the crown and leg portions thereof and allowed to dry. A strip or bar of staples such as indicated broadly at 12 in Figs. 1 and 2 of the drawing, is thus formed of the staple assembly. The adhesive serves to detachably connect the staples of the strip or bar together and the portions 9 afford additional binding surface and provide a reenforced, truss-like crown for the strips or bars extending longitudinally of the same at the tops thereof.

I have discovered that by making the degree of inclination of the crown portions 9 of each staple between approximately five to fifteen degrees relative to parallel lines drawn through the peak 8 and corners 10 of each staple, a crown of truss-like form is provided enabling driving force applied thereon to be distributed equally throughout the staple and at the same time affording reenforcement for, and added strength to, the staple to the end of enabling it to withstand maximum driving effort without bending or breaking. In the embodiment of the invention shown in Figs. 1 to 3, inclusive, the aforesaid angle of inclination of the crown portions 9 of each staple is seven and one half degrees, whereas in the embodiments of the invention shown in Figs. 4, 5 and 6, said angle of inclination is five degrees, ten degrees, and fifteen degrees, respectively, as indicated on the drawing. The staples shown in Figs. 4 to 6, inclusive are otherwise the same in form and construction as the staples shown in Figs. 1 to 3, inclusive, and may be made up in strips or bars such as illustrated in Figs. 1 and 2. The staples shown in Figs. 4 to 6 inclusive, therefore have the same reference characters except that in the case of the staple shown in Fig. 4 the reference characters are primed, in the case of the staple shown in Fig. 5 they are double primed, and in the case of the staple shown in Fig. 6 said reference characters are triple primed.

Staples constructed in accordance with the present invention and having crown portions in-

clined as aforesaid may, with machines such as disclosed in my copending applications Serial Nos. 704,112 and 704,113, filed of even date herewith, be driven in objects or materials in such manner that the staple crowns are substantially flush therewith but so related thereto as to leave small spaces between the objects or materials and the peaks of the crowns of the staples. Neat stitches or fasteners may thus, on the one hand, be produced from the staples while, on the other hand, the same may, through insertion of a tool in said spaces, be readily pulled or extracted from the objects or materials, if so desired.

While several embodiments of the present invention have been described and illustrated with more or less particularity in the present disclosure, it is to be expressly understood that said invention is not limited to said disclosure or otherwise than by the appended claims.

What I claim is:

1. A readily deformable staple of the type adapted to be clinched to form a substantially closed loop enclosing a portion of a sheaf of papers or the like on four sides, said staple comprising a single piece of flexible material of uniform cross-section formed to provide legs substantially parallel throughout their length, and a head having a central peak and straight portions inclined downwardly and outwardly to said legs.

2. A readily deformable staple of the type adapted to be clinched to form a substantially closed loop enclosing a portion of a sheaf of papers or the like on four sides, said staple comprising a single piece of flexible material of uniform cross-section bent to form legs substantially parallel throughout their length, and a head comprised by straight portions of equal length inclined downwardly and outwardly from the center of said head to said legs.

3. A readily deformable staple of the type adapted to be clinched to form a substantially closed loop enclosing a portion of a sheaf of papers or the like on four sides, said staple comprising a single piece of material of uniform cross-section bent to form legs substantially parallel throughout their length and a head joining said legs, said head having a crown comprised by portions each inclined at an angle of not more than approximately fifteen degrees relative to parallel lines drawn through the top of said crown and the top of said legs respectively.

4. A readily deformable staple of the type adapted to be clinched to form a substantially closed loop enclosing a portion of a sheaf of papers or the like on four sides, said staple comprising a single piece of material of uniform cross-section bent to form legs and a crowned head, said legs being substantially parallel throughout their length, and said head comprised by opposite portions each inclined at an angle of not less than five degrees relative to parallel lines drawn through the top of said crown and the top of said legs respectively.

5. A readily deformable staple of the type adapted to be clinched to form a substantially closed loop enclosing a portion of a sheaf of papers or the like on four sides, said staple comprising a single piece of material of uniform cross-section bent to form legs and a crowned head, said crowned head comprised by portions each inclined at an angle not greater than fifteen degrees nor less than five degrees relative to parallel lines drawn through the top of said crown and the top of said legs respectively.

JOHN F. CAVANAGH.