United States Patent [19]

Zinn

[11] E **Re. 29,412**

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[54] **STUDS**

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[22] Filed: **Nov. 20, 1975**

Related U.S. Patent Documents

Reissue of:

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Filed: **July 25, 1973**

U.S. Applications:

[62] Division of Ser. No. 257,943, May 30, 1972, abandoned, which is a division of Ser. No. 74,022, Sept. 21, 1970, abandoned.

[51] **Int. Cl.**[2] **E04C 3/07**

[52] **U.S. Cl.** **52/720;** 52/346; 52/732

[58] **Field of Search** ..... 52/243, 346, 347, 356, 52/359, 730, 729, 100, 364, 738, 481, 714, 720, 732, 743, 747, 741, 243, 241, 242; 181/33 A, 33 G, 33 GA, 33 GC, 33 K

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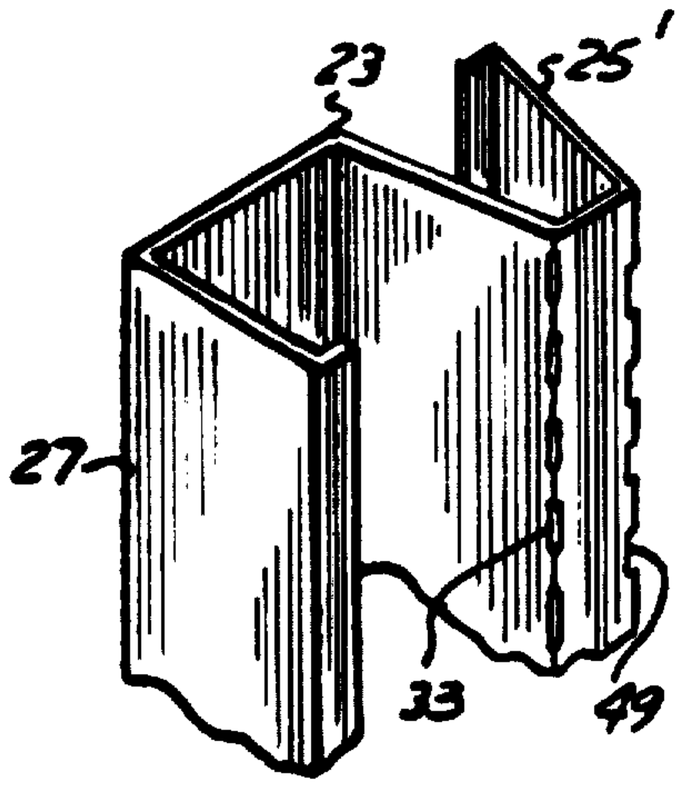
[57] **ABSTRACT**

For use in wall constructions, novel studs are here shown, characterized by their having two sides or flanges of different resiliency when formed and mounted.

They may be of different resiliency when initially formed; or they may be of similar resiliency when initially formed, but become of different resiliency when mounted.

7 Claims, 8 Drawing Figures



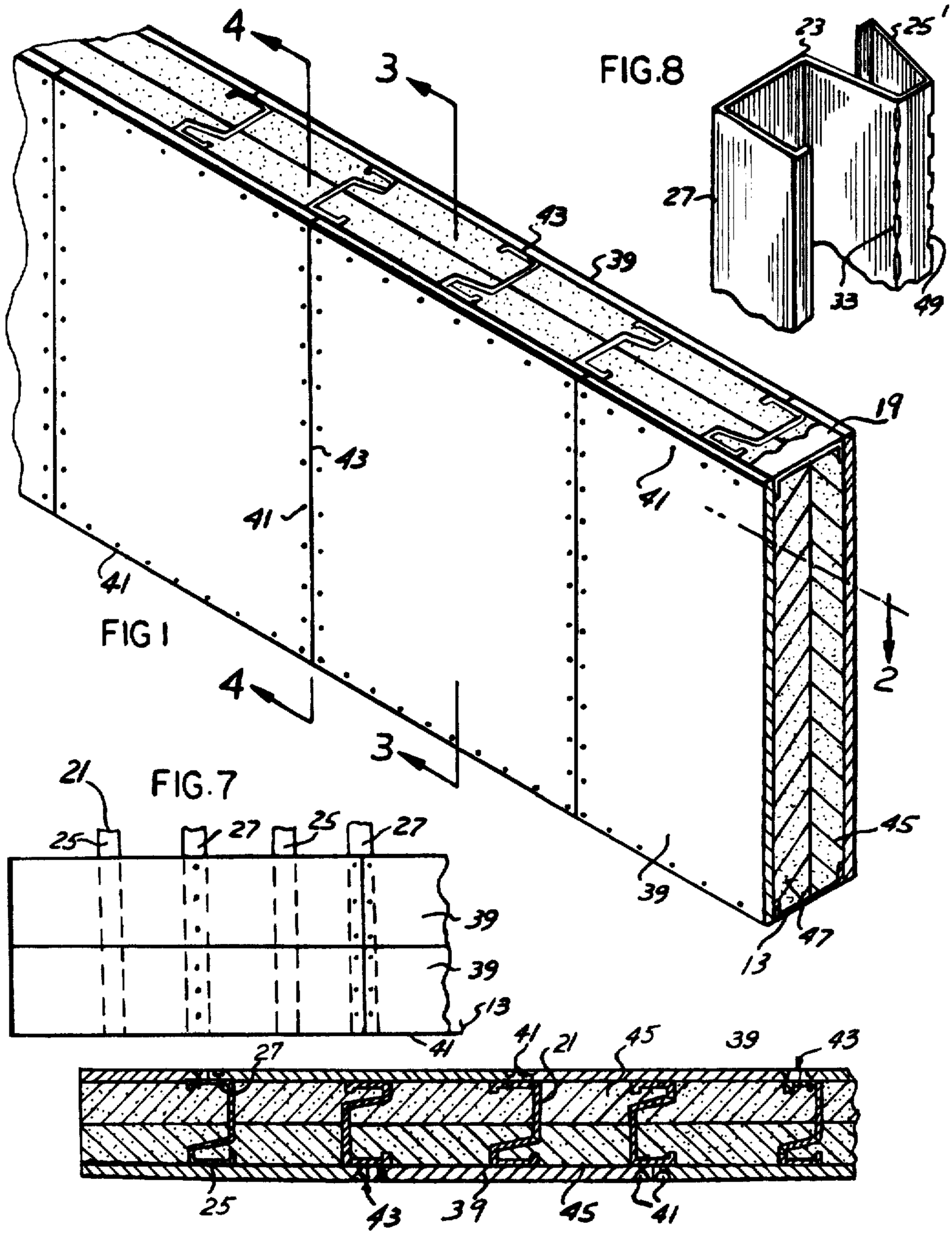


FIG 1

FIG.8

FIG.7

FIG.2

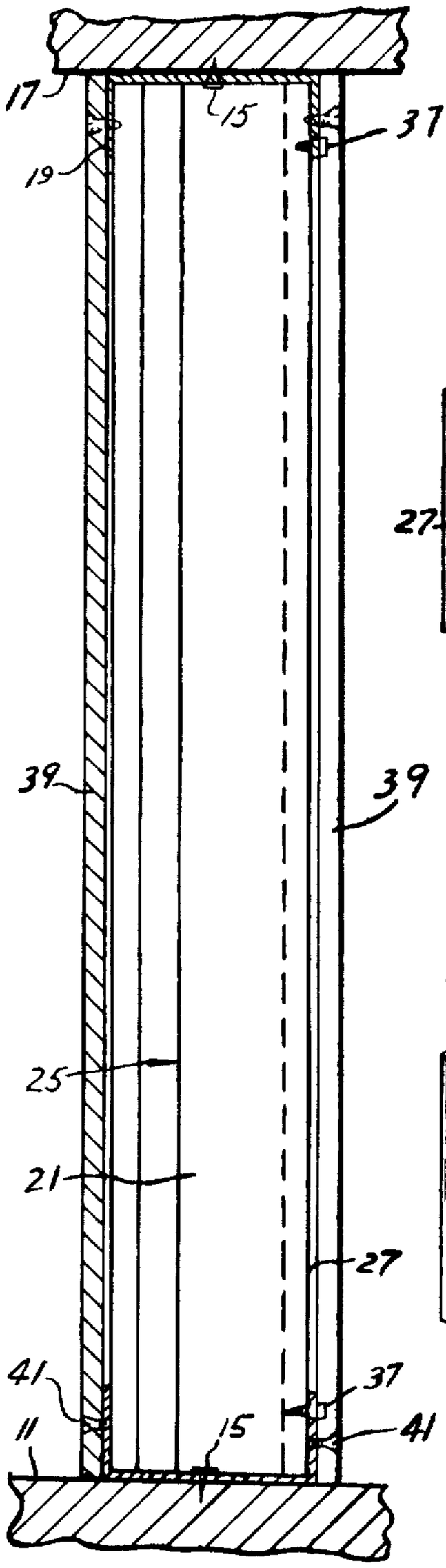


FIG. 3

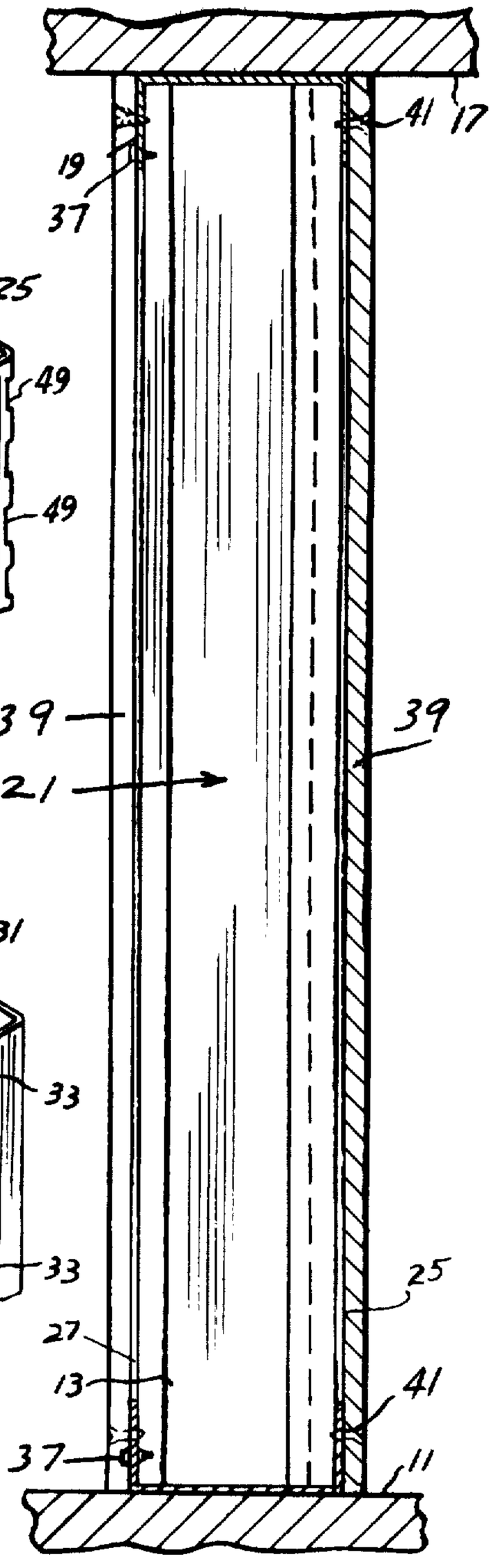


FIG. 4

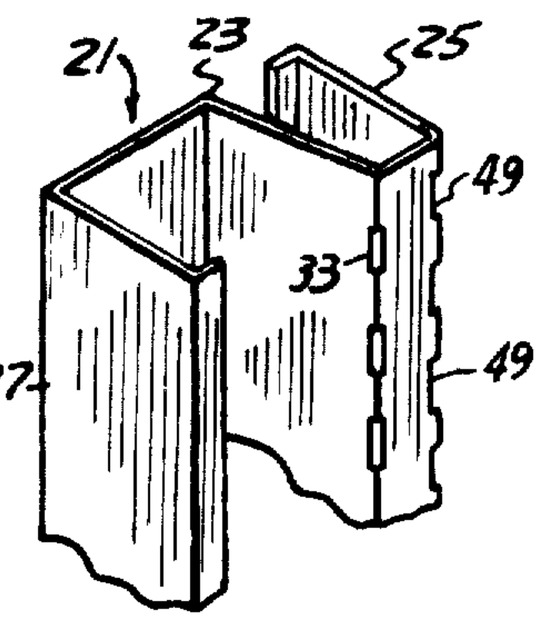


FIG. 5

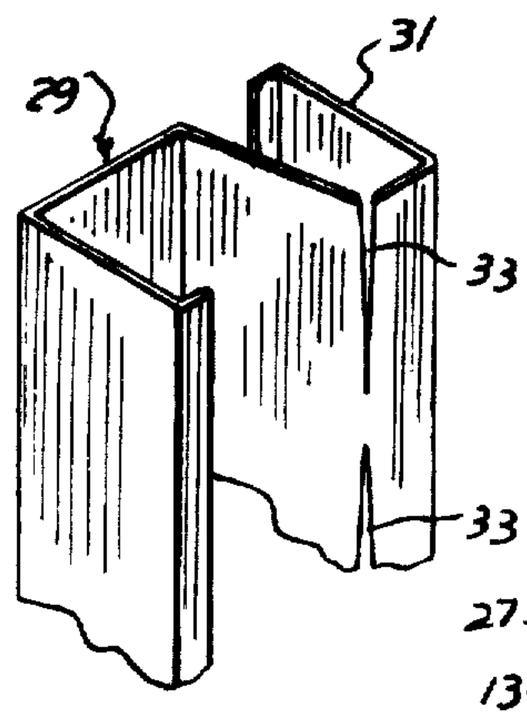


FIG. 6

STUDS

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

CROSS REFERENCES

This application is a division of my copending application, Ser. No. 257,943 of May 30, 1972 now abandoned, which was a division of and copending with application Ser. No. 74,022 of Sept. 21, 1970, now abandoned.

This application relates specifically to "Studs" used in the Wall Construction of my application Ser. No. 382,604, filed July 25, 1973, and in Methods of my application Ser. No. 382,605, filed July 25, 1973.

THE PREFERRED EMBODIMENTS

The preferred embodiments of such studs are shown in the appended drawings, to be read in conjunction with this specification.

THE DRAWINGS

FIG. **1** is a fragmentary perspective view of a portion of the present sound attenuation wall.

FIG. **2** is a fragmentary section taken in the direction of arrows **2—2** of FIG. **1.**

FIG. **3** is a fragmentary section taken in the direction of arrows **3—3** of FIG. **1.**

FIG. **4** is a fragmentary section taken in the direction of arrows **4—4** of FIG. **1.**

FIG. **5** is a fragmentary perspective view of the present improved stud construction.

FIG. **6** is a similar view of a modification.

FIG. **7** is a fragmentary elevational view with the partitions extending longitudinally.

FIG. **8** is similar to FIG. **5** showing a modified stud.

DETAILED DESCRIPTION OF THE EMBODIMENTS SHOWN IN THE DRAWINGS

A sound attenuation wall is shown in FIG. **1,** and as indicated in FIGS. **3** and **4** is adapted for use between fixed structures, such as a building floor **11** and ceiling **17,** having channels **13** and **19** secured by fasteners **15.**

THE STUDS

A line or series of longitudinally spaced studs **21** having webs **23** is interposed between and projects into channels **13** and **19** and are suitably secured thereto with each stud, having a first side **25** and a second side **27,** both of some resilience.

The studs **21** are alternately reversed so that the first and second flanges **25–27** of adjacent studs are alternately reversed.

The second flanges **27** are anchored to the channels by fasteners **37.** The first flanges **25** are not anchored to the channels.

Thus, flanges **25** are more resilient than flanges **27** when the studs are mounted. Resiliency is the rebounding of the flange after removal of a deflecting force or load. To properly compare the resiliency of two flanges, it is of course understood that the loading or force on each must be the same in amount and in location relative to each web—flange juncture.

THE PANELS

Wallboard panels **39** are applied to opposite sides of the studs with the wallboards on each side being in alignment and in engagement with each other at their edges.

The wallboard panels on each side of the studs throughout the length of the partition are in engagement along the registry lines **43,** FIG. **1** which correspond to the central portions of the particular second flanges **27** to which the wallboards are fixed by fasteners **41.**

Each wallboard panel spans at least three studs with the outer edges of each panel fixed to the second flanges **27** of the outer of said three studs as by fasteners **41.** In the modification shown in FIG. **7,** the wallboards extend longitudinally and span more than three studs.

The central or inner portion of each panel **39** is adjacent a first stud flange **25.** In FIG. **7,** central portions of the panels loosely bear against adjacent resilient first flanges **25.**

It is noted particularly with respect to FIGS. **1** and **2** that the panels **39** upon opposite sides of the partition at their respective meeting edges **43** are staggered or offset. Thus, the meeting line **43** between a pair of panels on one side of the wall is in registry with a corresponding central or intermediate portion of an opposed panel. The panels upon opposite sides of the wall are staggered whereby the panels on one side of the wall each spans three adjacent studs and the opposing but staggered wallboard on the opposite side of the partition spans two of the said three studs.

By this construction the outer edges of each panel are fixed to the second flange **27** of the corresponding stud whereas the central portion of each panel yieldingly bears against the corresponding resilient first flange **25** of the intermediate stud.

Thus, the individual panels affixed at their edges yieldably bear against the respective central stud and are adapted to flex inwardly and outwardly in the functioning of the present sound attenuation panel.

The panels along their top and bottom edges are fixedly secured to the floor and ceiling channels by fasteners **41.** Likewise in FIG. **7,** the longitudinal edges of some panels bear against and are affixed to channels **13** or **19.**

Suitable sound absorbing pads or blankets **45,** of which a pair are shown, FIGS. **1** and **2,** are interposed in compression between the assembled opposed wallboards **39** and have a very definite function in the final operation of the present sound attenuating panel. While the present panel as constructed is effective as a sound attenuation panel even without the sound absorbing pads interposed, an improved sound attenuation panel is provided when said pads are provided.

It has been found in operation that any inward flexing of the corresponding wallboards due to the transmission of sound vibrations therethrough causes a frictional rubbing action of the wallboard with respect to the sound absorbing pad. This rubbing action transforms sound energy to heat, thus, dissipating the sound and provides an improved sound attenuation wall partition. The compressed pads also dampen vibrations.

Glass fiber strips are shown in the illustrative embodiment, nine feet long for example, and thus extend between the floor and ceiling and are interposed in compression between the wallboards when assembled.

The resilient backing of each wallboard throughout its height is achieved by the yieldable first flanges **25** providing a yielding relationship between the wallboard and the supporting stud.

THE STUDS (CONTINUED)

As previously indicated, the broader aspect of this invention is that the studs, when formed and mounted, have first and second flanges of different resiliency. One method of accomplishing this result is to anchor only one flange of a stud to the channels. Thus, the stud as mounted provides the desired result.

Alternatively, the stud as formed but prior to mounting may have flanges of different resiliency, in which case anchoring only one flange to the channels is optional.

One such stud **29** is fragmentarily shown in FIG. **6.** The first flange **31** is provided additional resiliency by a series of aligned spaced slits **33** formed in the stud web.

In FIG. **5** the first flange **25** is given additional resilience by the use of more slits. Longitudinally spaced slits **33** correspond to those of FIG. **6.** Further longitudinally spaced slits **49** are formed at the one longitudinal edge of flange **25.** Slits **49** are alternately arranged and staggered with respect to slits **33.**

FIG. **8** is yet another modification of the stud in that the resilient first flange **25'** is initially before assembly non-parallel to second flange **27.** Flange **25'** extends outwardly at an acute angle to flange **27** in the range of 5°–20° for illustration.

Upon assembly of the wallboards such as in FIGS. **1** and **2,** the resilient first flanges **25'** shown in FIG. **8** are then in compression and substantially parallel to plane flanges **25.** Resilient first flange **25'** has been rendered more flexible and resilient by two series of slits **33** and **49.**

My Prior Patent 3,611,653

This co-pending issued Patent 3,611,653, hereinafter referred to as the "tabbed stud patent" since it discloses a "tabbed stud" is referenced here so that it may be contrasted, on the record, with the instant patent hereinafter referred to as the "tabless stud patent" since it discloses a "tabless stud".

In the "tabbed stud" construction, the two flanges of a stud are anchored and of equal resilience, with one flange, however, having integral struck-out tabs 31. These tabs are intended to provide the bearing surface, which is thus made up of isolated, separated, small projections, bound to be a variety of heights, thus, providing an irregular bearing surface. Since some, at least, of the tabs 31 can and may and probably would become twisted and deformed between the point and time of manufacture and the point and time of use, such tabs could puncture and damage the formed wall surface and panels.

The tabless studs hereof will present no such problems, since they are shown in the drawings as free of tabs or protuberances.

CONCLUSION

While presently preferred embodiments of the invention have here been disclosed, supra, the inventive concepts hereof are not limited to such preferred embodiments but are those defined in the claims which follow.

I claim:

1. An improved stud having a bearing flange, a mounting flange and a web joining the mounting flange to the bearing flange, said stud for use in a wall made up of a line of substantially identical studs and wall panels on opposite sides of the wall, with the studs alternated in reversed arrangement so that on each side of the wall the mounting flanges alternate with the bearing flanges; each pair of adjacent wall panels on each side of the wall having their adjacent panel edges fastened to a mounting flange and with each panel on each side of the wall having its central part bearing against a bearing flange; the improvement comprising:

said bearing flange and said mounting flange being substantially parallel and aligned on opposite sides of said web, said web including first and second legs interconnected by a transverse member, said transverse member being non-parallel relative to said bearing flange and said mounting flange;

each bearing flange and each mounting flange and its juncture with the web being so formed that the entire bearing flange will deflect a greater amount, from the web-flange juncture to the free end of the flange, than the deflection of the mounting flange from its web-flange juncture to its free end under the same loading at the same distance from the respective web-flange junctures;

said mounting flange providing a stiffer, less resilient mounting for the adjacent edges of a pair of panels so that when the panels are fastened to a mounting flange the panels are retained firmly and snugly against the mounting flange in a manner to avoid deflection inwardly or outwardly from the plane of such panels;

said bearing flange providing a more resilient bearing for the center of a panel having its edges fastened to a pair of mounting flanges, so that the center of the panel and the bearing flange flex inwardly resiliently for sound attenuation, but with the center of the panel being free of outward bias from the bearing flange, which bearing flange is formed to be free of a tendency to deflect outwardly, though it is resilient enough to be flexed inwardly by outward sound waves impinging against the panel, *said bearing flange and said mounting flange each being substantially smooth and substantially free of internal and external protuberances between its edges; so that substantially the entire area of such bearing flange provides a resilient overall bearing area for the adjacent central part of a panel.*

2. The invention as defined in claim **1** wherein the juncture between the web and the mounting flange is formed to be more rigid than the juncture between the web and the bearing flange.

3. The invention as defined in claim **1** wherein the juncture between the web and the bearing flange has weakening formations which produce greater resiliency.

4. The invention as defined in claim **1** wherein the two flanges are in substantial transverse alignment relative to the web.

5. The invention as defined in claim **1** wherein the web has resilience producing weakening formations which are closer to the bearing flange juncture than to the mounting flange juncture.

6. The invention as defined in claim **1** wherein the web includes first and second legs interconnected by a transverse member, said second leg being longer than said first leg and being joined to said mounting flange.

7. The invention as defined in claim **1** wherein the two flanges are parallel.

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