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(19)



(54) PROCESSES AND DEVICES FOR MOUNTING FASTENING
 ELEMENTS TO ONE SIDE OF A COMPOSITE PANEL

- (71) We, SWISS ALUMINIUM LTD, a company organised under the laws of Switzerland, of Chippis (Canton of Valais), Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—
- 10 This invention relates to processes and devices for mounting fastening elements to one side of a composite panel, in particular to a panel which has a core layer and two metallic outer layers.
- 15 A number of fastening elements which can be fixed to one side of relatively thin sheets of wood or composite panels are already known but have the disadvantage that they do not ensure a flawless appearance, either because relatively high pressure has to be applied locally to mount the fixture, thus producing an irregularity on the outer surface of the panel, or else because the fastening element can be mounted only by uneconomic means.
- 25 The object of the invention presented here was to develop a process and a device for mounting fastening elements to one side of a composite panel, in particular to a composite panel which has a core layer and two metallic outer layers, by means of which process and device the above-mentioned disadvantages associated with known fastening elements for composite panels are avoided.
- 30 The object of the invention is achieved by way of a process using a rigid fastening element, which has at one end a metallic expanding claw, in which process the claw is inserted into a blind hole in one face of

the panel, and then an accessory on a pneumatically powered gun is employed to urge the claw towards the panel, while gripping the fastening element and exerting on the fastening element a force away from the panel.

The accompanying drawings show in a simplified, schematic manner one example embodying the invention. In these drawings:—

Figure 1 shows a device for mounting a fastening element to a composite panel;

Figure 2 shows a rigid fastening element for holding a panel in place, set into a blind hole in a composite panel and fitted with an expanding claw; and

Figure 3 shows a section through a composite panel and a support member of angle iron joined together by means of the fastening element and expanding claw shown in Figure 2.

As shown in Figure 1, the device for mounting fastening elements 4 to one side of a composite panel 1 comprises a pneumatically powered blind rivet gun 2 fitted with an accessory 3. Prior to use, fastening element 4 is associated with an expanding claw 5. The accessory 3 serves to exert forces in opposite axial directions on the fastening element and on the claw.

The accessory 3 includes clamping jaws 6 which are coupled by a sleeve 21 to a piston 8 which can be moved pneumatically up and down in a cylindrical housing 7 of the riveting gun 2, the function of the said clamping jaws 6 being to grip the rigid fastening element 4. The accessory 3 also includes a cap 9 which is screwed on to the housing 7 and has a hole 10 through which the fastening element 4 is passed and

held by the clamping jaws 6. The outer edge of the hole 10 acts as an annular shoulder 11 which abuts the expanding claw 5 on the rigid fastening element 4.

- 5 The rigid fastening element 4 has at its lower end an upwardly-facing, sloping bearing surface 12 (see also Figure 2) for cooperating with the expanding claw 5. In the exemplified embodiment shown in Figures 1 to 3 the rigid fastening element 4 is a bolt 13 with a countersunk head 14. It is also within the scope of the invention that the rigid fastening element 4 can be for example in the form of a simple threaded stud (not described in any greater detail here) which has a nut screwed onto it, having a sloping bearing surface for cooperating with the expanding claw 5. At one end of the fastening element 4 or stud there could also be provided for example a hole into which a support rod projecting out of a wall fits and by which means the composite panel 1 is held in place.

- The relatively thin composite panel 1 shown in Figures 1 to 3 has a core 15 which is preferably made of a plastics material and bonded on both sides to metal cover sheets 16 and 17 made for example out of an aluminium alloy. In one side of the composite panel 1 there is a blind hole 18 which has been drilled into the panel, passing through the cover sheet 16 and extending into the core 15 to a pre-determined depth in accordance with the dimensions of the expanding claw 5. As far as the structure of the composite panel is concerned, special mention must be made of the fact that it may be made (in a manner not described in greater detail here) out of a plurality of layers of wood if desired. It can be seen from the exemplified embodiment shown in Figure 3 how the expanding claw 5 is embedded and anchored in the core 15 under the cover sheet 16 with the help of the special accessory 3 on the blind rivet gun, and the panel is then secured to a piece of angle iron 19 by means of a nut 20 screwed onto the bolt 13.

- In order to mount the rigid fastening element 4 to the composite panel 1, the said element 4, with an expanding claw 5 provided on it, is first placed in the blind hole 8. The accessory 3 of the blind rivet gun 2 is pushed over the fastening element 4 until the shoulder 11 of the accessory 3 rests on the upper edge of the expanding claw 5. On setting the rivet gun 2 into

operation, the piston 8 is urged upwards relatively to the housing 7, the latter being correspondingly urged downwards. In consequence the jaws 6 grip the fastening element, while the shoulder 11 exerts a downward force on the expanding claw 5, starting from the position shown in Figure 2. This causes the expanding claw 5 resting on the sloping surface 12 of the rigid fastening element 4 to move downwards and spread out until it attains the position indicated in Figure 3 in which the fastening element 4 is anchored in the composite panel 1. While this is occurring, the jaws 6 exert an upward force on the fastening element 4 which balances the force exerted by the claw 5 on the surface 12.

On using a fastening element 4 which is in the form of a bolt, the upper edge of an expanding claw 5 usefully becomes engaged with the thread of the bolt during the anchoring process with the rivet gun, thus usefully preventing the bolt from turning.

After mounting the fastening element 4 to the composite panel 1 at the desired place, the panel 1 can then be secured on to a wall in the above described manner.

WHAT WE CLAIM IS:—

1. A process for mounting a fastening element to one side of a composite panel, using a rigid fastening element, which has at one end a metallic expanding claw, in which process the claw is inserted into a blind hole in one face of the panel, and then an accessory on a pneumatically powered gun is employed to urge the claw towards the panel, while gripping the fastening element and exerting on the fastening element a force away from the panel.

2. A process according to claim 1, in which the accessory on the blind rivet gun has clamping jaws for gripping the rigid fastening element, and has an annular shoulder to abut the expanding claw.

3. A process according to claim 1 or claim 2, in which the rigid fastening element is a bolt with a countersunk head.

4. A process according to claim 1 or claim 2, in which the rigid fastening element is a stud which has a nut screwed on to it, the nut having a bearing surface to cooperate with the expanding claw.

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FIG.1.



