Sept. 22, 1942. O. E. GIBSON ET AL 2,296,609

BUILDING CONSTRUCTION

Filed March 27, 1939 2 Sheets-Sheet 1

Fig. 1.

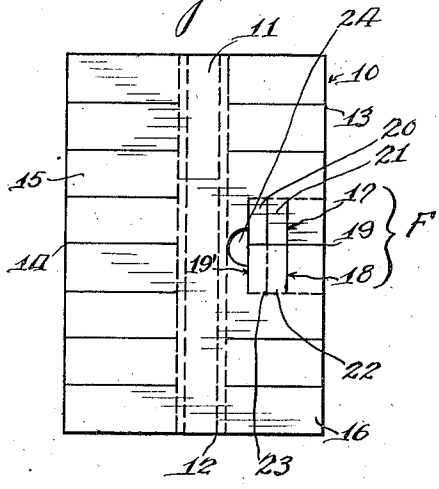


Fig. 2.

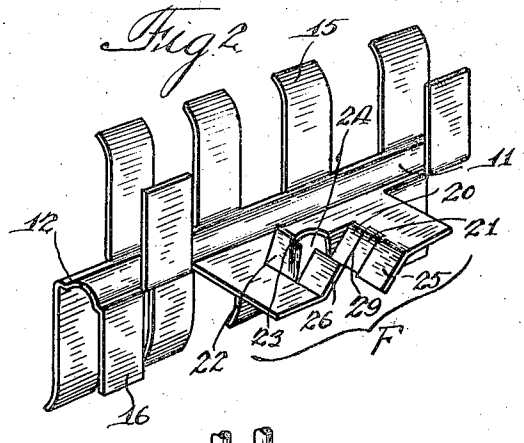


Fig. 3.

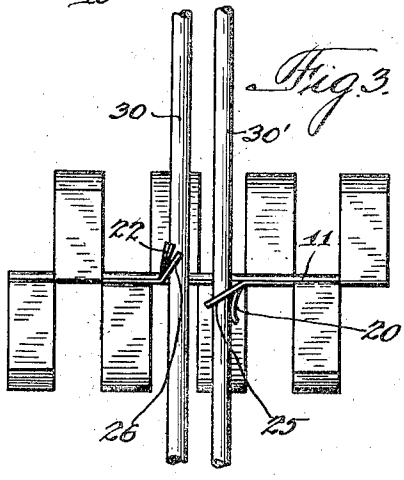


Fig. 6.

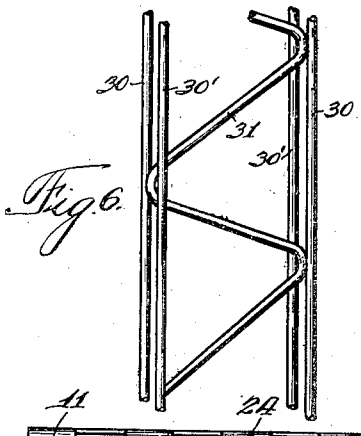


Fig. 5.

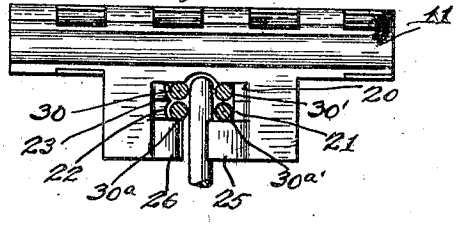
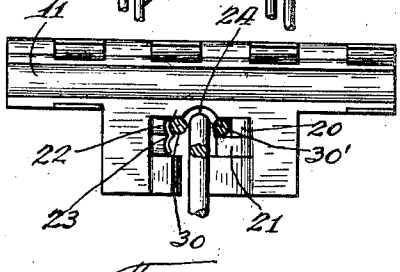


Fig. 4.



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BUILDING CONSTRUCTION

Filed March 27, 1939 2 Sheets-Sheet 2

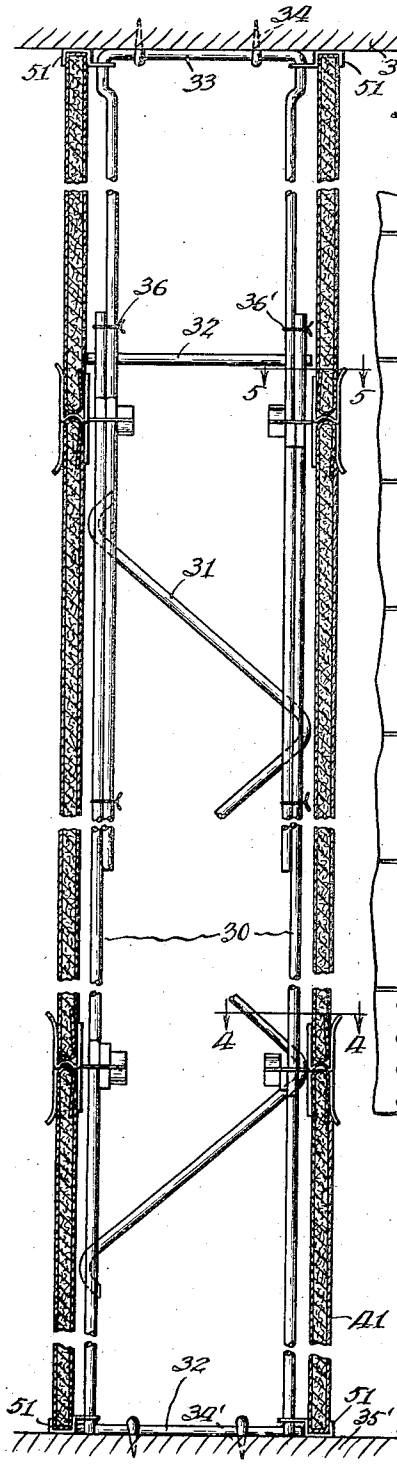


Fig 7.

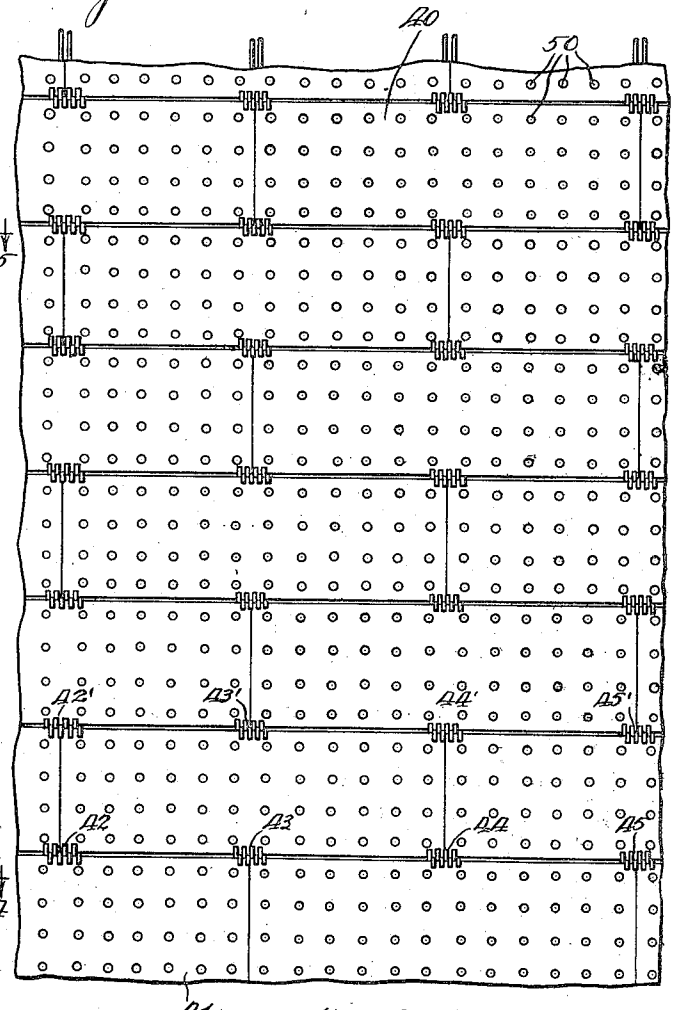


Fig 8

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UNITED STATES PATENT OFFICE

2,296,609

BUILDING CONSTRUCTION

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Application March 27, 1939, Serial No. 264,324

12 Claims. (Cl. 72—118)

The present invention relates to an improvement in building construction, involving the combination of wire studding and plaster boards together with suitable clips for the attachment of said boards to the studding in a rigid and secure manner. The term "plaster boards" as used in the present specification is intended to cover any type whatsoever of building board suitable for the reception of a coating of plaster. That is to say, the boards may consist of slabs of cement or plaster without any covering whatsoever, either reinforced or not; or they may be fibrous boards, either organic or inorganic, or boards consisting of combinations of fiber and cementitious materials such as the well known wallboards having outer surfaces of fabric or paper and a core of cementitious material, or boards or sheets made of ceramic materials or of metal, either perforated or not, or any other equivalent structure which is capable of receiving and holding a coating of plaster.

The invention also concerns itself in part with the clips employed for fastening the plaster board to the studding and with combinations of the studding, clips and plaster boards when erected, ready for the reception of the plaster coating.

One of the objects of the invention is to provide relatively inexpensive, substantially incombustible and conveniently assembled means for the erection of partitions and walls which may extend either vertically or horizontally, comprising, for example, vertically extending wire studding composed of two pairs of longitudinally extending strands to which there has been welded a transversely extending web-forming portion of strands which may extend either obliquely or at right angles to the strands and which preferably are located between each of the strands, constituting a pair, and being spot welded or otherwise rigidly secured to the strands. In co-operation with this type of studding there is a particular and special type of clip which has an elongated central portion and fingers extending therefrom, forming, together with the longitudinal central web or portion, a flange or flanges for the reception of the edge portions of plaster boards, the clip also having a rearwardly extending flange which itself is cut and bent so as to provide at least one bendable tongue and, preferably, also another relatively rigid tongue, the latter for abutment against a strand of the studding and the other sufficiently bendable to adjust itself when the clip is attached to the studding by the erector, so as automatically to adjust itself to the distance between the strands, as a result of which the clip is attached to the wire studding rigidly and without movement toward or away from the studding, so that the plaster boards will be held rigidly thereto with substantially no play.

Further details will be readily understood from the further description herein when read in connection with the drawings filed concurrently herewith, in which

Fig. 1 is a plan view of a piece of sheet metal suitably slotted and stamped so as to provide a blank from which the clip is made;

Fig. 2 is a perspective view from the rear of the completed clip, substantially on a full size scale;

Fig. 3 is a view from the rear of a portion of the clip when attached to the studding;

Fig. 4 is a sectional view of a part of the studding, looking down from above, showing the two strands thereof and their manner of engagement with the clip and the aforementioned tongues;

Fig. 5 is a view similar to Fig. 4 but showing the clip in engagement with a double pair of strands;

Fig. 6 is a perspective view of the studding employed;

Fig. 7 is a vertical section through a completed wall, showing some of the plaster boards in section and showing an elevation of the studding and corresponding end view of the clips in engagement both with the plaster boards and with the strands of the studding; and

Fig. 8 is an elevational view of a portion of a completed wall, containing plaster boards and clips, ready for the reception of the plaster coating.

Referring to Fig. 1, which shows some the steps employed in making the clip, it will be seen that this comprises a sheet of metal broadly designated by the reference numeral **10**. This piece of sheet metal has an elongated central portion **11** which preferably, but not necessarily, is provided with a central rib **12** for the purpose of rendering it relatively rigid and not easily bent in use. By suitable cuts **13** and **14** the two sidewardly extending portions of the sheet relative to the central portion **11** are divided into a number of individual fingers **15** and **16** while cuts **17**, **18**, **19** and **19'** permit the formation of a rearwardly extending flange F which in one embodiment is provided with tongues **20** and **21** of a bendable nature and a comparatively rigid tongue **22** having a substantially centrally located rib or indentation **23**. The blank also has a substantially semicircular cutaway portion **24** whose

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function, in connection with flange F, is to permit the passage of certain portions of a co-operating stud.

From an examination of Fig. 2, which is a rear perspective view of the completed clip of the present invention, it will be seen that the fingers 15 and 16 have been bent at a right angle to the central web 11 so as to form upwardly and downwardly extending fingers which preferably are slightly outwardly flared, at least on the front of the clip, these fingers together with the web 11 thus forming channel members for the reception of the edge portions of suitable plaster boards which are pushed into the flanges until the ends of the boards abut against the central web 11. As also shown in Fig. 2, it is preferable but not absolutely essential to provide the central web 11 with the rib 12, so that it may have requisite rigidity to resist bending strains. This rib may be quite wide, as shown in Fig. 2. The rearwardly extending flange F is provided with two opposed lugs 25 and 26, lug 25 extending at an angle downwardly and lug 26 at an angle upwardly, while adjacent the lug 26 and inwardly therefrom there is the angularly upstanding tongue 22, which is rendered rigid by being bent or slightly ribbed as at 23. The purpose of doing this will be explained later in connection with the manner of use of the clip. Adjacent the lug 25 and inwardly therefrom there may be one or two bendable tongues 20 and 21 which, as the clip is made and furnished to the user, extend substantially in the same plane as the lug 25 while the rigid tongue 22 is out of the plane of the lug 26 and may be entirely vertical but preferably is slightly inclined toward the central space of the flange F. The cutaway portion 24 has already been mentioned in connection with the flange.

Referring for the moment to Figs. 6 and 7, it will be seen that there is provided a vertically extending wire studding consisting of two pairs of strands 30 and 30' which are connected by transverse obliquely - extending web - forming wires 31 and, if desired, one or more transverse individual wires 32 (Fig. 7), these being welded between each pair of strands so as to unite the strands together with the transverse web-forming members to form a unitary stud. The stud itself is somewhat less in length than the distance from the floor to the ceiling which it is intended to subtend, the rest of the distance being made up by the employment of an auxiliary adjustable extension piece which consists of a transverse portion 33 and two downwardly depending members which between them grasp the crosspiece 32 and which themselves lie immediately behind the strands 30 and 30' of the completed, erected studding, this construction best being seen by a perusal of Fig. 7 and in section on Figs. 4 and 5. By sliding the extension piece until it strikes the ceiling and securing it, for example by staples 34 driven into a wooden scantling or beam 35, this extension piece is fastened to the ceiling. At the same time, staples 34' are fastened across the transverse piece 32 adjacent the floor. Alternatively, a metallic channel runner may be provided, having suitable holes through which wires may be passed and fastened to the studs, this runner being secured to the ceiling and floor, respectively. The extension piece and the stud proper are fastened together by means of tie wires 36 and 36'.

Referring now to Fig. 3, this shows a portion of the strands 30 and 30' viewed from a position at the rear of one of the pairs of strands, showing the clip in its final position. It will be noticed that the central web or portion 11 of the clip extends at substantially a right angle to the general direction of the strands 30 and 30'. The upstanding relatively rigid tongue 22 abuts against the side of the strand 30 while the lug 26 subtends the rear surface of the strand 30 so that it is impossible to pull the clip away from the strand because of the interlock thus produced. The lug 25 subtends the other strand 30', the bendable tongue 20 (assuming for the moment that in that particular clip there is only one of these tongues) having been bent further down than its original position, tangent to the side of the strand 30'. The clip is placed onto the strands in an oblique position and then bent so that the central web is at right angles, thereby bending the tongue 20 and thus automatically providing for a span between the tongue 20 and the tongue 22 of exactly the proper distance to prevent sideways movement of the clip. This is an important feature which completely differentiates the clip of the present invention from any clips of the prior art, none of which had this feature of automatic adjustability. By making the tongue 22 relatively rigid it will not bend when the clip is placed in horizontal position, but the tongue 20 will bend. A possible alternative is to make tongues 22, 20 and 21 of the same degree of bendability, without resorting to making tongue 22 less bendable.

If the clip is of the configuration shown in Fig. 2, the tongue 21 will lie directly behind the lug 25, as seen in Fig. 3, this tongue 21 thus performing the same function as the lug 25. In other words, if the clip is to be used at all times with a stud having merely a single pair of strands, the slit 29 which separates the tongues 20 and 21 need not be made, for in that case the lug 25 would have a width equal to 25 plus 21. However, inasmuch as for purposes of longitudinal adjustability it is preferred to employ two telescoping pairs of strands as shown in Figs. 5 and 7, the two bendable tongues 20 and 21 are provided.

By reference to Fig. 4, the appearance of the clip when viewed from above can readily be seen. In that figure, the strands 30 and 30' are shown in section. The tongue 22 with its central rib 23 can thus plainly be seen, and it will be noticed that the tongue 22, because of its bent form, will force or press the strand 30 against the shoulder of the central web portion 11 of the clip. At the right-hand side of the drawing it will be seen that the tongue 20 has been bent as a result of its contact with the strand 30' while the tongue 21 remains substantially unbent, in that case subtending the rear surface of the strand 30', thus also holding that strand in close contact with the shoulder of the web 11. Inasmuch as it is desired to slide these clips up and down along the strands of the studding to permit its adjustment according to the size of the plaster boards employed, and because of the fact that the transverse oblique as well as horizontal web-forming members 31 and 32 project slightly beyond the pairs of strands of the studding, the cutaway portion 24 is provided so that these extending portions may freely be passed by the clip.

In Fig. 5 the conditions obtaining when the clip happens to lie at that portion of the structure where there are two pairs of strands can readily be seen. In that case the strands are

doubled, one beyond the other, being designated in Fig. 5 by the numerals **30** and **30'** and **30***a* and **30***a'*. In this construction the lug **26** subtends the rear strand **30***a* while the lug **25** subtends the rear strand **30***a'* and both tongues **20** and **21** are bent downwardly so as to lie against the strands **30'** and **30***a'* respectively, while the relatively rigid tongue **22** with its central rib **23** abuts the strands **30** and **30***a* respectively.

As can be seen from Fig. 8, plaster board edge portions are inserted into the flanges provided by the fingers **15** and **16** respectively, the clips lying both at the central portion and the edge portions of the plaster boards **40** (Fig. 8). It is preferable to mount the boards in staggered relationship, and if desired they may be of the perforated plaster board type. Some indication is given in the drawing of the use of this type of plaster board, although, as above mentioned, the type of plaster board is a matter of indifference so far as the present invention is concerned, and the illustration of perforated paper-covered plaster boards is to be construed as merely exemplificative and not at all limiting.

The tops and bottoms of the boards are secured to the studs by comparatively simple clips **51** which are suitably fastened to the studs. These clips merely have upstanding flanges which subtend the lower edges of the lowermost boards and the uppermost edges of the topmost boards. The boards can be sprung into these clips at the top. Alternatively, nails driven into the floor and ceiling may secure the ends of the boards.

The present construction provides a very rapid means of erecting a wall or partition. For example, a workman applies one part of the studding to the ceiling by means of the staples **34'** and then slides a corresponding piece of studding into sufficient overlap with the first portion, securing the bottom thereof to the floor by means of the staples **34'**, then tying the strands of the studding together by the tie wires **36** and **36'**. This therefore constitutes the vertical supporting means to which the clips are then attached. There may first be laid along the floor, and extending vertically, a lowermost row of plaster boards **41** (Figs. 7 and 8), using, for example, clips **51**, or driving nails in front of the boards or obliquely through them. Suitable clips **42**, **43**, **44** and **45**, constructed in accordance with the present invention, may be put in place by first passing them, by means of the opening in the rearwardly extending flange, through the studding and then turning the clips so that the central web extends at a right angle to the strands of the studding, thus bending the bendable tongue **20** and possibly also tongue **21**, depending upon whether or not there is any overlap at that point. If all tongues are bendable, they will bend accordingly. As shown, there would be no overlap near the lower end of the drawing. The clip is then moved downwardly along the studding until the downwardly extending channel engages the upper edge portions of the lowermost set of plaster boards **41**. Thereafter a second row of plaster boards is put in place, the lower edges thereof being forced into the upwardly extending channels of the already affixed clips, whereupon a second row of clips **42'**, **43'**, **44'** and **45'** is put in place in exactly the same manner as already described and a further row of plaster boards supplied, etc., until the wall has been erected to the desired height. Wherever there is an overlap of the strands of the studding, clips having the configuration shown in Fig. 2 are employed, these having two bendable tongues **20** and **21**. It will be seen, however, that for most purposes it suffices to have available merely a clip as shown in Fig. 2, in which case the tongue **21** merely performs the function of the lug **25**, with which it might just as well have been made integrally instead of separated by a slit. In either event, the clip is tightly held to the strands and because of the abutment of the tongue **22**, after being once in place, is relatively difficult to slide up or down on the studs, the rib **23** on the tongue serving to give a sort of "bite" to the tongue.

After all the members have been put in place, plaster of any suitable kind may then be applied thereto and the wall then completed in the usual fashion.

It will be readily appreciated that this structure provides a substantially fireproof construction if the boards are of incombustible material or a fire-retarding wall if the boards consist of combustible or a combination of combustible and incombustible materials. If the boards consist of ceramic plates, then the entire structure is substantially fireproof, which would also be the case if the plates consisted entirely of cementitious material such as Portland cement or set gypsum. In the particular construction illustrated in Fig. 8, the boards consist of perforated plaster having outer layers of paper, these boards being provided with holes **50** through which some of the plaster applied can pass in order to form interlocking buttons or keys. This type of construction is quite highly fire resistant by virtue of the fact that should a fire occur and the plaster as well as the plaster of the boards become calcined by the heat, relatively thicker and rearwardly extending buttons will be protected against calcination by reason of their thickness and thus will retain sufficient strength to hold the plaster onto the wall, preventing the fire from breaking through the wall into the next adjacent space or room.

The provision of the rib **12** on the central body portion **11** of the clip is considered to be an important feature of the invention and is broadly new, as is also the provision of the combination of bendable and relatively unbendable tongue portions in the flange F.

Saving for ourselves such equivalents as will occurr to those skilled in the art to which this invention applies, we claim:

1. A clip of the character described consisting of a unitary piece of sheet metal cut and bent so as to provide a longitudinally extending comparatively rigid central portion, fingers thereon for engaging the edge portions of a plaster board, and an outstanding flange for engagement with wire studding, said flange comprising two separately bendable tongues on one side and a relatively stiff partly upstanding tongue on the other side as well as two angularly extending lugs beyond said tongues at the point farthest removed from the central portion.

2. A clip of the character described consisting of a unitary piece of sheet metal cut and bent so as to provide a longitudinally extending comparatively rigid central portion reinforced by being ribbed, upstanding and depending fingers thereon to form means for engaging the edge portions of a plaster board, and an outstanding flange for engagement with wire studding, said flange comprising two narrow depending separately bendable tongues and a lug on one side

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and an upstanding inclined relatively rigid tongue and a lug on the other side, said rigid tongue being reinforced by being ribbed, and both of said lugs being at points farthest removed from the central portion.

3. A clip of the character described consisting of a single piece of sheet metal cut and bent so as to provide a longitudinally ribbed relatively unbendable central web or body portion, comparatively resilient fingers extending at right angles to the body portion and together therewith forming channels for the reception of the edge portions of plaster boards, and a sidewardly extending flange provided with a cutaway portion for reception of the transverse web-forming wires of a wire stud and having on one side and in the order named in the direction from the central portion, respectively, two relatively narrow bendable tongues each of a size to correspond in width to the thickness of one strand of a wire stud and a wider lug, and on the other side an inclined tongue of a width equal to twice the diameter of the said strand, and a lug of approximately the same width.

4. A clip of the character described consisting of a single piece of sheet metal cut and bent so as to provide a central longitudinally extending ribbed web or body portion resistant to bending strains, fingers extending in both directions at right angles to said web to form channels capable of engaging edge portions of plaster boards and, extending in the same plane as the web, a rearwardly extending wire-stud-embracing flange cut centrally and slotted so as to provide two separately bendable tongues each of a width equal to the thickness of a strand of a wire stud, and a wider lug, and a relatively rigid ribbed tongue and a wide lug on the other side, whereby when the flange engages a wire stud one strand thereof will bend one of said bendable tongues while the other will clasp the strand between its sides and the body of the flange while the rigid ribbed tongue will force the other strand toward the body of the flange, thus locking the clip to the stud.

5. In a wall structure, means for supporting plaster boards comprising the combination of wire studding consisting of two pairs of longitudinal wire strands connected by transversely extending web-forming strands welded to said longitudinal strands, and therewith co-operating clips, each of which clips consists of a single sheet of metal cut and bent so as to provide a longitudinal central web, divergently extending fingers thereon for engaging edge portions of plaster boards, and a rearwardly extending flange, the latter having two lugs, each of which is adapted to engage the rear surface of a strand of a pair of said wire strands, a bendable tongue for adjustable bearing against one strand and a rigid tongue for rigid abutment against the other strand, whereby the clip is held in rigid contact with the stud when its central web is at a right angle to the strand.

6. In a wall structure, means for supporting plaster boards comprising the combination of wire studding consisting of two pairs of longitudinal wire strands connected by transversely extending web-forming strands welded to said longitudinal strands, and therewith co-operating clips, each of which clips consists of a single sheet of metal cut and bent so as to provide a longitudinal central web, divergently extending fingers thereon for engaging edge portions of plaster boards, and a rearwardly extending flange, the latter having two lugs, each of which is adapted to engage the rear surface of a strand of a pair of said wire strands, two bendable tongues for adjustable bearing against the one pair of longitudinal strands of the stud and a relatively rigid tongue for rigid abutment against the other pair of strands, whereby the clip is held in rigid contact with the stud when its central web is at a right angle to the strands.

7. In a wall structure, means for supporting plaster boards comprising the combination of wire studding consisting of two pairs of longitudinal wire strands connected by transversely extending web-forming strands welded to said longitudinal strands, and therewith co-operating clips, each of which clips consists of a single sheet of metal cut and bent so as to provide a longitudinal central web, divergently extending fingers thereon for engaging edge portions of plaster boards, and a rearwardly extending flange, the latter having two lugs, each of which is adapted to engage the rear surface of a strand of a pair of said wire strands, two bendable tongues for adjustable bearing against the one pair of longitudinal strands of the stud and a relatively rigid tongue for rigid abutment against the other pair of strands, whereby the clip is held in rigid contact with the stud when its central web is at a right angle to the strands, the flange also having a cutaway portion to permit passage of the protruding end of the web-forming transverse strands of the stud when the clip is slid along the stud.

8. A clip of the character described comprising a relatively rigid central web, upstanding fingers thereon forming channels for the engagement of plaster board, and a rearwardly extending flange split and formed into two opposed tongues to engage the sides of a stud, and two lugs each adapted to automatically engage the rear surface of a strand of a pair of wire strands of a wire studding to which the clip is attached by rotary movement.

9. A sheet metal clip formed of a single blank and comprising a web having oppositely extending fingers forming channels, and a rearwardly extending flange, said flange being formed to provide a channel in angular transverse relation to the plane of said web for the entrance of a studding when said clip is placed thereon, said flange having edge portions extending therefrom and positioned to engage behind and on each side of a portion of said studding when said clip is turned to a position perpendicular to said studding.

10. A clip of the character described comprising a single piece of sheet metal cut and bent so as to provide a single elongated central web, fingers extending from said single web in two directions to form channels for the reception of building boards, a flange substantially in the plane of said web and having an opening therethrough to receive a stud, said flange being provided with a bendable tongue on one side and a relatively rigid tongue on the other side, said tongues being spaced for the reception of a portion of a stud therebetween and so related that, when said clip is positioned on a stud at an angle to the perpendicular and then turned perpendicular to said stud, the distance between stud-engaging portions of said tongues becomes automatically adjustable to fit the dimensions of said stud, said opening having bent out edge portions positioned to engage behind a portion of said stud to retain said clip thereon.

11. A sheet metal clip comprising a web having fingers oppositely extending from each edge to form channels, a flange extending rearwardly from said web, said flange having an opening extending from the outer edge thereof toward said web for the entrance of a stud, the edges of said opening being bent out to provide a channel for said stud angular to the plane of said web and to snugly engage the sides and the rear of a portion of a stud when said clip is placed angular thereon and then turned perpendicular thereto.

12. A clip formed of a single piece of thin sheet metal sheared to provide a narrow web and a plurality of closely adjacent narrow fingers on each side of said web with a wide central supporting flange on one side between closely adjacent fingers, said fingers being bent substantially at right angles to said web to provide oppositely disposed wallboard channels, with said flange substantially in the plane of said web, said flange being slit and the edges of said slit bent out to subtend a portion of a stud when said clip is placed obliquely thereon and to interlock therewith when turned perpendicular thereto with sufficient force to bend one or more engaging portions of said flange, and a reinforcing longitudinal rib formed in said web throughout substantially its entire length and of sufficient size and strength to enable turning and locking of said clip on said stud without bending said web adjacent an edge of said flange.

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