

[54] **STAPLE**
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[57] **ABSTRACT**

A staple device which is particularly adapted to be used with gypsum board workpieces or the like and which includes a head portion having a cross-sectional configuration defined by an advancing and trailing portion which is particularly adapted to distribute the load on the workpiece to preclude damaging the workpiece when the head is driven flush with the surface of the workpiece.

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2 Claims, 5 Drawing Figures

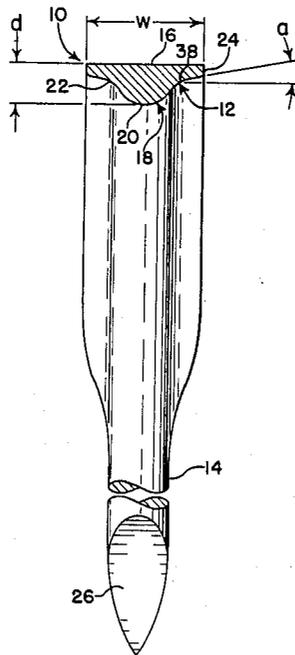


Fig. 1

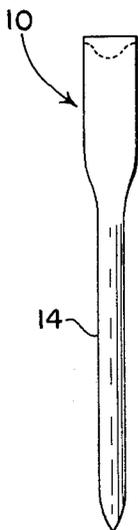


Fig. 2

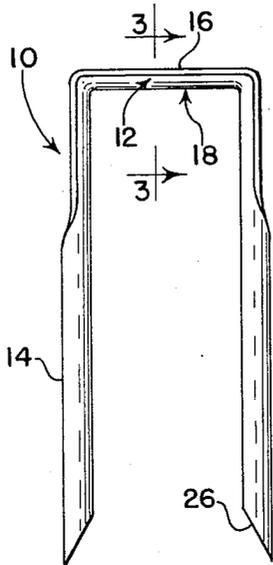


Fig. 3

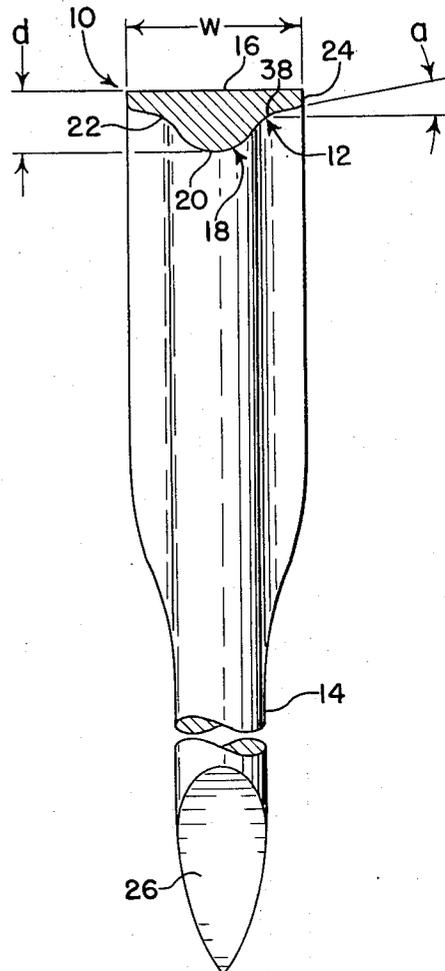


Fig. 4

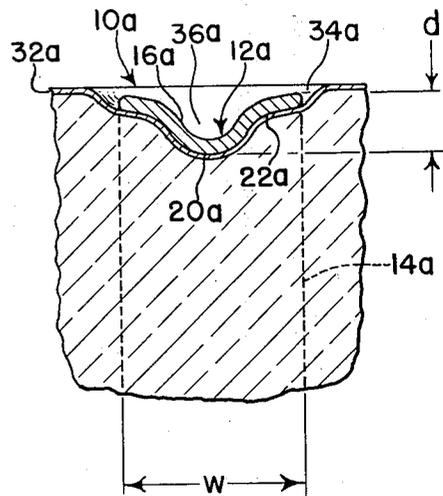
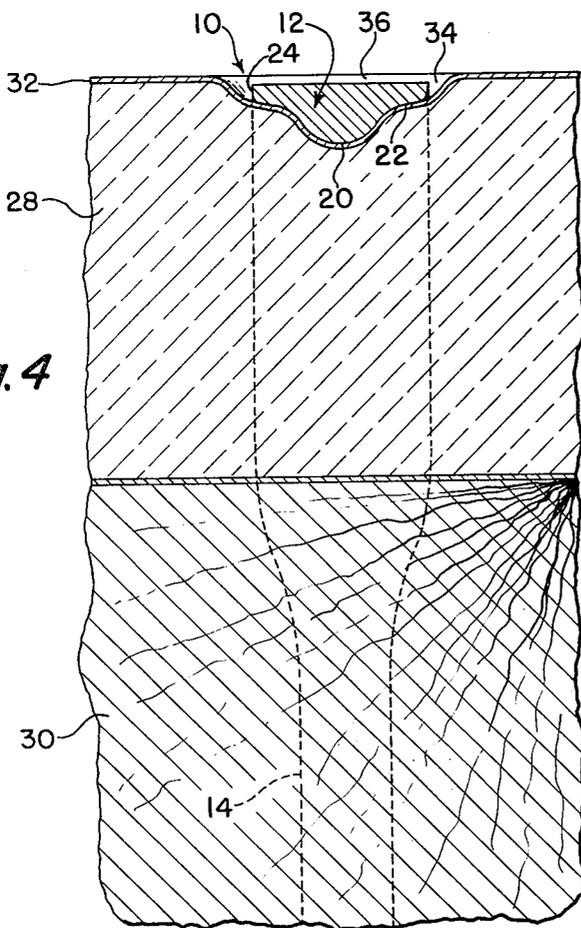


Fig. 5

BACKGROUND OF THE INVENTION

This invention relates generally to fastening devices which include a head or bridge portion interconnecting a pair of penetrating leg portions. The invention is more specifically directed to the provision of a fastening means for use with gypsum core wallboards.

Heretofore in wall construction of this type wherein panels are secured to supporting members by nail type fasteners difficulty has been encountered in scarring or tearing the paper surfaces of the wallboard with either the hammer or the nail head itself. A necessary secondary operation used with all fastening systems in conjunction with this type of construction is the concealment of the fastener head with a thin layer of plaster or cement. The use of fasteners that tend to tear the paper makes finishing operations difficult since the paper fibers will project outwardly from the surface and thus complicate the application of the cementitious material to provide a smooth appearing panel exposed surface. Conventional round wire staples or flat stamped staples having planar upper and lower surfaces provide much of the same problems that are encountered when using nails in this type of construction. Since the head of the staple must be driven at least flush with, and preferably beneath the surface of the wallboard, the round wire head of the staple tends to shear and otherwise tear paper on the wallboard along the length of the head. Likewise, the flat stamped staple provides a pair of cutting edges on either side of the crown of the staple which penetrate and cut the paper when the staple is driven flush with the surface. It is therefore evident that the economical advantages which are normally obtained by the use of a staple-like system is offset by the difficulty in properly finishing the work using a fastener system comprising conventional staples.

SUMMARY OF THE INVENTION

The present invention is concerned with providing a staple fastener which has a crown or head portion particularly designed to use with gypsum core wallboard construction.

Accordingly, it is the object of the invention to provide a staple having a bridge portion with an advancing and trailing under surface designed to smoothly depress the wallboard surface and eliminate cutting or shearing the paper when the staple is driven at least flush with the surface of the paper.

It is the further object of the invention to provide a staple having a head which distributes the load on the wallboard in such a manner to provide a smooth unbroken cavity on the surface of the workpiece to facilitate application of the finishing material to conceal the head of the fastener.

These and other objects and advantages are obtained by the present invention wherein a staple device includes a crown or bridge portion having an under surface defined by generally blunt curvilinear advancing portion and a trailing portion of a generally curvilinear configuration and in which the maximum width of the trailing portion defines the maximum width of the fastener head and which flares outwardly from the advancing portion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation view of a staple embodying the features of the invention.

FIG. 2 is a front elevation view of the staple shown in FIG. 1.

FIG. 3 is an enlarged cross-sectional view of the staple taken on line 3—3 of FIG. 2.

FIG. 4 is a cross-sectional view of the staple in FIGS. 1-3 as it is finally driven into a wallboard type of workpiece.

FIG. 5 is a cross-sectional view similar to that of FIG. 4 of an alternate embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and more particularly to FIGS. 1-3, a staple 10 is shown which includes a crown or bridge portion 12 and a pair of leg members 14 extending downwardly and integrally attached thereto. The crown portion 12 of the staple is shown to have a generally flat upper surface 16 and a generally blunt lower surface 18. The lower surface 18 is more particularly described as including an advancing portion 20 of a generally blunt curvilinear configuration and a trailing portion consisting of surfaces 22 flaring outwardly and upwardly from the advancing portion as well as short side portions 24 which join surfaces 22 to the upper surface and which extend generally perpendicularly to the upper surface 16.

Upon inspection of FIG. 3 it will be apparent that the maximum width w of the crown portion 12 defines the maximum width of the trailing portion 22 of the under surface. The maximum thickness or depth d of the staple is shown to be somewhat smaller than the width w . This relationship between the maximum width of the trailing portion and the depth which the advancing portion extends below the top surface of the staple effectively distributes the load of the staple crown portion of the wallboard over a relatively large surface area and precludes tearing the paper surfaces of the wallboard by the shearing action which is prevalent in prior art staples.

In actual practice the preferred embodiment of the staple can advantageously be produced by swaging the upper most portion, which includes the bridge portion, of a conventional round wire staple to the form described herein. This will obviously result in a crown portion having a cross sectional area which is substantially equal to the cross sectional area of the remaining portions of the wire staple. In FIGS. 1-4 the remaining portions are shown as a substantial length of the legs 14. It should be apparent that if desired the swaged form of the head can continue completely down to the entering points 26 of the staple or could only include the bridge portion and still be contemplated by this invention.

A product using the teachings of this invention which has been particularly effective when used in association with gypsum-core wallboard has been formed from a wire having a diameter of 0.062" with a head portion formed according to the teachings of the invention to have a width w of 0.120 inch and depth d of 0.040 inch and side surfaces extending downwardly from the top surface, a distance approximately 0.010 inch. The curvilinear surface defining the advancing portion of the head under surface is an arc having a radius of 0.032

inch which blends smoothly with the inclined trailing surfaces 22 and is preferably interconnected to the surfaces 22 by arcuate fillets 38 having a radius of curvature also of approximately 0.032 inch. The inclined trailing surfaces 22 preferably extend at an angle α of approximately 10° to the plane including the upper surface of the fastener. It can be further shown that an advancing portion which has a maximum width of approximately one-half the total width of the head and which has a maximum depth approximately one-half the maximum depth of the head provides a particularly effective fastener in the above-mentioned environment.

Turning now to FIG. 4, the preferred embodiment of the fastener 10 is shown driven into a wallboard panel 28 to secure the wallboard to a stud or support member 30. The wallboard 28 typically includes paper surfaces 32 forming both an upper and lower exposed surface. As the fastener of this invention is driven into the workpiece the legs penetrate the wallboard and the head is driven downwardly into contact with the paper surface 32. The unique design of the head allows the paper 32 to be initially depressed by the advancing portion 20. Since the advancing portion 20 is of a blunt curvilinear configuration, relatively small shearing forces are applied to the paper. As the advancing portion of the staple depresses the paper the trailing portion 22 further depresses the paper a short distance as the head is driven slightly below the plane of the wallboard. The trailing surfaces, however, depress the paper at a very slight angle to the horizontal and thus allows the staple itself to form a simple or depressed area 34 which is somewhat wider than the width of the staple itself. The extension of this cavity 34 beyond the edges of the staple in conjunction with the short side portions 24 provides additional volume into which cementitious finishing material can be placed and adhered. The recessed portion 36 formed by the depth of the upper surface 16 below the surface of the paper provides additional volume for this same cementitious material. It is apparent that the particular configuration of a staple head having an advancing portion and trailing portions flaring outwardly therefrom will adequately distribute the load on a wallboard type workpiece and effectively preclude the possibility that the head of the fastener will shear the paper surfaces as the fastener is driven at least flush with the surface of the wallboard.

The staple 10a in FIG. 5 describes an alternate embodiment of the invention and the elements thereof corresponding to like parts in the head section 10 shown in FIGS. 1-4 will be identified by the same numbers followed by the suffix *a*. The head section 12a is formed initially from a generally flat strip of material. This produces a head having a generally bell-shaped cross-sectional configuration, but which retains the under surface configuration described above relative to preferred embodiment. It includes an advancing generally blunt curvilinear portion 20a and trailing portions 22a flaring outwardly therefrom. It should be evident that the upper surface 16a follows closely the general configuration of the lower surface, but forms a trough-like central portion on the upper surface of the staple.

The embodiment shown in FIG. 5 will thus depress the paper 32a without shearing the surface. The flaring

trailing portions 22a will depress the surface further and act to distribute the load on the wallboard to preclude a shearing effect as the staple is driven flush with the surface of the wallboard. The novel configuration of this head also produces an extended dimple or cavity 34a and also provides a substantial cavity 36a into which the finishing material can be placed which enhances the capability of the finishing material to bond to the finishing joint. Again, the novel relationships between the width w of the head portion 12a and the total depth d of the head contribute to the effectiveness of such a fastening joint.

Thus, it is apparent that there has been provided in accordance with the invention a staple-like fastener that fully satisfies the objects, aims, and advantages set forth above. Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art in light of the foregoing description. Accordingly, it is intended to embrace all such alternatives, modifications, and variations that fall within the spirit and broad scope of the appended claims.

I claim:

1. A fastener device for use in wallboard or the like including a head integrally connecting and extending between a pair of legs, the fastener being formed from round wire with the cross-sectional area of the head portion being substantially identical to the cross-sectional area of the circular wire stock, the head having a cross-sectional configuration defined by a flat uppermost surface and an under surface with an advancing and trailing portion, the advancing portion being defined by a generally blunt curvilinear surface, the trailing portion forming wing-like lateral extensions of the advancing portion with the juncture of the advancing portion and the trailing portion being spaced upwardly from the lowermost extremity of the advancing portion, the trailing portion flaring outwardly and upwardly from the juncture point with the advancing portion to a maximum width and including short side surfaces extending generally perpendicularly to the flat uppermost surface and defining the maximum width of the head, the blunt advancing portion, in cross-sectional configuration, being of a depth not greater than one-half the total depth of the head and of a width not greater than one-half the maximum width of the head, the side surface extending to a depth not greater than one-quarter the total depth of the head and extending from the juncture point at an angle of generally 10° to the plane including the flat uppermost surface, the juncture point of the advancing and trailing sections being a smooth connecting curvilinear surface wherein the staple may be driven at least flush with the surface of the wallboard without tearing or otherwise damaging the surface and providing a dimple-like cavity surrounding the head capable of receiving and retaining cementitious material to provide a smooth appearing panel exposed surface.

2. A fastener device in accordance with claim 1, wherein the cross-sectional configuration of the head extends at least partially down the length of each leg.

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