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H. S. HELLER

2,351,044

STAPLING MACHINE

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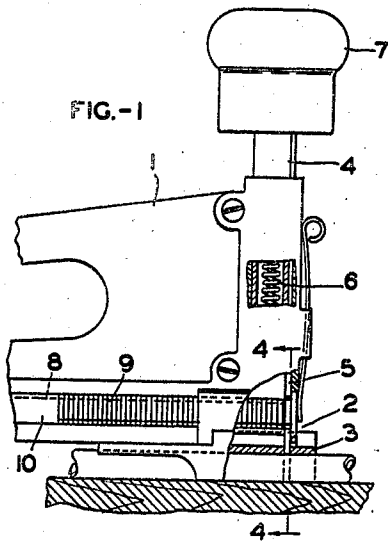


FIG.-1

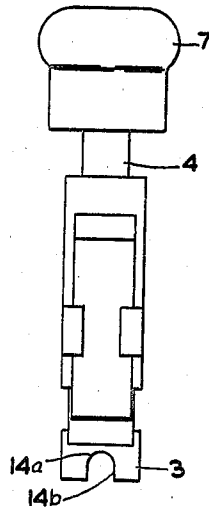


FIG.-2

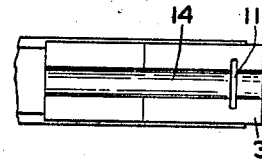


FIG.-3

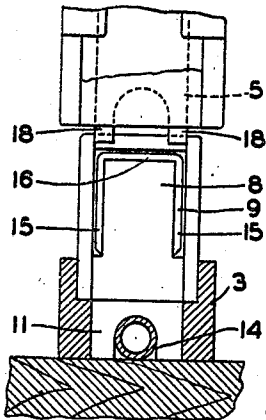


FIG.-4

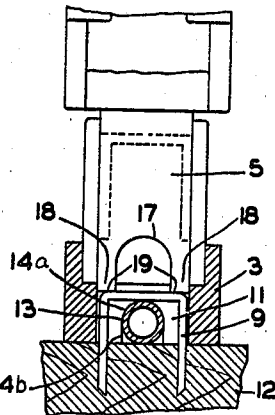


FIG.-5

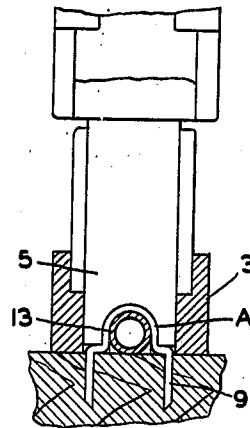


FIG.-6

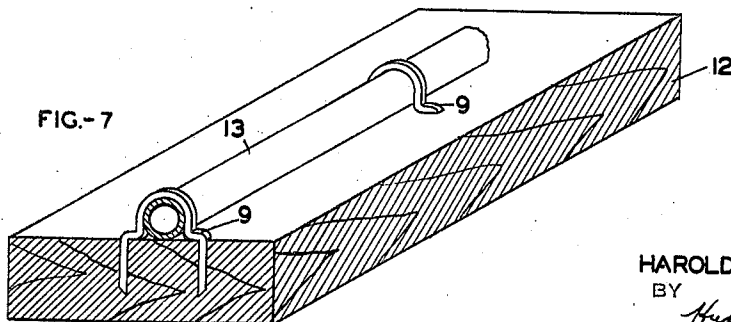


FIG.-7

INVENTOR
HAROLD S. HELLER
BY
Hyde and Meyer
ATTORNEYS

UNITED STATES PATENT OFFICE

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STAPLING MACHINE

Harold S. Heller, Cleveland Heights, Ohio

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1 Claim. (Cl. 1—49)

This invention relates to stapling machines, and more particularly to the small portable hand operated devices, sometimes called "tackers," which are used for securing one part to another. More particularly, the invention relates to staplers used for securing an elongated article to a supporting surface upon which it is to be mounted. For example, the stapler may be used to attach a round, square or other shaped rod or bar made of wood, metal, glass or the like, to the surface of a piece of any material into which the staple legs may penetrate. A helical or other coiled bed or other spring thus may be attached by staples to a wooden supporting base, and other like or analogous uses will occur to those skilled in the art.

One object of the invention is to provide an improved stapling machine of the character described, which employs ordinary commercial staples such as are readily available upon the open market, and which machine not only drives or pushes the staple legs into the base or support, but also limits their penetration to less than their total length and deforms their upper exposed portions in such manner as to more firmly anchor the secured rod or bar to the base and prevent its movement thereon.

A further object is to provide a stapling machine which limits the penetration of the legs of the staples driven thereby to the depth of the article being mounted or secured by such staples, with the result that there is no liability of crushing such article, even though such article is a fragile glass tube.

A further object is to provide a stapling machine embodying improved driving means for the individual staples, said driving means deforming both the leg and crown portions of the staples in such manner as to more closely mold them to the shape of the articles being mounted on or secured to the supports therefor, thus augmenting the usual holding effect.

Still another object is to provide an improved stapling machine embodying a driving tool having spaced driving arms arranged to engage only the end portions of the staple crown and separated by a recess at least as wide and as deep as the article to be mounted or secured, whereby said tool, in driving the staple, not only causes the staple legs to enter the base or support, but also more or less molds the staple to the mounted or secured article and thus improves the holding effect.

Another object of the invention is to provide an improved stapler of this kind in which the

stapler nose, which is applied to the article to be mounted or secured, is specially shaped to properly orientate the staple driving tool with respect to said article and thus insure proper application of the staple to such article.

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 side elevation of one form of stapling machine embodying the invention, parts being broken away to expose interior parts; Fig. 2 is an end elevation from the right in Fig. 1; Fig. 3 is a detail bottom plan view; Fig. 4 is a detail view, on a larger scale, showing the stapler applied to the articles to be mounted or secured and ready for operation, the view being on the line 4—4, Fig. 1; Fig. 5 is a similar view, illustrating the article to be mounted or secured, a staple, and the operating end of the staple driving tool, with the driving operation partly completed; Fig. 6 is a similar view, illustrating completion of the staple driving operation; and Fig. 7 is a perspective view illustrating a tube stapled on a support by the use of the present stapling machine.

Before the stapling machine here illustrated is specifically described, it is to be understood that the invention here involved is not limited to the details of construction or the specific arrangement of parts here illustrated or described, as the invention obviously may take other forms. It also is to be understood that the terminology or phraseology herein employed is for the purpose of description and not of limitation, the scope of the present invention being denoted by the appended claim.

Since the invention here to be described relates more particularly to the form or shape of the staple driving tool and its size and relation to the staple itself and to the article to be mounted or secured, the particular means and manner of mounting and operating the staple driving tool require very little description, as they may be of ordinary or usual form. The particular stapling machine shown in the drawing in general is of the same form illustrated, described and claimed in Letters Patent No. 1,996,640, granted April 2, 1935 to Francis M. Case for Stapling machine, to which reference may be had for further description, if necessary or desirable. The machine illustrated is of the portable hand operated type, sometimes called "tackers," designed for application by one hand in proper position with reference to and upon the article to be secured, the stapling operation being performed by pres-

sure or impact of the other hand upon the head of the staple driving plunger. Any arrangement suitable for operation in this way may be employed. In the drawing, the machine is shown as including the usual frame or housing 1 having a nose portion, marked generally 2, which exposes at the bottom of the frame a bearing plate or member 3 designed and arranged to be applied directly to the surface of the article to be mounted or secured at the place where the stapling operation is to be performed.

In said frame or housing 1 is mounted a vertically movable operating plunger 4 to which the plate form driving tool 5 is attached, said plunger being biased upwardly by the usual compression spring 6, and at its upper end being provided with a suitable head 7 designed to receive the pressure or impact of the hand or first. Within the housing or frame 1 is located the usual magazine guide or track 8 along which ride the staples 9 to be driven. These preferably are in the common gang form, many being secured together by adhesive in parallel channel form relation, as shown in Fig. 1. The staples are advanced by the usual spring-pressed follower 10 so that the leading staple lies beneath the lower end of the driving tool in the guiding channel therefor, ready to be sheared off from the gang when the plunger and driving tool is depressed, and thus to be driven into the base or support for the article to be mounted or secured, the bearing plate 3 being provided with a slot or mouth 11 (Fig. 3) through which the driving tool propels the staple into the base or support, as will be readily understood.

The present machine is particularly designed for use wherever it is desirable to attach to a suitable base or support made of any material into which the legs of the staple may be pushed, such as pasteboard, leather, wood or the like, a relatively long narrow article of rod, bar or pencil form and made of any material, such as wood, metal, glass or the like. Thus the present machine may be particularly built or designed for use in attaching a glass thermometer rod to a wood or pasteboard base, or for securing to a wooden bar or slat, the lower coil or turn of a spiral hourglass or other bed spring. The article to be mounted on or secured to the base or support may be either solid or hollow, and may be of any cross section, such as round, square, triangular, oblong or the like, a glass tube 13 being shown in Fig. 5 as stapled to a base or support 12 in Fig. 5.

Because these tackers usually are designed for a particular job or task, such as the attachment of the glass tube shown in Fig. 5, the bearing plate 3, exposed at the bottom of the nose of the stapler, and through which the driving tool protrudes in operation, preferably is designed or shaped to fit the article to be mounted or secured, both to simplify application of the tool to said article in the proper position and also to locate the tool more or less accurately on account of the small size of the article. In the arrangement shown, the lower surface of the bearing plate 3 is provided with a channel or groove 14 shaped to correspond with the particular tube 13 and of a depth approximately equal to the external diameter of said tube, or slightly greater. In the form of stapler shown and adapted for use on articles of the character illustrated in Fig. 5, the channel or groove 14 includes a semicylindrical or arched upper portion 14a and straight side walls 14b, as shown in Fig. 2, extending in a

direction transverse to the length of the slot or mouth 11, as illustrated in Fig. 3.

As best shown in Figs. 4 and 5, each staple of the gang or strip of staples is of generally channel form, the staples being made of wire, usually of rectangular cross section and each being provided with parallel side legs 15 connected by a substantially straight cross bridge or crown portion 16. As is usual, the staples are adapted to straddle the tube or other article 13 to be mounted upon or attached to the base or support 12, the attachment of such article to said base or support being effected by deformation of said staples in a manner to effect a very firm attachment of said article and with no liability of crushing or otherwise damaging or marring said article.

In the arrangement shown, the staple driving tool 5 is a metal plate whose thickness is approximately the same as that of each staple. At its lower or operating end, said tool is provided with an open ended recess 17, best shown in Figs. 4 and 5, and which is of approximately the same shape as a cross section of the channel 14, to-wit, having an upper semi-circular portion and straight side walls. This recess 17 is at least as wide horizontally and at least as deep vertically as the corresponding through dimensions of the article with which the stapler is to be employed, but the recess 17 is nevertheless narrower than the total width of the end of the driving tool so that it provides the tool with two downwardly extending driving arms 18, each presenting downwardly an elongated narrow horizontal surface 19, the two surfaces being in alignment with each other but separated by the width of recess 17.

In use of the stapler, it is applied, in the manner shown in Figs. 1 and 4, to the article to be mounted or secured, said views showing the parts of the stapler ready for operation. The staple driving tool is in retracted position with each of its operating arms 18 lying above the upper end of one of the staple legs, but the operating surface 19 at the lower end of each arm is longer than the width of the staple leg, so that the operating end of each tool-driving arm overlaps or extends along a short portion at one end of the staple crown or bridge 16.

The staple-guiding channel or groove, ahead of the staple to be driven, is entirely open and unobstructed not only all the way to the nose plate slot or mouth 11 through which the staple is ejected, but all the way to the article to be mounted or secured. Nothing, therefore, lies between the staple and said article, nor is any anvil employed unless for clinching purposes at the back of thin work.

When pressure or an impact is applied to the head 7 of the operating plunger, the driving tool 5 moves down, shears or breaks off the leading staple from the gang and pushes it down in the guiding channel, driving its legs into the material of the base or support 12. This operation continues until the parts reach the position shown in Fig. 5, in which the staple crown or bridge 16 has contacted with the upper surface of the tube 13. Of course, downward movement of the plunger and tool does not cease at this point, but continues until the parts reach the position shown in Fig. 6, where the arms of the driving tool have been halted by the base or support 12. Further advance of the driving tool is thus arrested, which prevents any impact thereof with the article 13, such as might break it if it is of glass, as it here is. In this final position of the

parts, that portion of each of the staple legs which in Fig. 5 had not entered the base or support 12, and those portions of the staple crown or bridge on either side of the tube 13, have been pressed down and indented or molded to an inverted form, as shown at A.

It will be observed that in effect, the length of the staple crown has been increased by including therein a portion taken from the upper end of each staple leg. The wire of the central portion of the staple crown has been more or less closely molded to U-form so that it closely hugs the tube or other article 13, and the horizontal crown portions are applied closely to the surface of the base or support 12 and are pressed against or even partly into the same. This provides very secure anchorage of the article 13 to the base or support 12 with no tendency for relative lateral or horizontal movement. The staple legs are spaced apart sufficiently to avoid splitting of the base or support 12 to which the article 13 is stapled, and inasmuch as substantially no pressure is applied to such article by the staple driving tool, there is no liability of crushing or otherwise damaging such article, even if it is a fragile glass tube.

By applying a series of staples at intervals, as shown in Fig. 7, an elongated article, such as a rod, bar, tube, or pencil may be very firmly secured to an underlying support.

The stapling machine described is of simple form, is capable of construction in quantities at low cost, and the operating parts are strong, durable and not likely to get out of order in service. It is readily and accurately applied to the article to be stapled and when operated, it produces very secure attachment of said article to a base or support.

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

What I claim is:

A stapling machine for more or less permanently attaching an elongated cylindrical member to the surface of a supporting member by means of a staple having substantially parallel straight legs spaced apart by a substantially straight connecting crown portion which is longer than the diameter of said cylindrical member, comprising a frame provided with staple guiding means, said frame being so formed and arranged that when the machine is applied to the work the staple is presented thereto with its legs straddling but each spaced from said cylindrical member, and a driving tool slidable in said frame in a direction parallel to the legs of the staple to be driven, said tool being of plate-like form and having at the middle of its working edge an open recess provided with straight parallel side edges and an arched semi-circular upper portion and being approximately as wide and deep as the diameter of said cylindrical member but shorter than said working edge, to thereby present to the end portions of the staple crown above the spaced legs the working edge portions of two aligned driving arm portions of equal width, spaced apart by the width of said open recess, whereby the driving tool by impact upon the crown end portions of the staple drives the lower end portions of the staple legs into the supporting member, bends the crown end portions inwardly around the cylindrical member, and bends a like upper portion of each staple leg at right angles to the leg and drives it into contact with the surface of said supporting member, thereby preventing any crushing or breaking impact upon the cylindrical member.

HAROLD S. HELLER.