



(11) **EP 2 090 705 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
19.08.2009 Bulletin 2009/34

(51) Int Cl.:
E04B 2/76 (2006.01) E04B 2/78 (2006.01)

(21) Application number: **09152817.4**

(22) Date of filing: **13.02.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR
 Designated Extension States:
AL BA RS

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(30) Priority: **13.02.2008 DK 200800204**

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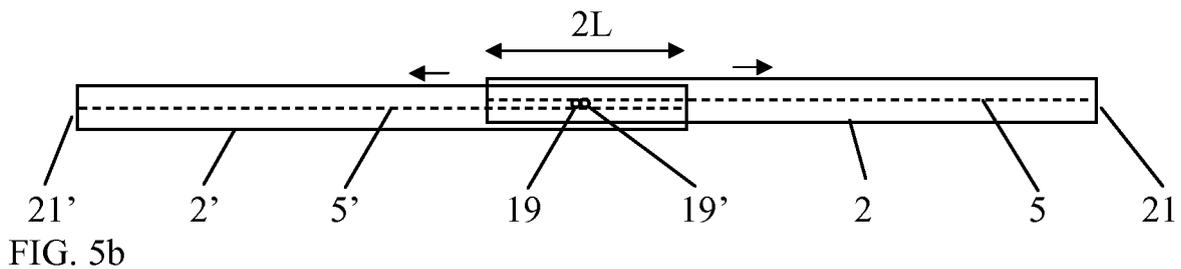
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(54) **A track and stud framing system for a drywall construction**

(57) A frame system comprising a stud (1) with two elongate, interlinked metal profiles (2, 2') arranged mutually slidable along a longitudinal direction in a telescopic manner. Each of the metal profiles has a flange (5, 5'), the two flanges being situated face-to-face when the profiles are interlinked forming two face-to-face flanges. In

addition, at least one of these two face-to-face flanges has a brake (19) element extending onto the oppositely facing flange for pressing the two face-to-face flanges away from each other and thereby inducing friction between the two metal profiles along the longitudinal direction.



Description

Field of the Invention

[0001] The present invention relates to a track and stud frame system for a drywall construction. Especially, the invention relates to a frame system comprising a stud with two elongate, interlinked metal profiles arranged mutually slidable along a longitudinal direction in a telescopic manner, each of the metal profiles having a flange, the two flanges being situated face-to-face when the profiles are interlinked forming two face-to-face flanges

Background of the Invention

[0002] Wallboards were originally invented in 1916 by the United States Gypsum Company. It is basically gypsum squeezed between two panels of paper. It is quickly nailed or screwed onto a metal frame and the seams between sheets are plastered to achieve a seamless wall. In the drywall system there is only a need for a thin coat of plaster. These aspects combined with the fact of wallboards being fire retardant have made drywall construction widely popular.

[0003] The wallboards are fastened to frame constructions, mostly containing upright metal studs supported by metal tracks at the bottom and the top. In order to adjust the height of the studs between a bottom track and a top track, normally, two stud profiles are fastened telescopically to each other, for example as disclosed in US patent No. 7,223,043 by Andrews.

[0004] However, prior art telescopic systems suffer from the fact that the two telescopic stud profiles have to be held manually during the fastening in order not to collapse longitudinally. This is tedious and time consuming for the construction worker or requires two cooperating workers, which is costly.

[0005] For this sake, a brake system has been provided as disclosed in International patent application WO 2007/103331. This stud system comprises two different interlinked U-formed profiles, where one profile is smaller than the other and embraced by the other profile. This system is rather expensive in production and has an inferior stability.

Description of the Invention

[0006] Therefore, it is the objective of the invention to provide a drywall frame system, which does not have the aforementioned disadvantages and which is an improvement in the art. Especially, it is the objective of the invention to provide a stable system with lower production costs and to ease the construction process with a telescopic stud system.

[0007] This purpose is achieved with a frame system for a drywall according to the invention as defined by the claims. The frame system comprises a stud with two elongate, interlinked metal profiles arranged mutually slidable

along a longitudinal direction in a telescopic manner. Each of the metal profiles has a flange, the two flanges being situated face-to-face when the profiles are interlinked forming two face-to-face flanges. In addition, at least one of these two face-to-face flanges has a brake element extending onto the oppositely facing flange for pressing the two face-to-face flanges away from each other and thereby inducing friction between the two metal profiles along the longitudinal direction.

[0008] The friction is determined by the form and the height of the brake elements leading to the deformation of the face-to-face flanges. By choosing a certain size of the brake elements relative to the material properties of the face-to-face flanges, the friction can be determined to finally yield a level of friction high enough that the stud with the extended two profiles does not longitudinally collapse when left standing without any other longitudinal fixation. This eases the process with the construction, saves time and effort.

[0009] In one embodiment, the brake elements are part of the side flanges, whereas in other embodiments, the two face-to-face flanges are normal to the side flanges. In a preferred embodiment, each of the two metal profiles comprises two side flanges connected along the longitudinal direction by an intermediate web, each intermediate web containing one of the two face-to-face flanges. Optionally, these two face-to-face flanges are plane and parallel.

[0010] For example, the distance between the two face-to-face flanges when the metal profiles are interlinked may be rather small and substantially less than the width of the side flanges, for example less than 10% of the width of the side flanges, or even as small as less than 10 times, or less than 5 times or 2 times the material thickness of one of the face-to-face flanges. For example, the side flanges may slide in contact along each other, apart from the locations of the brake elements.

[0011] In a preferred embodiment, the brake element is a protrusion extending from the flange. Optionally, this protrusion is located centrally between the side flanges. When two profiles are sliding telescopically along each other, at some point, the protrusion from the one profile will collide with the protrusion from the other profile. If the protrusions are sufficiently large, the protrusions act as efficient end stops for the telescopic extension.

[0012] If the brake element, for example in the form of the protrusion, is located a distance L from one end of the profile, a mutual overlap of the two profiles along at least a length of $2L$ is secured. For example, the distance L is less than 25% of the total length of the profile, for example between 25% and 10% of the profile.

[0013] Alternatively, the brake elements are flaps in the form of a piece of material bent out from one of the face-to-face flanges. In this case, the brake elements may act as a friction element as long as the profiles are in the process of being pulled apart for elongation and may act as a full stop brake element against the opposite sliding direction. In other words, the profiles can only slide

along each other in one direction. This one way brake system is in contrast to the protrusion brake system, where both sliding directions are possible with a certain friction effect.

[0014] Preferably, the two profiles are identical, which production-wise is an advantage. By providing identical profiles that can be interlinked telescopically, the production costs and the storage costs are lower, and the construction on site is made easier. A further advantage obtained is stability, which is best understood from the following arguments. When studying a system as disclosed in International patent application WO 2007/103331, it is readily recognised that two U-profiles, where one profile embraces the other to form a double-U formed profile, instability is obtained with respect to twist of the stud. However, by providing two identical profiles, it is not possible to insert one U-formed profile into another U-formed profile the way as in WO 2007/103331. Rather, the profiles have to be linked in a different way, for example as disclosed in International patent application WO 01/049952, US patent No. 4,809,476, or others. The latter, however not being provided telescopic and with brake systems.

[0015] Preferably, each of the metal profiles has two parallel side flanges, each side flange having two parallel edges defining the width of the side flange between the edges. Between the side flanges, a middle flange is provided offset from the edges to substantially form an M in cross section. The middle flange is provided laterally midway between the parallel edges of each side flange, such that the two middle flanges are situated face-to-face when the profiles are interlinked.

[0016] In a concrete embodiment, the profile has a first and a second side flange, and the first side flange is connected to a bent edge with a first wing forming a first concavity with the first side flange. In turn, the second side flange is connected to a web side part with a recess dimensioned for accommodation of at least part of the first wing of a corresponding profile when the two profiles are interlinked.

[0017] Optionally, this embodiment may be combined with the following embodiment, where each of the two metal profiles comprises two side flanges connected along the longitudinal direction by an intermediate web, the web being bent relatively to the first side flange so as to form a second concavity with the first side flange. This second concavity has a cavity part opposite to the first side flange. In addition, the second side flange is connected to a second wing extending from the second side flange, wherein the second wing extends into the second cavity until a short distance D from the cavity part. Typically, the distance D is less than 10 times the material thickness, preferably less than 5 times less and most preferably around 1-2 times the thickness of the material. For typical studs, the material thickness is around half a millimetre, such that the typical distance D is between half a millimetre and one millimetre.

[0018] When studs are inserted into tracks, the studs

have a tendency to tilt and fall before entirely fastened. Different methods have been developed for holding the studs stable inside the bottom track, until the stud is entirely fastened into a frame. For example, US 7,223,043 discloses a metal frame system, where the tracks have a V-formed male protrusion along the tracks which cooperates with corresponding female V-formed recesses across the side wall of the lower end of the studs. By pressing the recesses of the studs into the track with the protrusions, the cooperation of the protrusions and the recesses holds the stud in a vertical orientation relative to the horizontal track. Another example is disclosed in European patent No. EP 0 577 661 by Larsson and Marker, in which the stud is provided with a lateral slit into which a longitudinal inward directed edge of the track is inserted.

[0019] An improved system of this kind, suited for the above described invention but also suitable for other kinds of stud profiles, is achieved by the following. In this case, the frame system comprises a track accommodating an end of the stud, the track having a substantially U-formed cross section with two side, of which at least one has a bent rail part along the track, and wherein the lower end of the stud has a lateral recess for accommodating the rail part, wherein the rail part has an angle A of less than 90 degrees with the side wall, preferably between 45 and 75 degrees, for example around 60 degrees. The bent rail part acts as an efficient hook better than in prior art systems. Preferably, both side walls have such a rail part.

[0020] When drywalls are set up and supported by studs, often it is desirable to pull cables along inside the drywall. For this sake, it is known to provide stud profiles with apertures, for example as illustrated in FIG. 2 of US patent No. 4,809,476 by Satchell or in FIG. 2 in US patent No. 4,918,899 by Karytinios. Such apertures have sharp edges, which implies a risk for damaging cables and pipes when being pulled through the apertures. It is therefore a purpose to provide stud profiles with reduced risk for damage of cables and tubes that are provided in drywalls

[0021] This purpose is achieved by a frame system for a drywall comprising a stud with two elongate, interlinked metal profiles arranged mutually slidable along a longitudinal direction in a telescopic manner. Each of the metal profiles has apertures with smoothed edges for cables and tubes. The smooth edges are provided by bent metal curving smoothly away from the aperture. One way of providing such smooth edges is by punching out metal to form a first aperture with a first - smaller - size. Then, a tool is inserted into the aperture to press the edges of this first aperture outwards to increase the size of the aperture. This outwards increase is performed by bending the edges into arcs curving smoothly away from the aperture.

[0022] This kind of apertures are suited for the stud profiles according to the invention with or without brakes but also for other stud profiles. For example, for the stud

profile with the M-form as described above, the edge of the punched aperture is pressed outwards into the concave side of the stud profile, the concave side being provided by the middle flange and its connection to the parallel side flanges.

Description of the Drawing

[0023]

FIG. 1 shows an end of a stud according to the invention,
 FIG. 2 shows a cross sectional view of the stud with two interlinked profiles,
 FIG. 3 is a perspective view of a profile with a protrusion as a brake element,
 FIG. 4 is a cross sectional view of two interlinked profiles with the protrusion,
 FIG. 5 a) illustrates the interlinking process and b) the telescopic extension,
 FIG. 6 shows a bottom track in a) perspective view and b) cross sectional view,
 FIG. 7 illustrates the mounting of a stud profile a) turning the stud into the bottom track, and b) the stud located inside the bottom track,
 FIG. 8 illustrates a stud with an aperture in greater detail in a) side view and b) lateral view.

Detailed Description of the Invention

[0024] FIG. 1 shows a part of a stud 1 according to the invention. The stud comprises a first profile 2 and a second, identical profile 2' interlinked with the first profile 2 to form a laterally stable stud which is telescopically variable in length by longitudinally displacing the first 2 of the two profiles 2, 2' relatively to the second 2' of the two profiles 2, 2'. As the second profile 2' is inserted into the first profile 2, only a small part of it is visible in FIG.1. Each profile 2, 2' has a first side flange 4a and a second side flange 4b mutually connected by an intermediate web 3. The web 3 comprises a middle flange 5 connected to the first side flange 4a through a first side part 6 and connected to the second side flange 4b through a second side part 7.

[0025] This is shown in more detail in the cross sectional view in FIG. 2. The first side part 6 comprises a first lateral edge part 8 connected to the middle flange 5 through a skew connection part 10. The second side part 7 comprises a second lateral edge 11 connecting the second side flange 4b with the web 3 through a second skew connection part 12.

[0026] The first side flange 4a is connected to a laterally bent edge 13 with a first wing 14 forming a first concavity 15 with the first side flange 4a. The second side part 7, in turn, comprises a laterally bent edge 11 with a recess 16 dimensioned for accommodation of the first wing 14' of a corresponding profile 2' when the two profiles 2, 2' are interlinked.

[0027] The web 3 is bent in an angle between the first lateral edge part 8 and the skew connection 10 so as to form a second concavity 17 with the first side flange 4a. The skew connection 10 constitutes a cavity part opposite to the first side flange 4a. The second side flange 4b is connected to a second wing 18 extending from the second side flange 4b and into the second cavity 17' of the second, corresponding profile 2' when the two profiles 2, 2' are interlinked as illustrated in FIG. 2. The second wing 18 extends into the cavity until a short distance D from the skew connection 10' of the second profile 2'. This distance D is short in order to prevent the second side profile 4b to be pressed away from the first side flange 4a' of the second profile 2' when a screw is screwed through the first side flange 4a' of the second profile 2'. The prevention of the second profile 4b being pressed away is achieved because the second wing already after a slight displacement of distance D achieves a stopping support on the oppositely situated skew element 10'. Such a screw has the aim to fasten the first side flange 4a' of the second profile 2' to the second side flange 4b of the first profile 2. A typical distance of D is less than 20% of the length of the second wing 18. Typically, the distance D is less than 10 times the material thickness, preferably less than 5 times less and most preferably around 1-2 times the thickness of the material. For typical studs, the material thickness is around half a millimetre, such that the typical distance D is between half a millimetre and one millimetre.

[0028] As it clearly appears from FIG. 2, the middle flange 5 is offset relative to the lateral edge part 8 of the first flange 4a and relative to the laterally bent edge 11 of the second flange 4b. As illustrated, the first flange 4a and the second flange 4b are parallel. The first flange 4a has a first edge defined by the lateral edge part 8 and a second edge defined by the laterally bent edge 13. The second flange 4b has a first edge defined by the laterally bent edge 11 and a second edge defined by second wing 18. The middle flange 5 is provided laterally midway between the first and the second edge of the first flange 4a and laterally midway between the first and the second edge of the second flange 4b.

[0029] The middle flange 5 of the first profile 2 faces the middle flange 5' of the second profile 2'. The distance between these two middle flanges 5, 5' is preferably small, such as shown in FIG. 2, where the flanges are substantially touching each other. However, by using protrusion 19 on the middle flanges 5, 5', as illustrated in FIG. 3, the two middle flanges 5, 5' are pressed away from each other, as illustrated in the cross sectional view in FIG. 4, which increases the friction along the longitudinal sliding direction of the first profile 2 relative to the second profile 2'. This friction is configured to prevent collapse of a vertically oriented, telescopically adjusted stud 1, where the first profile 2 is longitudinally displaced relatively to the second profile 2'.

[0030] As illustrated schematically in FIG. 5a, the protrusions 19 are located a specific distance L from the end

20 of the profile 2, for example between 5% and 30 % from the entire length of the profile. Typical profiles for drywalls are between 10 and 20 cm broad and between 1.5 m and 2 m long in order to cover all lengths between 1.80 m and 2.80 m. In this case, the distance L is preferably between 20 and 40 cm. For example, with reference to FIG. 5a, for interlinking the two profiles 2, 2', the profiles 2, 2' may be pushed longitudinally into each other starting with the ends 21, 21' opposite the end 20, 20' with the protrusions 19, 19'. For telescopic extension, the opposite ends 21, 21' are pulled longitudinally, in which case, the protrusions then act as friction enhancing brakes, on the one hand, and as extension stop, on the other hand, namely when the two profiles 2, 2' are telescopically extended until the two protrusions 19, 19' block each other from further extension, which is illustrated in FIG. 5b. When two profiles 2, 2' are pushed into each other for interlinking, the profiles will at least be connected along a length of approximately 2L, as is illustrated in FIG. 5b.

[0031] The protrusion 19 on the middle flanges 5, 5' and the profiles 2, 2' are shown in cross sectional view in FIG. 4.

[0032] In case that the protrusions 19, 19' are not desired as end stops, the protrusion 19, 19' may be arranged off a longitudinal centre line of the profiles 2, 2' without extending to the opposite side of the centre line, so as to be able to slide past each other on either side of the longitudinal centre line of the profiles 2, 2' when these are telescopically moved.

[0033] It should be noted that profiles 2, 2' for a stud with a cross section as illustrated in FIG. 2 may also be provided and used without the brake system. In this case, the stud would not have the advantages of a brake, but due to the improved stability, such a system would still be an improvement over the prior art.

[0034] FIG. 6a is a drawing of a bottom track 21 having two side walls 22a, 22b connected by a track bottom 23. The side walls 22a, 22b have bent rail parts 24a, 24b that are bent such that they have an angle A of around 60 degrees with respect to the walls. However, an angle A of 90 degrees is also within the scope of the invention. The rail parts 24a, 24b act as hooks when a stud 1 has been arranged in the bottom track 21. For this reason, the profile 2 of the stud 1, as illustrated in FIG. 1 has a recess 20, into which the rail parts 24a, 24b engage. A system with a bottom track of this kind and a stud with a recess to accommodate rail parts having an angle of less than 90 degrees with the side walls, preferably between 45 and 75 degrees may also improve prior art and is not necessarily linked to the invention.

[0035] The placement of the stud 1 in the bottom track 21 is illustrated in FIG. 7. The profile 2 is placed inside the track 21 and fastened by turning around the longitudinal direction - which is illustrated by arrow 25 - into the right orientation, which is illustrated in FIG 7a. Once the profile 2 is oriented correctly inside the track, as illustrated in FIG. 7b, the stud is held in an upright orientation due

to the engagement of the rail parts 24a, 24b in the recesses 20.

[0036] Two longitudinal elevations 23 in the bottom 27 of the track 21 lift the stud slightly above the central bottom 26 of the track 21, where, normally, heads of screws are located through holes 28 for fastening the track 21 on a support, for example a floor. The lifting of the stud 1 relatively to the central bottom 26 of the track 21 facilitates the longitudinal displacement of the stud profile 2 inside the track 21 even over the screw heads.

[0037] It should be mentioned at this point that the bottom track 21 can act as a top track if turned upside down, and may even functions in other orientations in connection with studs 1.

[0038] As shown in FIG. 3, the stud profile is provided with one or more apertures 29 in the middle flange 5, for example for pulling cables and tubes through the stud profile 2. For example, there is provided an aperture 29 near each end of the stud profile 2. Another example is provision of a number of apertures 29 at mutually equal distances, for example for each 50 cm of the stud profile 2 length. For example, the distance of a first aperture from a first end is identical to the distance of a second aperture from a second end of the stud profile 2 in order for the apertures 29 to overlap, when two stud profiles 2 are combined. However, this is not strictly necessary, as the telescopic insertion may leave one end of one profile 2 without overlap to the other profile 2', by which the aperture 29 is not covered by the other profile 2'.

[0039] Such an aperture 29 can be produced by punching out part of the metal in the middle flange 5. However, the edges 30 of the aperture 29 will then, typically, be sharp and prevent a smooth motion of the cable when pulled through the aperture 29. For this sake, the aperture 29 in a preferred embodiment has smoothed edges 30.

[0040] One exemplary embodiment for such smooth edges 30' is illustrated in FIG. 8a. One way of providing such smooth edges 30' is by punching out metal from the middle flange 5 to provide a first aperture with a first - smaller - size. Then, a tool is inserted into the hole to press the edges 30 of this first aperture outwards to increase the size of the aperture 29. This outwards increase is performed by bending the edges 30 into arcs curving smoothly into the concave side 32 of the stud profile 2, the concave side being provided by the middle flange 5 and the two skew connections 10, 12.

Claims

1. A frame system for a drywall, the frame system comprising a stud (1) with two elongate, interlinked metal profiles (2, 2') arranged mutually slidable along a longitudinal direction in a telescopic manner, each of the metal profiles having a flange, the two flanges (5, 5') being situated face-to-face when the profiles are interlinked forming two face-to-face flanges, **characterise in that** at least one (5) of these two

- face-to-face flanges has a brake element (19) extending onto the oppositely facing flange (5') for pressing the two face-to-face flanges away from each other and thereby inducing friction between the two metal profiles along the longitudinal direction. 5
2. A frame system according to claim 1, wherein each of the two metal profiles (2, 2') comprises two side flanges (4a, 4b) connected along the longitudinal direction by an intermediate web (3), the intermediate webs containing one (5) of the two face-to-face flanges (5, 5'), wherein each side flange (4a, 4b) has two parallel edges (8, 13, 11, 18) defining the width of the side flange (4a, 4b) between the edges (8, 13, 11, 18), wherein one of the face-to-face flanges (5) is provided offset substantially midway between the parallel edges (8, 13, 11, 18) to substantially form an M in cross section of the profile (2, 2'). 10
 3. A frame system according to claim 2, wherein the two face-to-face flanges (5, 5') are plane and mutually parallel and the two face-to-face flanges (5, 5') are normal to the side flanges. 15
 4. A frame system according to any preceding claim, wherein the distance between the two face-to-face flanges (5, 5') when the metal profiles (2, 2') are interlinked is less than ten times the material thickness of one of the face-to-face flanges. 20
 5. A frame system according to any preceding claim, wherein the brake element (19) is a protrusion extending from the flange (5, 5'). 25
 6. A frame system according to claim 5, wherein each profile (2, 2') only has one brake element (19) and wherein the brake element is located a distance L from one end of the profile, wherein the distance L is less than 25% of the total length of the profile (2, 2'). 30
 7. A frame system according to any preceding claim, wherein the two profiles (2, 2') are identical. 35
 8. A frame system according claim 7, wherein each of the profiles (2, 2') has a first (4a) and a second (4b) side flange, wherein the first side flange (4a) is connected to a bent edge (13) with a first wing (11) forming a first concavity (15) with the first side flange (4a), and wherein the second side flange (4b) is connected to a web side part (7) with a recess (16) dimensioned for accommodation of at least part of the first wing (11) of a corresponding profile when the two profiles (2, 2') are interlinked. 40
 9. A frame system according to claim 7 or 8, wherein each of the two metal profiles (2, 2') comprises two side flanges (4a, 4b) connected along the longitudinal direction by an intermediate web (3), the web 45
- being bent relatively to the first side flange (4a) so as to form a second concavity (17) with the first side flange (4a), the second concavity (17) having a cavity part opposite to the first side flange (4a), wherein the second side flange (4b) is connected to a second wing (18) extending from the second side flange (4b), the second wing extending into the second cavity until a short distance D from the cavity part, the short distance being between one and five times the thickness of the material of the side flange. 50
10. A frame system according to any preceding claim, wherein the frame system comprises a track (21) accommodating an end of the stud (1), the track having a substantially U-formed cross section with side walls (22a, 22b) having bent rails parts (24a, 24b) along the track, and wherein the lower end of the stud has a lateral recess (20) for accommodating the rail part, wherein the rail part has an angle A of between 45 degrees and 75 degrees with the side wall (22a, 22b). 55
 11. A frame system according to any preceding claim, wherein the metal profile (2, 2') has an aperture (29) with smoothed edges (30') for cables and tubes, the smooth edges being provided by bent metal curving smoothly away from the aperture. 60

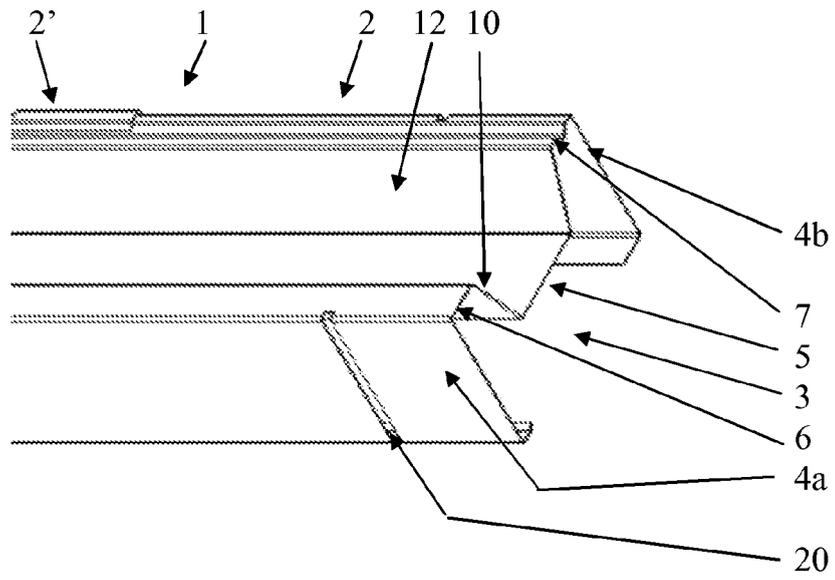


FIG. 1

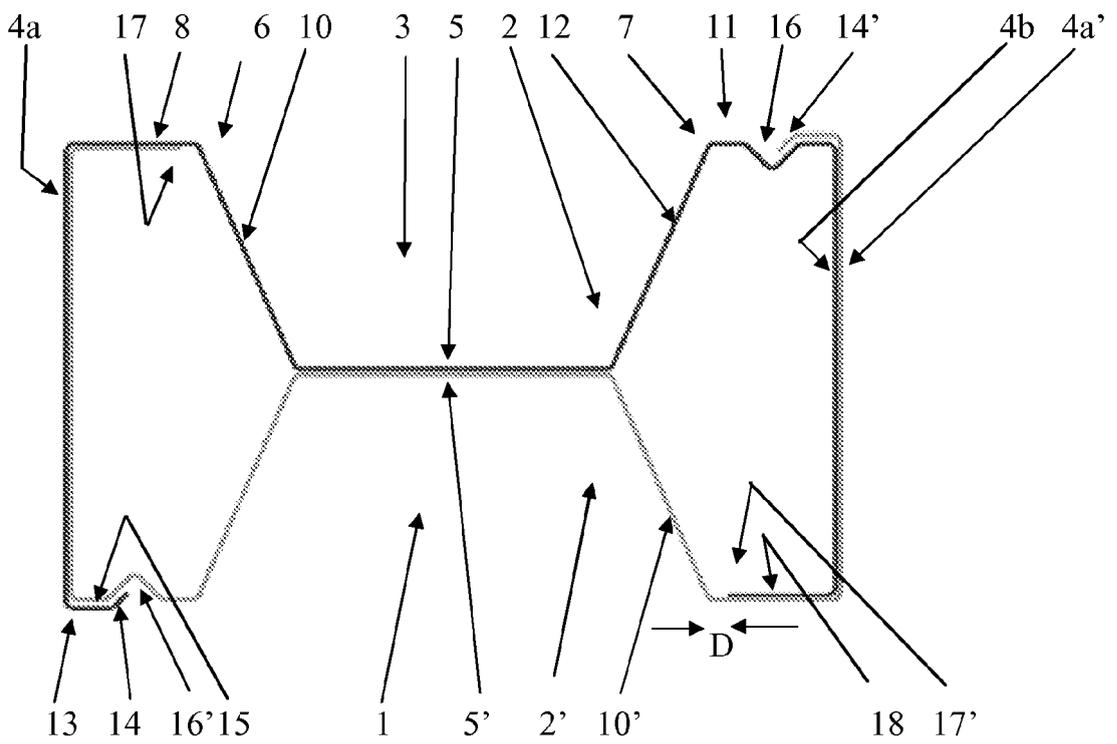


FIG. 2

FIG. 3

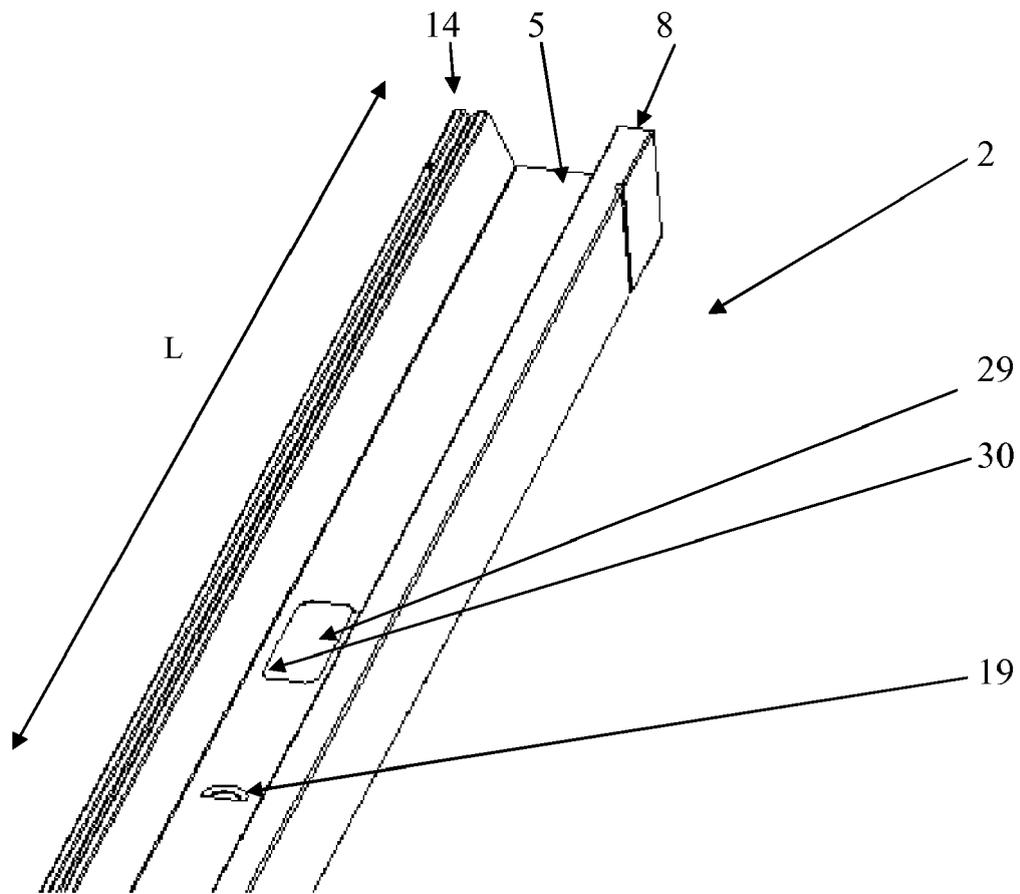


FIG. 4

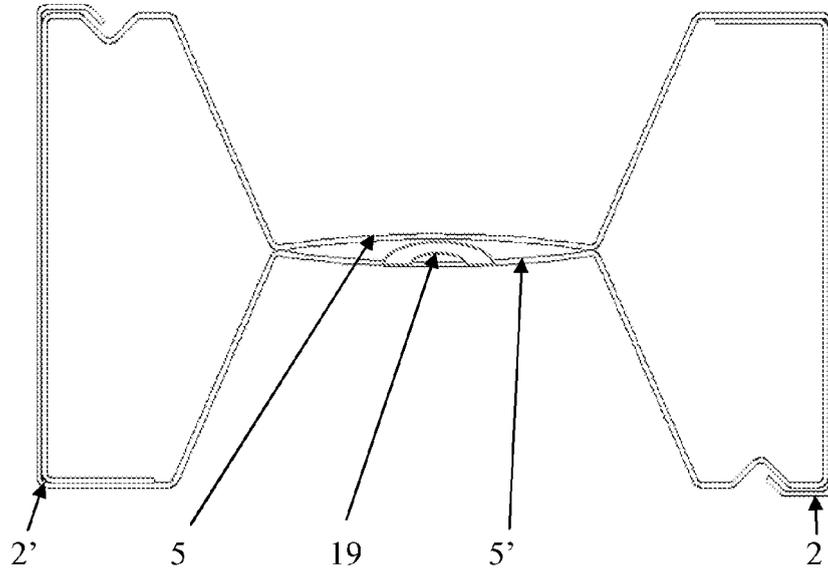


FIG. 5a

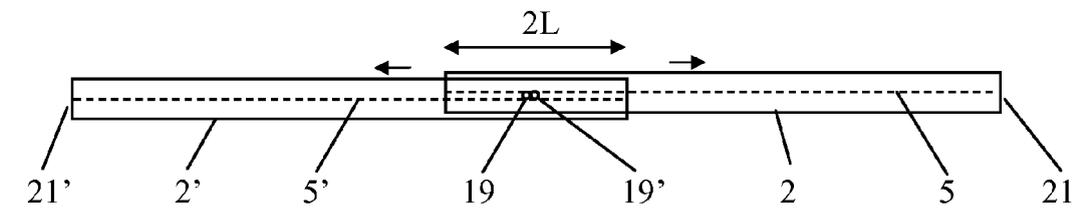
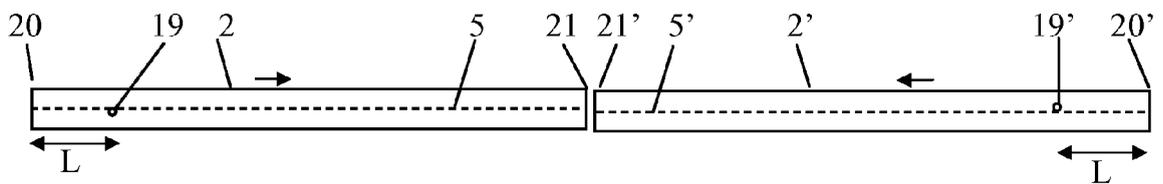


FIG. 5b

FIG. 6a

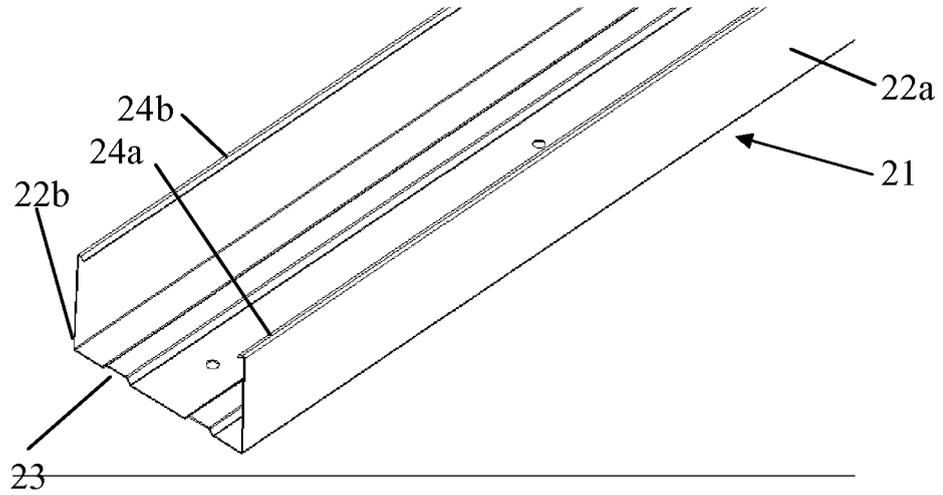


FIG. 6b

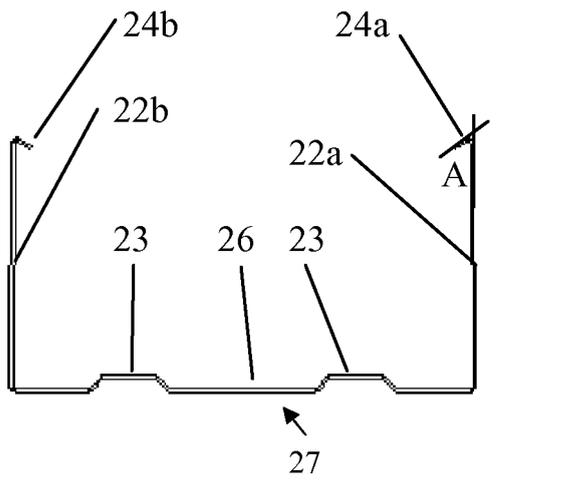


FIG. 8a

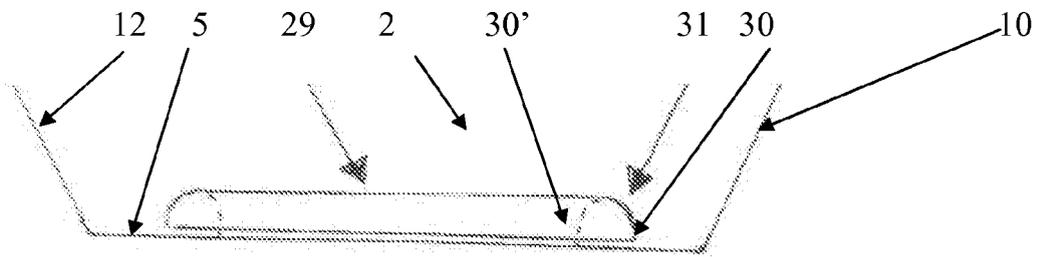
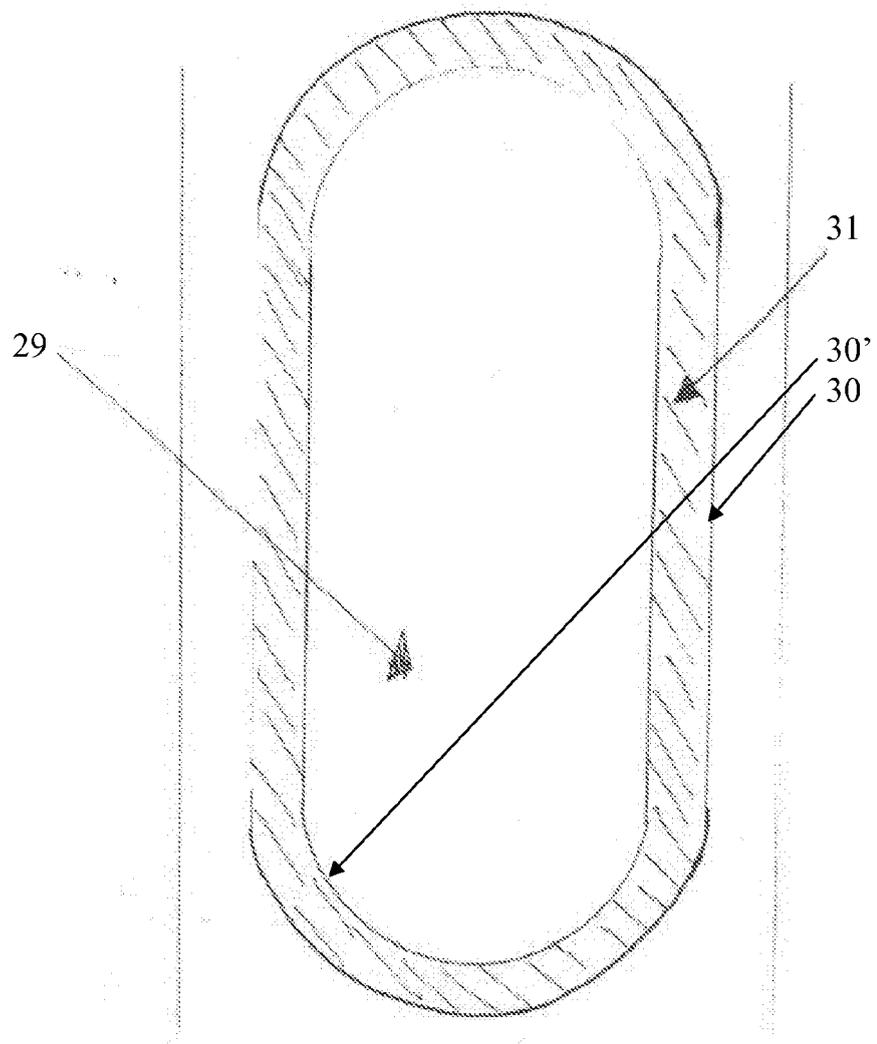


FIG. 8b





EUROPEAN SEARCH REPORT

Application Number
EP 09 15 2817

DOCUMENTS CONSIDERED TO BE RELEVANT			
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