

T. B. HAFERTEP.
METHOD OF FASTENING SHEET MATERIAL.
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1,114,135.

Patented Oct. 20, 1914.

Fig. 1.

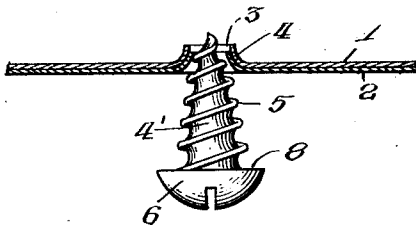


Fig. 2.

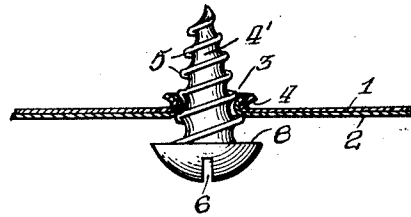


Fig. 3.

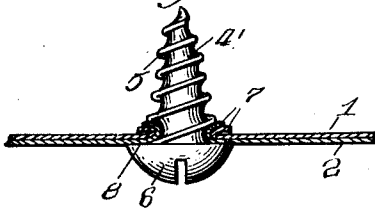


Fig. 4.

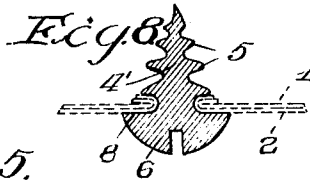
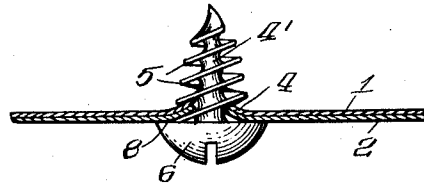


Fig. 5.

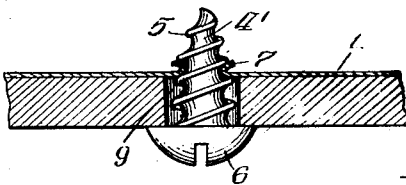


Fig. 6.

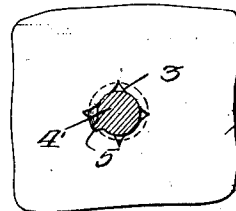


Fig. 7.



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UNITED STATES PATENT OFFICE.

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METHOD OF FASTENING SHEET MATERIAL.

1,114,135.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, THEODOR B. HAFERTEP, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Fastening Sheet Materials; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to methods for securing sheet materials to one another, its prime object being to provide a simple method of uniting overlapped sheets of material with the use of only a single and cheap element and with the aid of simple and commonly available tools.

Another object of my invention is to provide a method of making a fastening of the class described, which method will produce a flange upon at least one of the materials which are to be secured to each other, thereby reinforcing the said materials at the point at which they are secured to each other by the said appliance.

Other objects will appear from the following description and from the accompanying drawings, in which—

Figure 1 is a fragmentary section through a pair of overlapped and jointly punctured sheets, showing the fastening member in the act of being inserted through the perforation in the said materials. Fig. 2 shows the same elements with the fastening member advanced to effect the forming of a reinforcing flange on the overlapped materials. Fig. 3 shows the same elements after the fastening has been effected. Fig. 4 shows the alternative effect produced by a fastening member having a shank of relatively small diameter. Fig. 5 shows a fastening effect according to my invention between a sheet of wood and a single sheet of metal. Fig. 6 is a plan view showing the perforation as effected by a square punch. Fig. 7 shows an alternative form of fastening element.

In carrying out my invention, I suitably overlap the sheets 1 and 2 which are to be secured to each other, and then punch a perforation 3 simultaneously through both sheets by means of a prick punch or similar sharply pointed tool, the said tool being preferably equipped with a conical tip. In using the said punch, the overlapped materials are preferably held with one sheet 1

thereof bearing against a perforated or yielding material so that the tool will indent both sheets upon punching the same, thereby forming around the opening 3 walls 4 disposed substantially in the shape of a frustum of a cone, one or both of which walls will present what is commonly termed a bur upon the surface of the sheet 1 adjacent to the said perforation. When the overlapped sheets have been thus punched, I insert into the said perforation 3 from the side of the sheet 2 (that is from the side opposite to that upon which the said bur is presented) a screw having a tapered shank 4' equipped with a raised thread 5, the tip of the said screw being smaller in diameter than the said perforation. Upon rotating the screw by means of a screw-driver applied to the slotted head 6 thereof, the thread 5 will engage the protruding end of one or both of the said burs, that is the edge of the wall of the said perforation, and the tapering shank of the screw will engage the inner wall of the said perforation at a little distance from the said tip, whereby the said portions of the screw will coact to flare the burred or raised portion of the materials outwardly as shown in Fig. 2. Upon continuing the rotation, the said screw portions will coact to continue the said flaring until the outwardly turned portions of the material is formed into flanges 7 surrounding the perforation and reinforcing the material of the sheets adjacent to the perforation. Then when the screw has been advanced sufficiently to cause the bearing surface 8 of the head thereof to engage the sheet 2, the said head will coact with the thread of the screw to clamp the said flange portion of the two sheets therebetween, thereby effecting a strong and simple fastening.

It will be evident from my description, that the making of such a fastening requires only a simple type of punch, a screw-driver, and a screw having a tapered thread extending to, or substantially up to, the head thereof. It will also be evident that with thin materials the flanging effect produced during the making of a fastening will afford a suitable reinforcement so that no auxiliary washers or other reinforcing members will be needed.

While the fastening of my invention thus effects a simply made and automatically reinforced fastening upon thin sheets, it may also be used upon sheets of stiffer material

by providing the screw element of the fastening with a relatively slender shank, as shown in Fig. 4. When this is done, the shank will not bear against the wall of the opening so as to coact with the thread to effect an outward flanging, as in Fig. 2, but will leave the thread of the screw free to draw the walls of the perforation inwardly or toward the slender shank, as in Fig. 4. Consequently, by using screws with similarly tapered threads but with shanks of varying diameters, I can apply my invention with equal facility and advantage to materials of varying thickness and rigidity.

While I have shown and described my invention as applied to sheet materials or similar materials which may be simultaneously punched, I do not wish to be limited to this simultaneous perforating, as the method of my invention can also be applied to fastening a sheet of metal or similar material to a layer or sheet of wood or other material, as in Fig. 5, by first providing the last named material with a perforation 9 at least equal in bore to the maximum diameter of the tapering thread of the screw. Likewise, I do not wish to be limited to the use of a punch having a conical tip as the punching might be effected by means of a punch having a sharply angulated tip, as for example, a four-sided prismatic tip. Fig. 6 shows a plan view of a perforation effected by such a prismatic punch, and also shows by dotted lines the adjacent portions which would be engaged by the thread of the screw. Moreover, it will be obvious that my invention need not be limited in application to sheet metals, but can be applied equally well to the fastening of other puncturable materials, such as leather or vulcanized fiber. It will also be evident that the heads of the screw element of my fastening may be varied in shape as desired, so as to present either the effect of a round head screw, or a hexagon head bolt (as in Fig. 7) or such other form as may be desired. So, also, the shank and thread portions of the screw element may be varied considerably but I prefer to use a screw in which the flange of the thread facing the head increases in its angle with the axis of the screw from a rather acute angle at the tip of the screw to substantially a right angle at the portion close to the head.

I claim as my invention:

1. The method of fastening a plurality of overlapped sheets which consists in providing alined perforations therein, equipping at least one of said sheets with a bur pre-

sented by the walls of the said alined perforations at one end thereof, inserting into the said alined perforations from the other end thereof a tapering screw having a tip smaller than the said bur and having a thread of greater diameter than the said bur, and forcibly rotating the said screw to cause the said thread to engage the end of said bur to clamp the said sheets between the said thread and the head of the screw.

2. The method of fastening a plurality of overlapped sheets which consists in forming a perforation extending through the said sheets and in equipping at least one of said sheets with a bur presented by the walls of the perforation at one end thereof, inserting through the said perforation from the other end thereof a tapering screw having a tip smaller than the bore of the perforation and having a thread of greater outside diameter than the said bur, forcibly rotating the said screw to cause the said thread to engage the said bur to flare the latter outwardly into a flange around the edge of the perforation, and continuing the said forcible rotating of the screw to cause the said thread and the head of the screw to coact to clamp therebetween the portions of the said sheets adjacent to the said perforation.

3. The method of fastening a plurality of overlapped sheets which consists in forming a perforation extending therethrough and equipping at least one of the said sheets with a bur presented by the walls of the perforation at one end thereof; inserting through the said perforation from the other end thereof a tapering screw having a tip smaller than the bore of the perforation and having a thread provided with a flange presenting a gradually increasing angle between the said flange and the axis of the screw; and forcibly rotating the said screw to cause the flange of the said thread to engage the exposed end of the bur and successively thereafter to flare the bur outwardly of the perforation, to flex the flanged material to decrease the bore of the flanged portion thereof, and to clamp the portions of the sheets adjacent to the shank of the said screw between the said thread and the head of the screw.

In testimony whereof I have signed my name in presence of two subscribing witnesses.

THEODOR B. HAFERTEP.

Witnesses:

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G. M. NEVILLE.