Feb. 26, 1946. H. B. CHATFIELD 2,395,656

CLAMP

Filed March 3, 1944

FIG. 1.

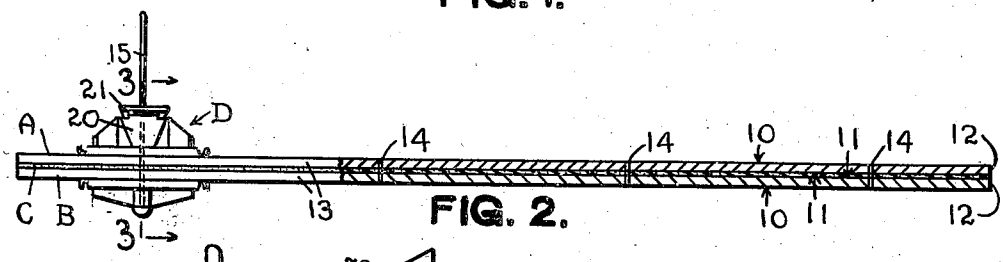


FIG. 2.

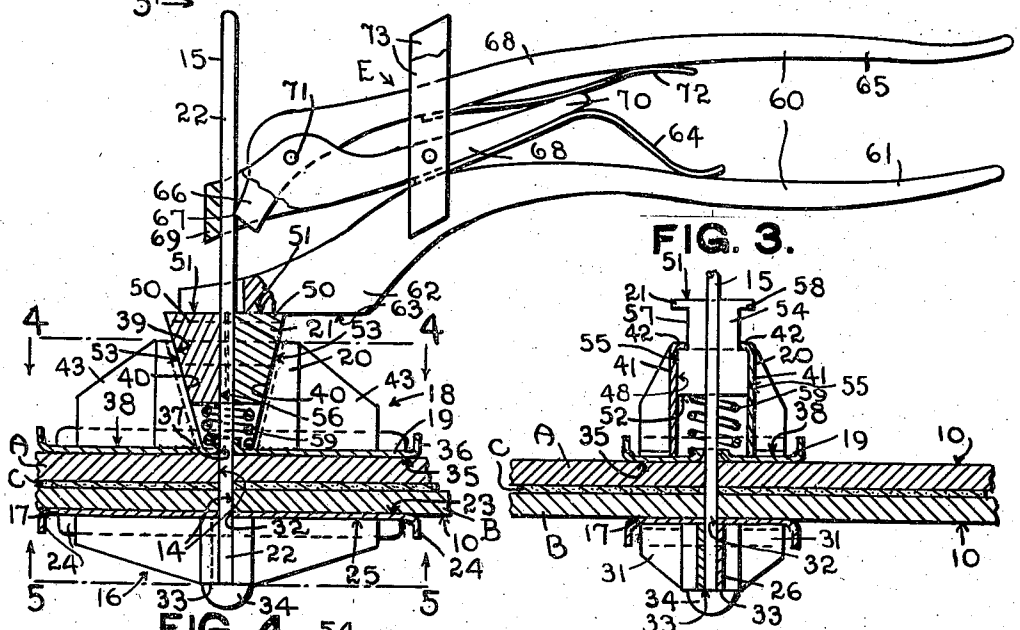


FIG. 3.

FIG. 4.

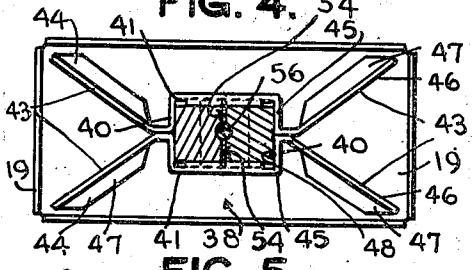


FIG. 5.

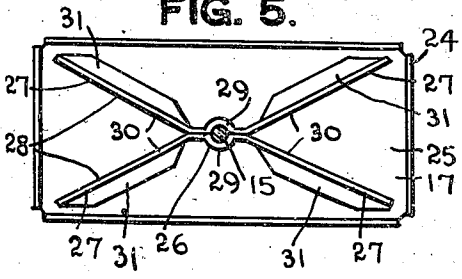
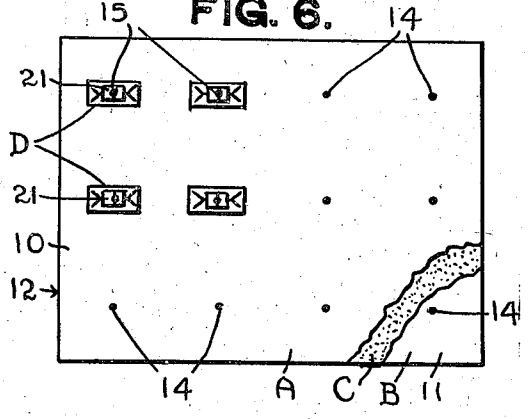


FIG. 6.



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CLAMP

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Application March 3, 1944, Serial No. 524,955

1 Claim. (Cl. 144—297)

This invention relates to clamps and more particularly to clamps adapted to draw together and temporarily retain in that condition several sections of material.

In securing two sheets of material together, employing an adhesive, the problem of retaining the sheets in close relationship over their entire areas has been found difficult, particularly where the sheets are of relatively large area and where they normally tend to fall apart while the adhesive is hardening. Clamps which include bight portions extending over the edges of sheets, are not adapted to press the sheets together at areas relatively far removed from the sheets' edges.

An important object of this invention is to provide a clamp adapted to exert compressive pressure inwardly from the outer surfaces of two sheets, or the like, of material, without regard to the proximity of the areas of pressure of the sheets' edges.

Another important object is to provide such a clamp whereby the direction of pressure is exerted substantially normal to the sheets' surfaces, so that slippage of the sheets is obviated. Sheets coated with fresh adhesive are very apt to slip, one with relation to the other, if the direction of pressure is not substantially normal to the sheets' surfaces.

Still another object is to provide temporary clamps adapted to retain two or more sheets in surface-to-surface relationship, with adhesive between the sheets, with the clamps disposed over the outer surfaces of the sheets, suitably spaced one from another, and, after the adhesive has hardened or dried, the clamps may be readily removed and reused.

Among other objects of the invention are to provide a light-weight, readily and economically manufactured clamp, comprising few parts, adapted to temporarily clamp together sheets of material, such as wallboard, plyboard, veneers and cardboard for the purpose of having them adhere, but the clamp may also be employed in securing together two sheets of metal, particularly where it is desirable that no rivets or bolts and nuts be used, but the sheets spot welded together. By the use of the clamp, the metal sheets will not slip while being welded.

Other objects and advantages of the invention will be apparent during the following detailed description of the invention, taken in connection with the accompanying drawing, forming a part of this specification, and in which drawing:

Figure 1 is a side elevation of the novel clamp in use.

Figure 2 is a view, partly in vertical section, of the clamp being applied, by the use of a special tool therefor.

Figure 3 is a vertical transverse section substantially on the line 3—3 of Figure 1, but with the clamp parts in unclamped relationship.

Figure 4 is a longitudinal section on substantially the line 4—4 of Figure 2.

Figure 5 is a section upon substantially the line 5—5 of Figure 2.

Figure 6 is a top plan view of two sheets of material, with several of the novel clamps applied thereto.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of the invention and wherein similar reference characters designate corresponding parts thruout the several views, the letters A and B may designate two sheets of material, C means for permanently securing them together, D the novel clamp and E means for applying the clamp.

In the example shown, two like sheets A and B are positioned so as to be permanently secured together by the means C between them. Each sheet has an outer surface 10 and inner surface 11, end edges 12 and side edges 13 and each sheet is provided with a plurality of minute perforations 14 suitably spaced apart over its area, the perforations of one sheet aligning with those of the other sheet and their axes being substantially normal to the surfaces 10 and 11.

The means C, in the example shown, may be an adhesive such as glue, evenly spread over the inner surfaces 11 of the sheets A and B.

The novel clamp D includes a length 15 of material which may extend thru the perforations 14 and be placed under tension, means 16 including a plate 17 for retaining the length 15 against movement in one direction and afford a broad flat face in contact with one outer surface 10, a broad flat plate member 18 including a plate 19 substantially like the plate 17 for contacting the other outer surface 10, a housing 20 and a wedge member 21 in the housing.

Small-gauge wire may comprise the length 15 of material to be placed under tension. The physical qualities of the wire are that it may be tensioned and will not break nor elongate under tension. The smaller circumference of the wire, the better, where it meets the qualities above. Since the perforations 14 serve no other purpose than temporarily to snugly accommodate the wire, and it is very often desirable that the perforations do not show up materially, the gauge of the wire should be as small as possible. A steel

wire of 35 to 55 thousandths inch diameter gauge is suggested as a desirable wire to be employed. The wire extends through the aligning perforations 14 and projects on either side thereof.

The means 16 includes a broad flat plate 17 with its inner face 23 in contact with one surface 10. This plate 17 is made broad since it is desirable that, due to one of the uses of the novel clamp, that is, to clamp two sheets or the like of material together to secure them together with adhesive between them, there be a broad pressure area. The plate 17 may have upturned edges 24. Extending from the outer face 25 of the plate 17 is a collar 26 with a bore to accommodate the length 15, and four braces 27 for the collar. This collar and braces may be formed of two like sections 28 of suitable material, each formed to provide a semi-circular wall forming one-half 29 of the collar 26 and two diverging arms 30 with feet 31 forming two of the four braces 27. The two sections 28 may be secured together as by spot welding and secured to the plate 17 in a like manner with the bore of the collar aligning with a centrally-disposed perforation 32 in the plate 17 to accommodate the length 15. The outer end of the collar 26 provides a substantially flat edge 33 upon which rests an enlargement 34 suitably secured to the extremity of the end 22 of the length 15. When the plate 17 contacts one outer surface 10 and the enlargement 34 contacts the collar edge 33, the length 15 is prevented from moving in one direction—that is toward the other outer surface 10.

As for the plate 19 of the plate member 18, this is substantially like the plate 17, being broad and flat with its inner face 35 in contact with the opposite surface 10, and may have upturned edges 36 and a centrally-disposed perforation 37 to accommodate the length 15. The superstructure of the member 18 is different from that of the plate 17, and comprises the housing 20 extending from the outer face 38 of the plate 19.

The housing 20 has an open outer end 39 with two of the facing walls 40 of the housing converging from the end 39 until they meet the outer face 38 of the plate 19. The other facing walls 41 may be normal to the face 38 and be provided, at their outer ends by inwardly-facing lugs or projections 42. These lugs 42 may be formed by bending over the material forming the walls 41. The housing 20 and four braces 43 therefor, may be formed of two substantially like sections 44 of suitable material, each formed to provide one-half 45 of each converging wall 40 and an entire wall 41 with two diverging arms 46 and feet 47. The two sections 44 may be secured together and the assembly secured to the plate 19 as by spot welding. The recess 48 provided in the housing 20 is positioned with its axis aligning with the axis of the perforation 37. Arranging the arms 46 with relation to the wall 40, by having an arm 46 extend from each half wall 40 reinforces the walls 40 where the pressure is greatest when the clamp is in operation.

Disposed in the recess 48 is the wedge member 21 which comprises two substantially like portions 50 each having an outer face 51, inner face 52, a face 53 sloping outwardly from the inner to the outer faces and a face 54 opposite the face 53, substantially normal to the faces 51 and 52. There are two faces 55 paralleling each other and joining the faces 51 and 52 as well as 53 and 54. The face 54 is provided with a centrally-disposed straight groove 56 extending from the face 51 to the face 52 with the groove semi-circular in transverse cross section. When the two sections 50 are placed together with the faces 54 in contact, the straight distance from the base of one groove 56 to the base of the other groove should be slightly less than the diameter of the length 15 of wire or the like. Extending into each face 55 is a horizontal slot or recess 57, wider than the travel of the wedge member 21 and the lugs 42 extend into these slots. That is, when the wedge member has been forced toward the plate 19, the lugs 42 will not contact the wall 58 of the slot 57 nearest the outer face 51. These lugs retain the wedge portions 50 against becoming separated from the housing 20. The wall 58 has another function, to be later described.

It will be noted in Figures 1, 2 and 3 that the wedge member 21 always extends outwardly of the housing 20 and, in Figure 3, that the innermost faces 52 do not contact the plate 19. In fact, there is a space between these faces 52 and the plate 19 housing a resilient member, such as an expansion coil spring 59, normally tending to force the wedge sections outwardly. Of course the sloping faces 53 of the wedge member 21 normally slide over the faces of the converging walls 40 but may be forced to frictionally grip the latter faces.

Now as for the means E for applying the clamp, the same operates to draw the two plates 17 and 19 toward each other to force the wedge member 21 toward the plate 19, and to place the length 15 of wire or the like under tension. The means E includes two main handle levers 60. One lever 60 comprises a handle portion 61 and a forked end portion 62 with the forked end portion 62 provided with a flat face 63 adapted to contact the outer faces 51 of the wedge portions 50 when the forked end is about the length 15. The width of the fork is such that the end portion 62 does not bind herewith. This lever 60 carries a bow spring 64, secured thereto at one end, in any approved manner. The other lever 60 comprises an integral handle portion 65 and jaw portion 66 having a wire engaging edge or tooth 67, and a pivoted portion 68 including a substantially U-shaped section 69 adapted to extend around the length 15, with the other end 70 of the pivoted portion 68 providing an abutment section contacting the bow of the bow spring 64. The portion 68 is pivoted as at 71 to the jaw portion 66. A bow spring 72 is secured to the lever 60 intermediate the portions 65 and 66 and disposed between the end 70 and the handle portion 65. The spring 72 is of less strength than the spring 64. Intermediate the ends of the pivoted portion 68 (along its abutment section 70), the latter is pivotally connected with a pair of plates 73 which extend along the sides of the levers 60, retaining the latter against lateral movement but permitting longitudinal movement when the levers are associated as in Figure 2. Upon grasping the handle portions 61 and 65 and pressing them together, the jaw portion 66 with its associated U-shaped section 69 tend to move away from the forked end portion 62 while the same action forces the tooth 67 into biting or close frictional contact with the length 15. This multiple action draws the length 15 taut, with the plate 17 tight against one outer face 10, forces the wedge member 21 toward the sheets A and B and, consequently, the wedge portions

50 tight within the recess 48 and against the length 15, compresses the spring 59, and forces the plate 19 against the other outer face 10, drawing both sheets A and B toward each other. The means E now may be removed, but the clamp will not become disconnected due to the tension of the wire, tending to draw the wedge member 21 toward the means 16. However, all that is required in order to disconnect the clamp D, is to insert the free end of a suitable tool, as a screw driver, into one of the slots 57, with its tip against the wall 58 thereof and cant the tool downwardly, thus forcing the wedge member 21 outwardly.

The clamps D may be applied to the sheets A and B, spaced at any desired distance apart, such as shown in Figure 6, where 4 clamps have been applied and the others applied at the areas of the perforations, whereupon the adhesive may be allowed to dry or harden. Then the clamps D are removed as stated, for reuse, and the minute perforations suitably plugged if desired.

By the use of these novel clamps D, large sheets may be thoroughly secured together over their entire contacting surfaces, whether two or more sheets are to be so secured and, since the clamps are of light weight, the sheets may be stacked on end for drying or laid horizontal.

Since what is desired is a broad contact area of clamp to sheets, in order to provide a broad contact area of sheet to sheet, the plates 17 and 19 are not mere devices adapted to house a wedge and provide an abutment for an enlargement upon the end of a wire.

It should be noted that no part of the wedge member extends into the perforations in the sheets A or B nor the perforation 37, consequently the perforations 14 are no larger than the transverse cross sectional area of the length 15. The smaller these perforations 14 are, the better, since their sole function is to temporarily accommodate the length 15.

Various changes may be made to the form of invention herein shown and described without departing from the spirit of the invention or scope of the claim.

What is claimed is:

In a clamping device, adapted to temporarily clamp together two sheets with adhesive between said sheets and having an aligning perforation in each sheet, a length of wire adapted to extend through and substantially fill said perforations and to project outwardly therefrom; means at one end of said wire for retaining said wire against movement in one direction, including a broad, flat plate adapted to contact one outer face of one of said sheets; a second broad, flat plate, including a plate of substantially the same area as said first-named plate and adapted to contact the outer face of the other of said sheets, said second plate having a centrally located opening therethrough accommodating said wire, a pair of brackets mounted to extend upwardly from said second plate and shaped to form a recess around said opening, two opposite walls of said recess converging toward said second plate and two opposite walls being normal thereto, said brackets abutting each other intermediate the width of said recess and having end portions diverging from the points of abutment, means securing said brackets to said second plate, and a split wedge member within said recess and having a slidable bearing against the walls thereof, each half of said split wedge member having a vertical groove on that face thereof which contacts the other half, said grooves being complementary and arranged to embrace said wire and frictionally bind therewith when said wedge member is forced into said recess.

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