

IMPROVED STUD

Technical Field

This invention relates to the building industry. In particular, this invention relates to an improved form of stud for use in building.

5 Background Art

Traditionally, studs for use in building have been constructed in rigid sections. These may have various cross sections, some of the best known in current use being the "C" section and the "dog bone" stud.

Disclosure of the Invention

- 10 This invention is predicated upon the discovery that there are substantial advantages to be gained if a stud is adjustable in a vertical or horizontal direction.

Accordingly, in one form, this invention provides a stud of chosen length, the stud having a plurality of sections, each extending for substantially the length of the
15 stud. In one embodiment, the stud has two or more sections, which are adapted to be moveable one relative to the other so that the stud is adjustable as to height. In another embodiment, the stud has two or more sections which are moveable one relative to the other so that the stud is adjustable horizontally and consequently can vary in thickness. Preferably, the stud is made of first and
20 second sections, being slideable relative to one another.

While the stud of the invention may have any desired number of sections, it is especially preferred that the stud has two or four sections.

In yet a further embodiment, the stud of the invention is a two-part stud in which one part is adapted to intersect with the other to form the stud.

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The invention also provides a stud section for use in forming the stud of the invention.

The improved stud of the present invention may be made of any suitable material, including metal or fibre reinforced cement.

- 5 In the case of the stud of the invention which is adjustable as to height or width, it is contemplated that once the stud is adjusted in the appropriate dimension, either vertically or horizontally, the stud is fixed in position by fixing means. This may be achieved, for example, by fixing one section of the stud to another by various methods. One of these methods is to screw one part of the stud to
10 another. Another is to employ an expanding locking mechanism. A third is to use a ratchet arrangement. Examples of all three will be described in connection with the drawings, below.

- It will be appreciated that the ability to adjust a stud vertically, especially by sliding one section of a two part stud relative to the other, can have decided
15 advantages in building. For example, in the construction of a typical wall made of panels attached to the stud, a panel may be attached to one section of the stud on one side and a second panel attached to the other section of the stud on the other side, the sections of the stud being slideable relative to each other. The panels may thus be raised or lowered to provide a gap for access to cabling and
20 other services within the wall.

Similarly, where a stud is adjustable horizontally, this can be used to create a gap between panels, through which access can be gained to the stud, for example to hang furniture or work stations from the stud.

- The fixing means may also include clips. Further, remote fixing technology may
25 be used and in this regard the contents of International patent specification No. PCT/AU99/00185 are imported herein by reference.

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Brief Description of the Drawings

The invention will now be described in connection with certain embodiments thereof in the attached illustrations, in which:

Figures 1 and 2 illustrate two versions of prior art studs which are of one piece construction and which are not adjustable vertically or horizontally. Figure 1 shows in perspective view part of a C-shaped stud, while Figure 2 shows in perspective view part of a dogbone stud;

Figure 3 shows in perspective view part of an embodiment of an improved stud according to the invention, which is similar to a dog bone stud but which is adjustable for height;

Figure 4 shows in perspective view part of a second embodiment of a stud according to the invention comprising two "C" type sections adjustable relative to each other in a vertical direction;

Figure 5 shows in perspective view part of the stud of Figure 4 with a panel attached (the two part nature of the stud has been omitted for convenience) and a top track for positioning above the stud and panel;

Figure 6 shows in perspective view a detail of an embodiment of a stud similar to that of Figure 4;

Figure 7 shows in perspective view a different embodiment of a stud according to the invention, where the stud is made from four identically-shaped sections;

Figure 8 is a cross-sectional view of the stud of Figure 7;

Figures 9 to 11 detail in plan view options for locking together sections of the stud of Figures 7 and 8;

Figures 12 to 21 show how a two-part stud according to the invention can be locked together by use of a ratchet. Figure 12 is a plan view of the first section of the stud. Figure 13 is a side elevation of part of the section. Figure 14 shows detail of the ratchet component on the first section. Figure 15 is a plan view of

two sections of the stud nested together with the second section shown in dotted outline. Figure 16 is a longitudinal sectional view of part of the two sections when nested together, showing ratchet detail. Figures 17 to 20 are corresponding views of the second section. Figure 21 is the same as Figure 16
5 and is repeated for ready reference;

Figure 22 shows in table form a preferred spacing for the ratchet stud in the previous two embodiments;

Figures 23 to 25 show in perspective view (Figure 23) and plan view (Figures 24 and 25) a further embodiment of the invention in which the stud is adjustable
10 horizontally;

Figures 26 to 30 illustrate in perspective view (except for Figure 28, which is in plan) an embodiment of the invention in which an "X" stud is formed from intersecting portions;

Figure 31 shows in plan view how the sections in Figure 26, for example, can be
15 cut from a single sheet of fibre reinforced cement; and

Figures 32 to 36 show in perspective view parts of further embodiments of improved studs according to the invention.

Best Modes for Carrying out the Invention

It will be noted that in the embodiments in Figures 3 and 4, stud 10 has a first
20 section 12 and a second section 14 which mate through a suitable connection such as U-shaped webs 16 and 17 and which can slide relative to one another in a vertical direction, as shown by arrow 15.

Panels, such as panel 18 in Figure 5 and tracks such as top track 20 in Figures 5 and 6 may be attached to the stud of the invention by any suitable fastening
25 system, including remote fastening as described in International patent application No. PCT/AU99/00185.

As can be seen from Figure 7, the stud of the invention may include apertures 22 (refer also Figures 5 and 6) or spikes 24, which can be used to fix a panel or other element to the stud. Stud 10 in Figures 7 and 8 has four sections 11, 12, 13 and 14, each of which is identical. Each section has at each of its longitudinal edges a U-shaped web 16 or 17 which can mate with web 17 or 16 respectively on an adjoining section.

The sections of stud 10 may be locked together in various ways, for example as shown in Figures 9 to 11. For example, Figure 9 shows a pierced type of fixing wherein a nail or screw is inserted through two U-shaped webs 16 and 17 or web 16 is glued to web 17.

As an alternative, and as illustrated in Figure 10, an expanding locking mechanism 30 may be used to lock web 16 and 17 together. Once mechanism 30 expands, webs 16 and 17 will lock onto each other due to friction. The mechanism 30 may consist of a continuous strip inserted in channel 26 or a series of strips.

Figure 11 shows how panels 18 may be fixed to sections 12 and 13 by any suitable means and result in a decorative feature, in this case, a recessed shadow line 28. It is noted that furniture or decorations may be attached to the stud by using this shadow line 28, without damaging the panels 18. Any holes that are drilled into the shadow line 28 will be more difficult to see than if they were drilled through the panels 18.

The stud sections may lock together by means of a ratchet mechanism in the version illustrated in Figures 12 to 21. As shown in Figures 12 and 15, stud 10 is made of two sections, 32 and 34. Section 32 is illustrated in Figures 12 to 16, with section 34 in dotted outline in Figure 15. Section 34 is illustrated in Figures 17 to 21, with section 32 in dotted outline in Figure 20. Section 32 has V-shaped webs 36 and 38, in each of which has a series of apertures, 40.

Similarly, as shown in Figures 17 to 21, section 34 has V-shaped webs 42 and 44, each of which includes protrusions 46 adapted to mesh with apertures 40 in a ratchet manner, as illustrated in Figure 21.

In Figure 22, the symbol x indicates the position at which protrusion 46 is fully engaged in aperture 40. The symbol o indicates locations of partial engagement. The left hand side of Figure 22 represents spacing at 20mm, while the right hand side represents spacing at 18mm.

- 5 As shown in Figure 22, when the ratchet spacing is chosen appropriately, the sections 32 and 34 of the stud 10 may engage in five places over the space of one meter or eleven places over the space of two meters. In addition, there will be a partial lock at every two millimetre interval in the illustration shown.

It is to be appreciated that the ratchet mechanism can be used on a wide variety
10 of stud designs.

As earlier indicated, it is within the scope of the invention that the stud can be adjustable horizontally. One embodiment of this version of the invention is shown in Figures 23 to 25, where the stud is made of two portions, 50 and 52, which are triangular in cross-section. When portion 52 is adjusted relative to portion 50, for
15 example as shown in Figure 25, the stud can increase in thickness and be used where it is desired to space wall panels further apart. Of course, the stud in Figures 23 to 25 may also be adjustable vertically.

The stud in Figures 26 to 31 is particularly suitable for manufacture from a fibre reinforced cement (FRC) sheet (refer Figure 31). After the portions 51 and 53
20 have been cut from the sheet, and unwanted sections 54 and 56 have been removed, portion 51 can be mated with portion 53 as shown in Figure 27 to form an "X" stud, as shown in Figure 28. Especially when this type of stud is used to connect FRC panels, the resulting structure is homogenous. Thus panels will have the same capability of expansion and contraction as the stud.

- 25 The stud of Figures 28 to 30 is also illustrated in Figure 34 and a further variation is shown in Figure 35 where the stud is enclosed in a box. This box, and the studs in Figures 32 and 33 as well the elements found in Figure 36, may be constructed from a web made of suitable material, such as fibre reinforced cement. The sections of the web may be hinged together by using paper tape
30 hinges or polysulphide type hinges or clip hinges, for example.

It will be readily apparent to one skilled in the art that the various improved studs described above represent significant steps forward in the art. It will be especially appreciated that studs made of the same material as the panels or elements which are to be attached to them can have decided advantages over
5 conventional systems.

The scope of this invention is not limited by the embodiments described above. Various modifications may be made without departing from the spirit of the invention.

Industrial Applicability

- 10 The invention represents a significant step forward in the technology relating to studs used in the building industry and is capable of producing studs at a low cost, as well as having flexibility in relation to movement horizontally and vertically.

Claims

1. A stud of chosen length, the stud having a plurality of sections, each extending for substantially the length of the stud.
2. The stud of claim 1, wherein the stud has first and second sections.
- 5 3. The stud of claim 2, wherein the first section is moveable relative to the second section in a direction parallel to the length of the stud.
4. The stud of claim 2, wherein the first section is moveable relative to the second section in a direction perpendicular to the length of the stud.
- 10 5. The stud of any one of claims 1 to 4, wherein the sections are adapted to be fixed by fixing means chosen from the group comprising screws, expanded locking mechanisms and ratchet arrangements.
6. The stud of any one of claims 1 to 3, wherein each section has a U-shaped web and the sections are adapted to connect by mating the U-shaped webs.
- 15 7. The stud of claim 6, wherein the mated U-shaped webs are locked together by fixing means chosen from the group comprising screws, expanded locking mechanisms and ratchet arrangements.
8. The stud of claim 2, wherein the first and second sections are cut from a single piece of material so as to form a plurality of fingers adapted to be interlaced to form the stud.
- 20 9. A stud of chosen length as substantially herein described with reference to any one of Figures 3 to 36 of the accompanying drawings.
10. A stud section adapted to form the stud of any one of claims 1 to 9.



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