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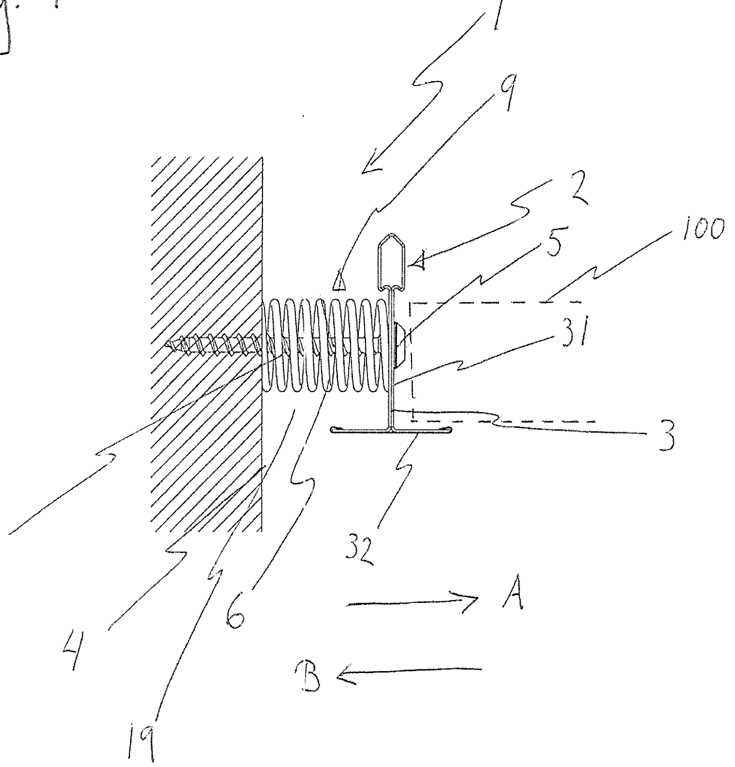
(54) **System for supporting a ceiling along a wall and a method for mounting the same**

(57) The present inventions relates to a system (1) for supporting a ceiling along a surface (4), comprising a rail (2) and at least two connecting means (9). The rail (2) has a profile (3) adapted to support at least one tile (100), and the connecting means (9) is adapted to engage the rail (2) and connect the rail (2) to the surface (4). Each connecting means (9) further comprises a resilient element (6) adapted to act on the rail (2) with a force in a first direction in relation to the surface (4), and a setting element (5) adapted to act on the rail (2) with a force in a second direction, opposite the first direction, the connecting means (9) allowing an adjustment of a distance between the surface (4) and the rail (2). The present invention further relates to a method for mounting a system for supporting a ceiling along a surface.

Fig. 1



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Description

Field of the invention

[0001] The present invention relates to a system for supporting a ceiling along a wall, comprising a rail and at least two connecting means. The rail has a profile comprising a surface adapted to support at least one tile, and the connecting means is adapted to engage the rail and connect the rail to the wall. The present invention further relates to a method for mounting a system for supporting a ceiling along a wall.

Technical background

[0002] When mounting a ceiling comprising tiles having sound-absorbing and sound-insulation properties, the object is mainly to improve the acoustic environment of the room but also to conceal cable arrangement, ventilation equipment, lighting installations and other features. Additionally, the ceiling affects the aesthetic impression of the room, since the ceiling may contribute to the overall impression of the room and enhance the architectural experience of the interior of a building.

[0003] With the aesthetical aspect in mind, it is extremely important that no element disturbs the impression of the ceiling. Disturbing element could be edges that are not straight, damaged edges, negligent mounting of the tiles etc.

[0004] A further aspect is that when mounting a ceiling consisting of tiles and a supporting grid system supporting the tiles, approximately 80 % of the time for mounting the complete ceiling is for mounting the grid system and cutting the tiles and only 20 % of the time is for mounting the tiles. Thus, mounting the grid is a time-consuming task. Further, mistakes or inaccuracies in the mounting of the grid becomes highly visible when mounting the tiles and results in a less aesthetic impression of the ceiling.

[0005] Not only mistakes originating from the mounting of the ceiling affect the visual impression of the ceiling, also imperfections of the room or building structure may become apparent. For example, walls are seldom completely straight, and as a consequence, a gap is formed between a rail supporting the tiles along portions of the extension of the wall along the wall and the wall, which gap varies along the wall. This gap is visible from the room as a shadow on the wall. Even if the distance between the rail and the wall only differs one or two millimetres along the wall, the shadow varies and makes the varying distance between the rail and the wall easier to perceive. As this kind of discrepancy is easy to perceive, the overall impression of the ceiling may be less attractive.

[0006] If the wall is not straight, the rail for supporting the tiles along the wall follows the irregularities of the wall and becomes twisted. As a result, the surface of the profile adapted to support the tiles is not parallel to the upper ceiling. In the portions where the profile is twisted (where the supporting surface of the profile is sloping towards the floor or towards the upper ceiling), the tiles are not completely abutting the supporting surface. As a consequence, a gap is formed between the supporting surface of the rail and the tile. In this gap a shadow is formed, the shadow being visible from the room and creating an impression of the ceiling being wobbling or wave formed.

[0007] In order to diminish the visual effects associated with walls not being straight, shadow-line trims have been used to create very small gaps between the wall and the tiles. The bigger the gap, the less the wall needs to be straight. With this solution, the tiles are arranged at a distance from the wall. As the tiles arranged adjacent the wall nearly always have to be cut, and thereby having a cut edge facing the wall, the cut edge has to be provided with a trimming or sealing if being visible from the room. Nevertheless, if the profile is fastened to a wall not being straight, the profile, and consequently the tiles, will not be straight. Using shadow line trimming only tries to hide this imperfection visually. Further, this solution does not solve the problem associated with the twisted profile.

[0008] FR 2 740 800 discloses an arrangement for fastening tiles to the walls of a corridor. A first profile fastened to the wall is adapted to receive a second profile, the second profile being movable within the first profile in a direction essentially perpendicular to the wall. As the second profile being movable within the first profile, this arrangement allows adaptation to varying distance between the walls of the corridor. Even if the arrangement allows adaptation to walls not being straight, the disclosed solution represents a complicated arrangement comprising a plurality of profiles for fastening the supporting structure to the wall and then elements for mounting the tiles to the supporting structure. Additionally, the second profiles supporting the tiles have to be manually adjusted in order to form a straight line. In order to ensure that the profiles are maintained in this position, the second profile has to be secured to the first profile in an additional step.

[0009] Another solution for creating a gap between the wall and the tiles is to use a wall fixing bracket having an overlying portion. The fixing bracket has the shape of un U-shaped element turned upside-down, having its first leg attached to the wall, its second leg attached to the profile which supports the tiles and its overlying portion facing the ceiling. Thereby, a gap is formed between the wall and the tile. This type of fixing bracket is commercially available and manufactured by Saint-Gobain Ecophon AB. However, the solution does not solve the problem associated with twisted profiles or walls not being straight.

[0010] Further, not only walls are uneven or irregular. For example, the ceiling structure of a building does often constitute a surface not being completely plane. As a result, a suspended ceiling mounted to such a ceiling will not form a plane surface as a consequence of the different heights of the fixing points.

Summary of the invention

[0011] It is an object of the present invention to provide an improvement over the above described techniques and prior art.

[0012] A further object is to provide a system for supporting a ceiling along a wall and a method for mounting a system for supporting a ceiling along a wall, which system and method simplify the mounting of the ceiling along the wall.

[0013] A further object is to provide a system for supporting a ceiling along a wall and a method for mounting the same, which facilitates aligning the rail supporting the tiles such that the rail forms a straight line, and consequently, that the tiles forming the ceiling along the wall form a straight line.

[0014] A further object is to provide a system and a method which accomplish a visually attractive and aesthetic impression of the ceiling.

[0015] At least some of these and other objects and advantages that will be apparent from the description have been achieved by a system for supporting a ceiling along a surface, comprising a rail and at least two connecting means, said rail having a profile adapted to support at least one tile, said connecting means being adapted to engage the rail and connect the rail to the wall. Each connecting means comprises a resilient element adapted to act on the rail with a force in a first direction in relation to the wall, and a setting element adapted to act on the rail with a force in a second direction, opposite the first direction, said connecting means allowing an adjustment of a distance between the wall and the rail.

[0016] An advantage of the inventive system is that the distance between the surface and the rail is adjustable. When the inventive system is used for supporting the suspended ceiling along a ceiling structure of a building, the distance between the ceiling and the rail is adjusted such that the tiles supported by the rail form a plane surface. When the inventive system is used for supporting the suspended ceiling along a wall, the distance between the wall and the rail is adjusted such that the rail forms a straight line, and consequently the tiles supported by the rail form a straight edge along the wall.

[0017] In case of the surface being a wall, there is provided a system for supporting a ceiling along a wall, comprising a rail and at least two connecting means, said rail having a profile comprising a surface adapted to support at least one tile, said connecting means being adapted to engage the rail and connect the rail to the wall. Each connecting means comprises a resilient element adapted to act on the rail with a force in a first direction in relation to the wall, and a setting element adapted to act on the rail with a force in a second direction, opposite the first direction, said connecting means allowing an adjustment of a distance between the wall and the rail.

[0018] An advantage of the inventive system is that the distance between the wall and the rail is adjustable, such that the rail forms a straight line, or any other desired shape, even if the wall is irregular and/or wave-formed. The rail does not follow the irregularities of the wall. Instead, the setting element is adapted to adjust the varying distance between the rail and the wall in order to form a gap between the rail and the wall which is varying along the wall such that the rail remains straight. As a consequence, the ceiling formed by the tiles forms a straight line along the wall, and the irregularities of the wall are not transferred to ceiling, neither in the plane of the ceiling nor in any other directions.

[0019] As the resilient element acts on the rail with a force in a first direction, and the setting element acts on the rail with a force in a second opposite direction, the force in the second direction is counteracting the force in the first direction. Thereby, the distance between the rail and the surface may be adjusted by adjusting the setting element. In one embodiment, the resilient element acts on the rail with a force outwards from the surface, and the setting element is used to counteract this force with a force forcing the rail towards the surface. By varying the force towards the surface by adjusting the setting element, the distance between the rail and the surface is adjustable.

[0020] Another advantage is that the aesthetic impression of the ceiling is improved compared to prior art solutions. As the rail no longer follows the irregularities of the wall, or the ceiling, the rail will not be twisted when it is fastened to the wall. When the rail is straight, no gap will occur between the supporting surface of the rail and the tiles, i.e. in the plane formed by the ceiling. When no gap is formed no shadows will occur, the shadows would otherwise be visible from the room. The result of mounting a ceiling in accordance with the inventive system is a ceiling visually hiding the imperfections of the walls and a ceiling having straight edges along the wall and a horizontal extension from the wall.

[0021] The possibility of forming a straight edge along the wall is advantageous when using uncut tiles for forming the edge adjacent the wall as well as when using tiles being cut adjacent the wall.

[0022] A gap may be formed between the rail and the surface when the rail is connected to the surface. When arranging the rail with a gap between the rail and the wall, any irregularities of the wall will not be as easy to perceive as if the rail were abutting the wall. If the gap is large enough, any irregularities in the shadow will not be as easy to perceive, compared to when arranging the rail with a smaller gap between the rail and the wall. In the latter case, the varying gap would result in a non-symmetrical, eye catching shadow suddenly occurring between the rail and the wall.

[0023] The first direction may be perpendicular to the surface. In this case, the ceiling when mounted in accordance with the inventive system extends from the wall perpendicular to the wall and parallel to the floor of the room.

[0024] The resilient element may comprise a compression spring. The compression spring acts on the rail with a force pushing the rail outwards from the surface. The setting element may then be used to adjust the compression of the compression spring, and, consequently, adjust the distance between the rail and the surface.

[0025] The setting element may be adapted to engage with the surface for fastening the rail to the surface. In this embodiment, the setting element is also used for securing the rail to the surface, thus having two functions.

[0026] The setting element may be provided with threads. Using a threaded setting element, for a example a screw, is a simple way of fastening the rail to the surface and a stepless variable adjustment is possible.

[0027] The setting element may be adapted to extend through a web of the profile facing and preferably extending in parallel with, the surface, and is adapted to extend through a centre portion of the resilient element. In this embodiment, the setting element acts on the same leg of the rail as the resilient element but on opposite sides. If a helical compression spring is used as a resilient element, the setting element may extend through the centre portion of the spring.

[0028] A flange of the profile may be arranged to form a surface adapted to support the at least one tile. This type of profile is used for conventional edge trims.

[0029] The profile may be a L-profile in cross-section. The L-profile has a web extending in a direction substantially parallel to the wall, providing a surface on which the setting element may act, and a flange providing a supporting surface for the tiles extending substantially perpendicular from the wall. The profile may be a T-profile in cross-section. The T-profile does also provide a web extending in a direction substantially parallel to the wall, providing a surface on which the setting element may act, and a flange providing a supporting surface for the tiles extending substantially perpendicular from the wall. The T-profile is more rigid, both in a horizontal and vertical direction, compared to the conventional L-profile. Further, T-profile is usually provided with connection openings for connecting cross profiles. Additionally, the T-profile is used for other portions of the supporting grid and is therefore easily accessible.

[0030] The resilient element may comprise at least two legs, the legs being flexible and extending between a first flange adapted to abut the rail and a second flange adapted to abut the surface, the resilient element being adapted to receive the setting element and being adapted to act on the rail with a force in a direction outwards from the surface, the resilient element further being adjustable by said setting element in order to vary the distance between the rail and the surface. Compared to a conventional compression spring, this plastic element improves the torsional rigidity of the connecting means and prevents the rail from being twisted when it is fastened to the wall.

[0031] The connecting means may further comprise a housing, comprising a first tubular element and a second tubular element, the first tubular element being displaceable received in the second tubular element, and the housing being adapted to receive the compression spring. The housing improves the torsional rigidity of the resilient element, preventing the rail from being twisted when it is fastened to the wall.

[0032] According to another aspect of the invention, a method for mounting a system for supporting a ceiling along a surface is provided. The method comprising connecting a rail to the surface by at least two, preferably at least three, connecting means, each comprising a resilient element adapted to act on the rail with a force in a first direction in relation to the surface, and a setting element adapted to act on the rail with a force in a second direction, opposite the first direction, aligning the rail to a reference line by adjusting a distance between the surface and the rail by adjusting said setting element.

[0033] The method incorporates all the advantages of the system, which previously has been discussed. Thereby, the previous discussion is applicable also for the inventive method. In addition to the advantages already discussed, the method is advantageous since the rail is aligned with a reference line, the reference line being independent and separate from the wall. Thus, the alignment of the rail is independent of any irregularities of the wall.

[0034] When connecting the rail to the surface by at least three connecting means, it is possible to adjust the central connecting means such that a straight line is formed between the farthest connecting means.

[0035] The method may further comprise forming the reference line by using a laser device. The laser device is a useful and simple tool for forming the reference line. The laser beam from the device is used as a reference line when aligning the rail. The laser device is arranged at a predetermined distance from the wall, and the setting element is adjusted such that the distance between the rail and the reference line is equal along the extension of the rail.

[0036] The method may further comprise adjusting said setting elements with a tool having an indication, wherein the indication coincides with a laser beam formed by the laser device when the rail is aligned with the reference line. The setting elements are adjusted by a tool, such as a screwdriver, having the indication at a predetermined distance from the tip of the screwdriver. The setting elements along the rail are then adjusted such that the indication coincides with the laser beam. After the adjustment, the rail is straight as the distance from the rail to the laser beam is equal along the rail. Using a laser beam in combination with a tool is a fast and easy way of aligning the rail.

[0037] The reference line may be a straight line.

[0038] The method may further comprise fastening the at least two connecting means to the rail such that the connecting means engage the rail.

[0039] The setting elements may be operated by screwing.

Brief description of the drawings

[0040] The present invention will by way of example be described in more detail with reference to the appended schematic drawings, which show embodiments of the present invention.

Fig. 1 shows a connecting element comprising a resilient element and a setting element according to a first embodiment and a rail when the rail is mounted to a wall.
Fig. 2a shows the rail extending along the wall as seen from inside a room.
Fig. 2b shows the setting element securing the rail to the wall in more detail.
Fig. 3 shows the rail secured to wall by the connecting means extending along the wall as seen from above.
Fig. 4 discloses a laser apparatus and a tool for facilitating the aligning of the rail.
Fig. 5a illustrates the setting element being adjusted for aligning the rail.
Fig. 5b shows the tool in form of a screwdriver in more detail.
Fig. 6a shows a resilient element according to a second embodiment.
Fig. 6b shows the resilient element in fig. 6a as seen from above.
Fig. 7 shows a connecting means according to a third embodiment.

Detailed description

[0041] In the description below, the system and method will be described when it is used for supporting a suspended ceiling along a wall. Even if described with reference to a wall, the system and method may also be used for supporting a suspended ceiling along a ceiling structure of a building, beams or any other surface in a similar way.

[0042] With reference to fig. 1, 2a and 2b, a rail 2 extending in a horizontal direction along a surface 4, such as a wall, is disclosed. The rail 2 is adapted to support tiles 100 along the wall 4. In fig. 1, the tile 100 is arranged on the rail 2 such that the rail 2 will be visible from the room after mounting the tile 100. It is also contemplated that the tile 100 may be arranged on the rail 2 in any other way. For example, the tile 100 may be arranged on the rail 2 such that the tile 100 is hiding the rail 2.

[0043] A plurality of tiles 100 having sound-absorbing and/or sound-insulation properties forms the ceiling. The tiles 100 are arranged side by side in order to form a plane ceiling surface. In addition to the rail 2 extending along the wall, a conventional grid system (not shown) fastened to an upper ceiling supports the tiles 100. The grid system is well known to the skilled person.

[0044] The rail 2 comprises a profile 3 in form of a T-profile having a first and a second leg 31, 32. In another embodiment, the profile 3 may be a L-profile or another type of suitable profile. It is understood that the invention is not limited to these profiles. The profile may be of many different types, including profiles providing an invisible suspension of the tiles 100 (not shown).

[0045] The first leg 31 is extending in a vertical direction. The first leg 31 is extending in a direction essentially parallel to the wall. The second leg 32 forms a surface adapted to support the tiles 100. The second leg 32 is extending in a horizontal direction essentially perpendicular to the wall.

[0046] The rail 2 is arranged at a distance from the wall, thus a gap 19 is formed between the rail 2 and the wall 4.

[0047] The rail 2 is connected to the wall 4 by means of a connecting means 9. The connecting means 9 comprises a resilient element 6 and a setting element 5. In this embodiment, the setting element 5 is a threaded element such a screw. By the setting element 5 being a screw, a stepless variable adjustment is achieved. The threaded element may be single-threaded or double-threaded. Alternatively, the setting element 5 is provided with a bayonet fitting. The setting element 5 extends in horizontal direction essentially perpendicular the wall 4. A first portion of the setting element is extending through the first leg 31 of the profile 3. The profile 3 is provided with cut-outs 8 for receiving the setting element 5. A second portion of the setting element 5 engages the wall in order to fasten the rail 2 to the wall 4.

[0048] In this embodiment, the resilient element 6 is a helical compression spring 7. The compression spring 7 is arranged between the rail 2 and the wall 4, and is extending in a horizontal direction essentially perpendicular to the wall 4. The setting element 5 extends through a centre portion of the compression spring 7. The compression spring 7 is abutting both the wall 4 and the surface of the first leg 31 facing the wall 4.

[0049] The compression spring 7 acts on the first leg 31 of the profile 3 with a force in a first direction (A) substantially perpendicular to the wall. The setting element 6 acts on the first leg 31 of the profile 3 with a force in a second direction (B) opposite the first direction, the second direction being substantially perpendicular the wall. By adjusting the setting element 5, the distance between the wall 4 and the rail 2 is adjusted. The compression spring 7 strives to hold the rail 2 at a predetermined distance from the wall 4. As the wall 4 may be wave-formed, the distance between the rail 2 and the wall 4 has to be adjusted along the wall 4 in order to form a straight extension of the rail 2 along the wall 4. If the distance between the rail 2 and the wave-formed wall 4 is equal, the rail 2 will also be wave-formed. On the contrary, if the distance is adjusted in order to adjust to these variations, the rail 2 will be straight. This distance between the wall 4 and the rail 2 is adjustable by adjusting the setting element 5, for example by screwing the threaded setting element 5.

[0050] Fig. 2a shows the rail 2 extending along the room before any tiles 100 have been arranged on the second leg of the profile 3. The rail 2 is fastened to the wall 4 with three fastening means 5, which in this embodiment also function as setting elements 5. In this figure, only a portion of the rail 2 is shown. Normally, the rail 2 is extending along the entire wall 4 of a room, and the length of the rail 2 is several metres. The rail 2 is cut to the desired length. For determining the appropriate distance between the setting elements 5, consideration has to be taken to load, size and type of tiles, and other conditions.

[0051] In fig. 2b, a setting element 5 and the rail 2 are shown in detail. The rail 2 receives the setting element 5 in a cut-out 8. The cut-out 8 has an extended cross-section. The head of the setting element 5 is abutting the first leg 31 of the profile 3 on the surface facing the room. The force applied by the setting element 5 is acting on the first leg 31 of the profile 3 which is facing the room. As apparent in fig. 2a, the rail 2 is provided with a plurality of cut-outs 8 along the rail 2, but only three are provided with setting elements 5 in the figure.

[0052] It may be possible to adjust the rail in a vertical direction by applying a force acting on the rail 2 which is large enough for counteracting the force of the load. Thereby, the setting element 5 may be fastened to the rail in a fixed position. As an alternative, a rubber gasket may be used for increasing the frictional force between the setting element 5 and the rail 2.

[0053] Fig. 3 shows the rail 2 when mounted to the wall 4. For illustration purposes the wave-form of the wall 4 is greatly exaggerated. The figure illustrates the wave-form of the wall 4 and that the gap 19 between the wall 4 and the rail 2 is not equal along the wall 4. The distance between the wall 4 and the rail 2 differs along the wall 4. However, the rail 2 forms a straight line. The distance between the rail 2 and wall 4 has been adjusted by adjustment of the setting element 5 in order to form a straight line of the rail 2. As the rail 2 is straight in its extension along the wall 4, the edges of the tiles (not disclosed) arranged on the second leg 32 of the profile 3 form a straight line and a ceiling having a plane, horizontal extension.

[0054] As disclosed in fig. 3, the compression of the compression spring 7 arranged along the rail 2 differs among the different connecting means 9. Further, the portion of the setting element 5 that engages in the wall 4 varies among the different connecting means 9.

[0055] When mounting the system 1 to the wall 4, the setting element 5 is introduced into the cut-out 8 of the profile 3. The compression spring 7 is then arranged in the gap 19 between the wall 4 and the rail 2. The setting element 5 extends through the centre portion of the compression spring 7. The rail 2 is fastened to the wall 4 at a desired height from the floor by means of the setting element 5. The length of the setting element 5 exceeds the length of the compression spring 7, thereby the spring 7 having no pretension. As the setting element 5 is introduced into the wall 4, the compression spring 7 starts acting on the rail 2 with a force directed outwards (in the direction indicated as A in the drawings) from the wall 4. When the rail 2 is secured to the wall 4, the adjustment of the distance between the wall 4 and rail 2 is performed by the setting element 5. If the rail 2 is closer in some portions so that the rail 2 is wave-formed and not forming a straight line, or is not aligned to any other reference line, the setting element 5 has to be untighten. In this case, the compression spring 7 forces the rail 2 outwards from the wall 4 to form a straight line again. On the contrary, if the rail 2 is further away from the wall 4 in some portions so that the rail 2 is wave-formed and not forming a straight line, or is not aligned to any other reference line, the setting element 5 has to be tighten in order to force the rail 2 towards the wall 4. This procedure is performed for every connecting element 9 along the rail 2 until the rail 2 is aligned with the reference line 15. The reference line 15 is parallel to the desired extension of the rail 2. The reference line may be formed by using a laser device or a string.

[0056] Referring to figs. 4, 5a and 5b, a laser apparatus 40 facilitating the aligning of the rail 2 is shown. The laser apparatus 40 comprises a laser device 41. The direction of the laser beam 42 formed by the laser device 41 is adjustable by two adjustment screws 43, 44. The apparatus 40 is attachable to the wall 4 by means of a screw 47. The distance between the laser device 41 and the wall 4 is also adjustable. The laser apparatus 40 is used in combination with a tool 45, such as a screwdriver, having an indication 46 arranged on the stem. The indication 46 may be in form of a coloured strip or a groove, or a scale along the stem of the tool 45 corresponding to different distances between the rail 2 and the reference line 15 formed by the laser beam 42.

[0057] The method of using the laser apparatus 41 when mounting the inventive system will now be described. Firstly, the rail 2 is attached to the wall 4 by the setting element 5 such that the rail 2 is fixed. No further adjusting takes place in this step. The laser apparatus 40 is fastened to the wall 4. The distance between the laser device 41 and the wall 4 is then adjusted. The laser device 41 is directed in horizontal and vertical directions such that a desired reference line 15 is formed along the wall by the laser beam from the laser device. The laser beam 42 is used as the reference line 15 when aligning the rail 2. In the next step, the tool 45 is used. The setting elements 5 is adjusted by the tool 45 such that the laser beam 42 coincide with strip or groove 46 on the tool 45. This procedure is repeated for all setting elements 5. This means that some setting elements 5 have to be adjusted outwards from the wall 4, and some inwards to the wall 4. When the laser beam 42 coincides with the strip or groove 46 on the tool 45 for all setting elements 5, the distance between the rail 2 and the reference line 15 in form of the laser beam 42 is equal along the rail 2. Consequently, the rail 2 is aligned with the reference line 15. If the reference line is a straight line, as the laser beam 42, the rail 2 is also straight. Even if the distance between the rail 2 and the reference line 15 is equal, the distance between the rail 2 and the wall 4 is not equal along the wall 4 (apparent from fig. 3). This distance is varying along the wall 4 as a result of the wall 4 not being straight.

[0058] As an alternative to the tool 45 described above, the rail 2 may also be aligned to the reference line 15 by using a tool measuring the distance between the first leg 31 of the profile 30 to the reference line 15.

[0059] In the embodiment described above, the resilient element 6 is in form of a compression spring 7. With reference to figs. 6a and 6b , another embodiment of the present invention is disclosed. The resilient element 10 in this embodiment is made of a plastic material, preferably a flexible plastic material. The resilient element 10 acts on the rail 2 with a force in a direction outwards from wall 4, thus functioning as a compression spring 7. The resilient element 10 comprises two or more legs 11, 12. The legs 11, 12 have an elongated cross-section. The legs 11, 12 are flexible such that the resilient element 10 is adapted to adjust to varying distances between the wall 4 and the rail 2. Although being flexible, the resilient element 10 does not collapse as a result of the force from the setting element 5. The resilient element 10 continuously strives to reach a position wherein the two legs 11, 12 being parallel. Consequently, the resilient element 10 acts on the rail 2 with a force in a direction outwards from the wall 4. The resilient function of the resilient element 10 is provided by deformation zones wherein the material is weaker. In these portions, the resilient element 10 is foldable. The resilient element 10 further comprises a first flange 13 abutting the rail 2 and a second flange 14 abutting the wall 4. As a result of the legs being flexible, the distance between the first flange 13 and the second flange 14 is variable.

[0060] By comparison with using a conventional compression spring as previously disclosed, the resilient element 10 according to this embodiment is torsional rigid due to the elongated cross-section of the legs 11, 12. When a force is applied on the resilient element 10 in a direction towards the wall 4, i.e. the force resulting from the setting element 5, the two flanges 13, 14 of the resilient element 10 remain parallel. Thus, the resilient element 10 prevents torsional movements of the rail 2.

[0061] When mounting the rail 2, the resilient element 10 is attached to the rail 2, preferably by using a snap lock function. The setting element 5 is then introduced into the resilient element 10 as disclosed in figs. 6a and 6b. The setting element 5 and the resilient element 10 being attached to the rail 2, the rail 2 is fastened to the wall 4 by means of the setting element 5 as previously described.

[0062] Fig. 7 discloses a further embodiment of the connecting means 9. In this embodiment, the resilient element 6 (illustrated with a dashed line in fig. 7) is arranged in a housing 20 comprising at least two coaxially arranged tubular elements 21, 22. The two tubular elements 21, 22 have different diameters such that the first tubular element 21 is displaceable received within the second tubular element 22. In this way, the housing 20 is able to adapt to the varying distance between the rail 2 and the wall 4 by mutually displacement between the two tubular elements 21, 22.

[0063] The first tubular element 21 has a first flange 24 abutting the wall 4 and the second tubular element 22 has a second flange 23 abutting the rail 2. As the two tubular elements 21, 22 are coaxially arranged, the housing 20 improves the torsional rigidity of the resilient element 6, thereby preventing torsional movements of the rail 2.

[0064] When mounting the rail 2 to the wall 4, the housing 20 is firstly attached to the rail 2, preferably by using a snap lock function, the compression spring 7 and the setting element 5 is then introduced into the housing 20. The setting element 5 extends through the centre portion of the compression spring 7. The rail 2 is fastened to the wall 4 by means of the setting element 5.

[0065] The tiles 100 are made of fiber material, preferably mineral fibers, such as glass wool and stone wool, or gypsum.

[0066] When the inventive system and method is used for supporting a suspended ceiling along a ceiling structure of a building, the vertical distance between such a ceiling or beams and the suspended ceiling formed of a plurality of tiles is adjustable such that the suspended ceiling forms a plane surface irrespectively of the shape, inclination or other irregularities of the ceiling structure or the beams. In this alternative embodiment, connecting means, comprising a resilient member and a setting element, are attached to attachments points in the ceiling structure or the beams and engage the rail which supports the suspended ceiling. By adjusting the setting element of the connecting means, the distance is adjustable.

[0067] It is contemplated that there are numerous modifications of the embodiments described herein, which are still within the scope of the invention as defined by the appended claims.

[0068] It is contemplated that the resilient element may be a spring or any other equivalent element. Even if a helical compression spring has been described, the resilient element may be a leaf spring or a rubber spring. It is also contemplated that the resilient element may be a tension spring. In this embodiment, the resilient element acts with a force in a direction towards the wall. The setting element is counteracting this force with a force in a direction outwards from the wall.

[0069] In the previously described embodiments, the setting element is centrally arranged in the resilient element. It is contemplated that the setting element may be arranged outside the resilient element.

[0070] Further, it is contemplated that a separate fixing element may be used. The fixing element fastens the rail to the wall. In this alternative embodiment, the setting element is only used for adjusting the distance between the rail and the wall, not for connecting the rail to the wall.

Claims

1. System (1) for supporting a ceiling along a surface (4), comprising a rail (2) and at least two connecting means (9),
said rail (2) having a profile (3) adapted to support at least one tile (100),
said connecting means (9) being adapted to engage the rail (2) and connect the rail (2) to the surface (4),
characterised in that each connecting means (9) comprises

    a resilient element (6) adapted to act on the rail (2) with a force in a first direction in relation to the surface (4), and
    a setting element (5) adapted to act on the rail (2) with a force in a second direction, opposite the first direction,

said connecting means (9) allowing an adjustment of a distance between the surface (4) and the rail (2).

2. System (1) according to claim 1, wherein a gap (19) is formed between the rail (2) and the surface (4) when the rail (2) is connected to the surface (4).

3. System (1) according to claim 1 or claim 2, wherein the first direction is perpendicular to the surface (4).

4. System (1) according to any one of claims 1-3, wherein the resilient element (6) comprises a compression spring (7).

5. System (1) according to any one of claims 1-4, wherein the setting element (5) is adapted to engage with the surface (4) for fastening the rail (2) to the surface (4).

6. System (1) according to any one of claims 1-5, wherein the setting element (5) is provided with threads.

7. System according to any one of claims 1-6, wherein the setting element (5) is adapted to extend through a web (31) of the profile (3) facing the surface (4), and is adapted to extend through a centre portion of the resilient element (6).

8. System (1) according to any one of claims 1-7, wherein the profile (3) is a L-profile in cross-section.

9. System (1) according to any one of claims 1-7, wherein the profile (3) is a T-profile in cross-section.

10. System (1) according to any one of claims 1-9, wherein a flange (32) of the profile (3) is arranged to form a surface adapted to support the at least one tile (100).

11. System (1) according to any one of claims 1-10, wherein the resilient element (10) comprises at least two legs (11, 12), the legs being flexible and extending between a first flange (13) adapted to abut the rail (2) and a second flange (14) adapted to abut the surface (4), the resilient element (10) being adapted to receive the setting element (5) and being adapted to act on the rail (2) with a force in a direction outwards from the surface (4), the resilient element (10) further being adjustable by said setting element in order to vary the distance between the rail (2) and the surface (4).

12. System (1) according to any one of claims 1-10, wherein the connecting means (9) further comprises a housing (20), comprising a first tubular element (21) and a second tubular element (22), the first tubular element (21) being displaceable received in the second tubular element (22), and the housing (20) being adapted to receive the compression spring.

13. Method for mounting a system (1) for supporting a ceiling along a surface (4), comprising

    connecting a rail (2) to the surface (4) by at least two connecting means (9), each comprising a resilient element (6) adapted to act on the rail (2) with a force in a first direction in relation to the surface (4), and a setting element (5) adapted to act on the rail (2) with a force in a second direction, opposite the first direction,
    aligning the rail (2) to a reference line (15) by adjusting a distance between the surface (4) and the rail (2) by adjusting said setting element (5).

14. Method according to claim 13, further comprising forming the reference line (15) by using a laser device (41).

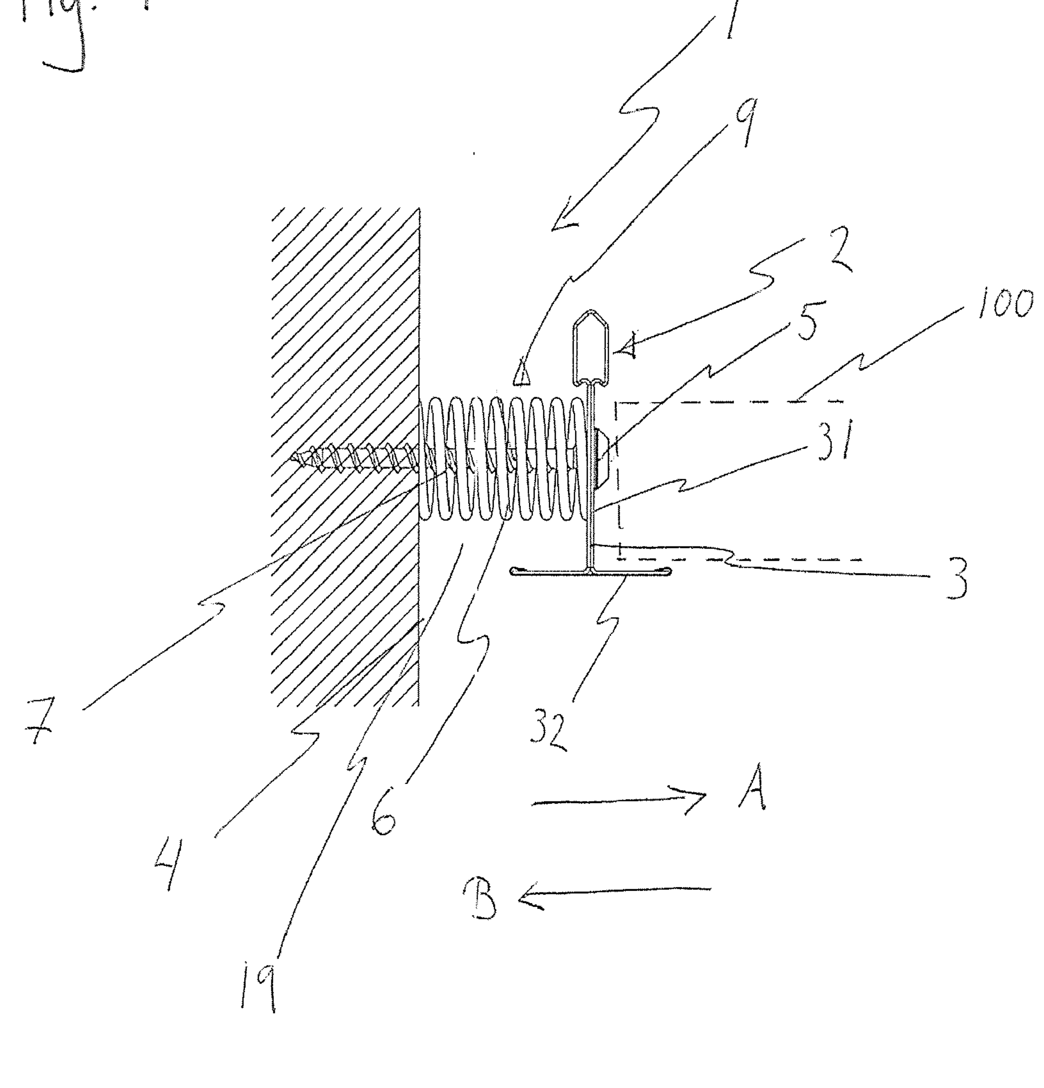
15. Method according to claim 14, further comprising adjusting said setting elements (5) with a tool (45) having an indication (46), wherein the indication (46) coincides with a laser beam (42) formed by the laser device (41) when the rail (2) is aligned with the reference line (15).

16. Method according to any one of claims 13-15, wherein the reference line (15) is a straight line.

17. Method according to any one of claims 13-16, comprising fastening the at least two connecting means (9) to the rail (2) such that the connecting means (9) engage the rail (2).

18. Method according to any of the claims 13-17, wherein said setting elements (5) are operated by screwing.

Fig. 1



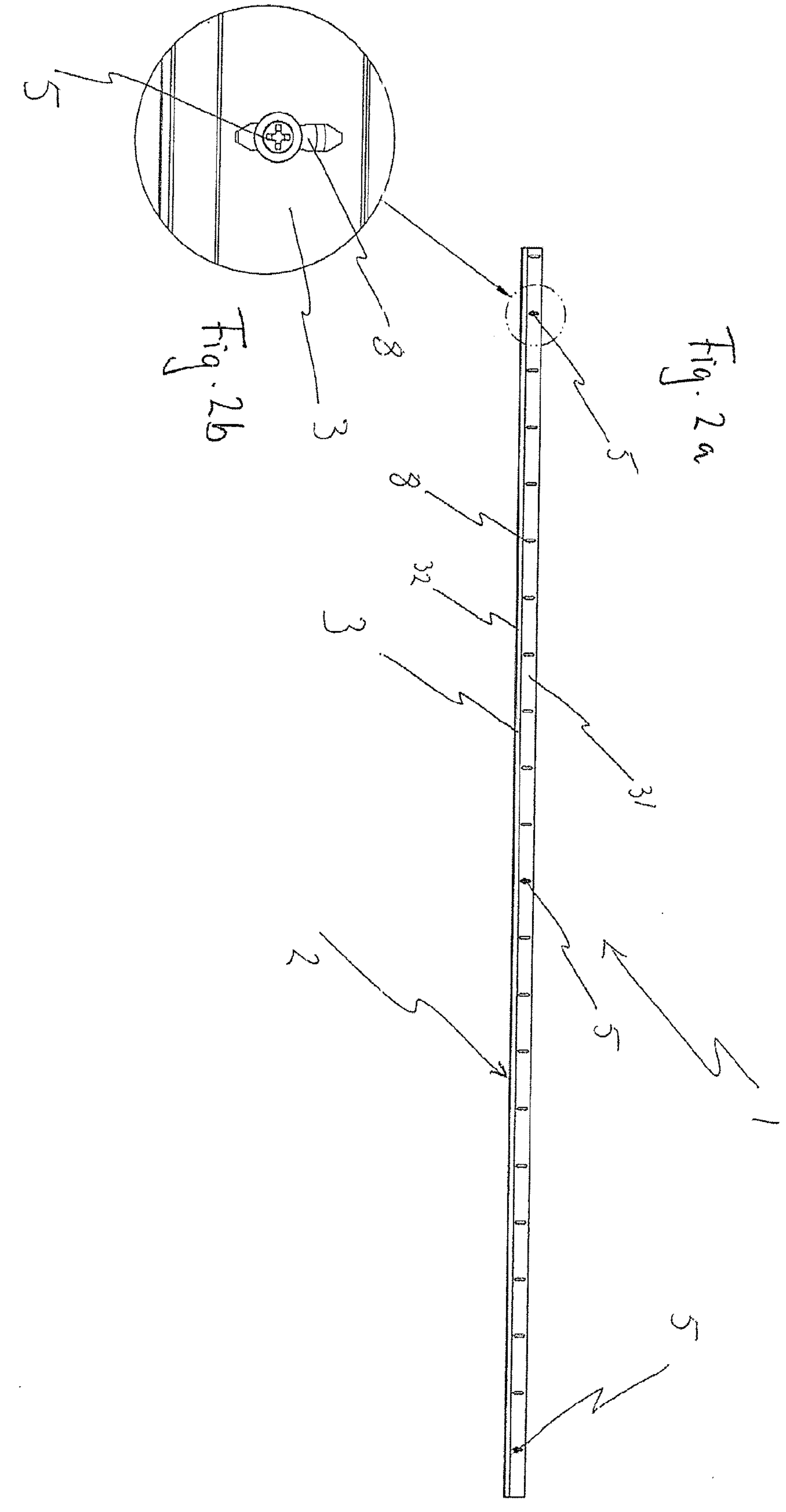
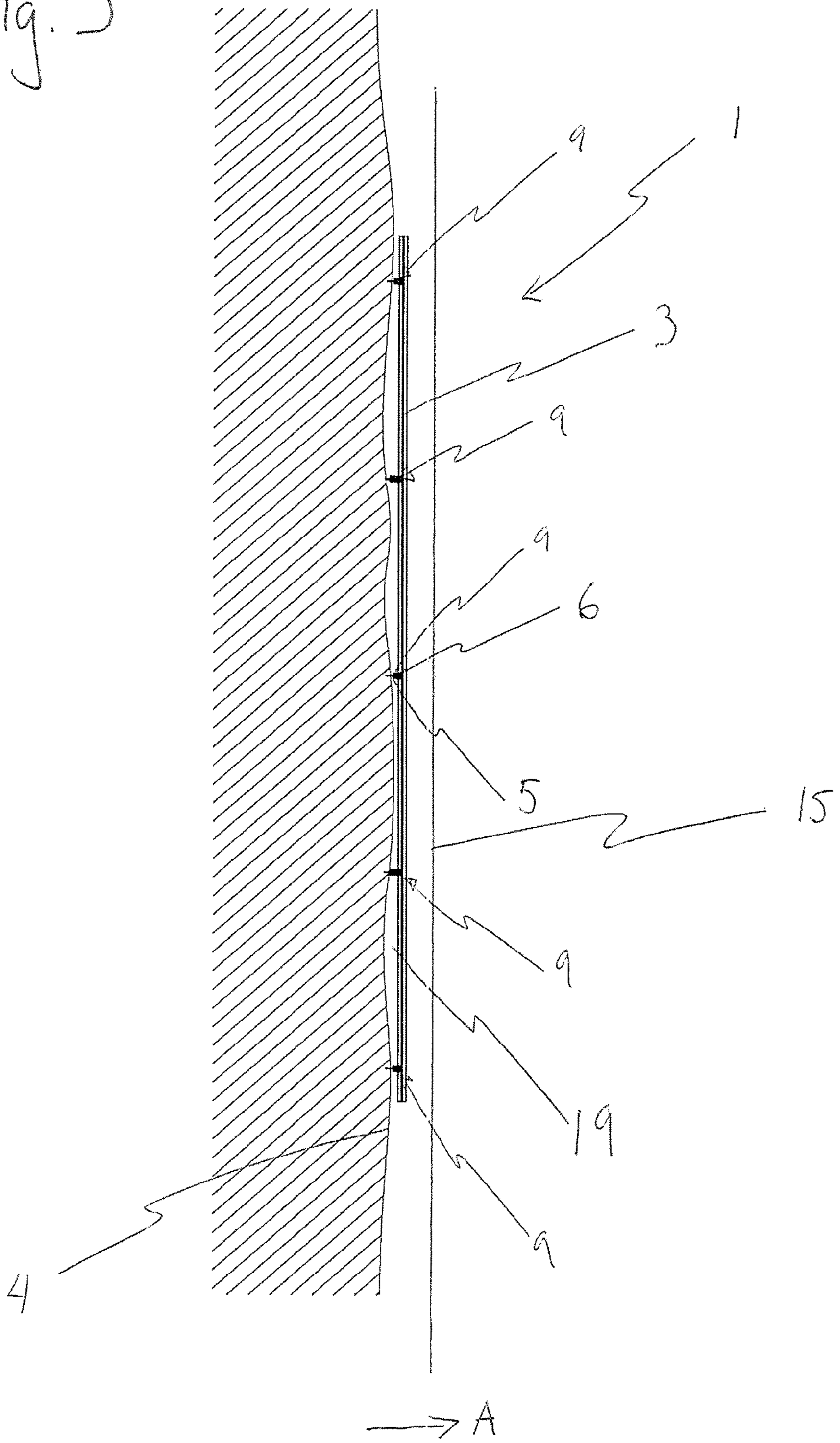


Fig. 2b
Fig. 2a
5
8
3
32
31
2
1

Fig. 3



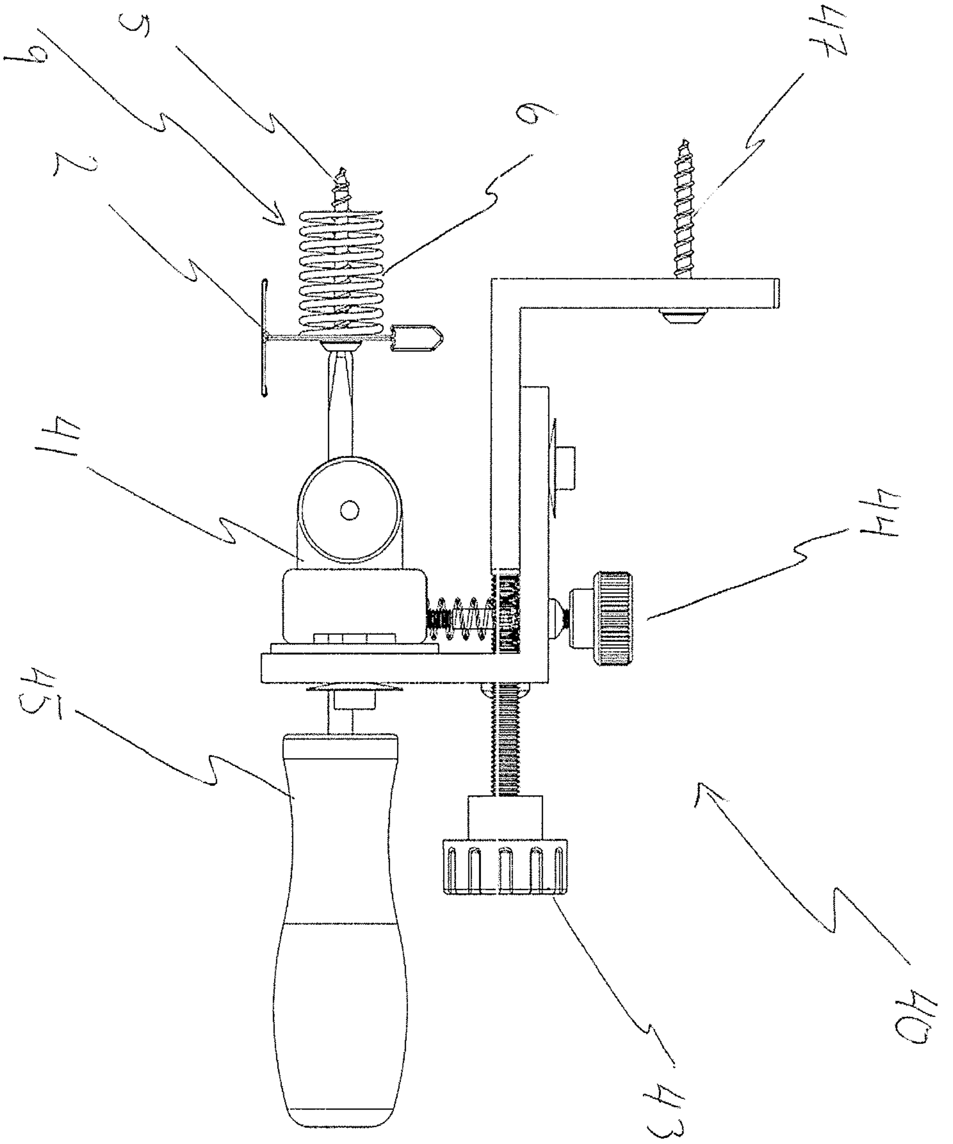


Fig. 4

Fig. 5b

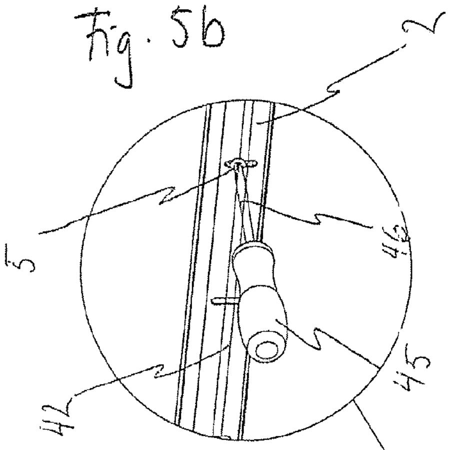


Fig. 5a

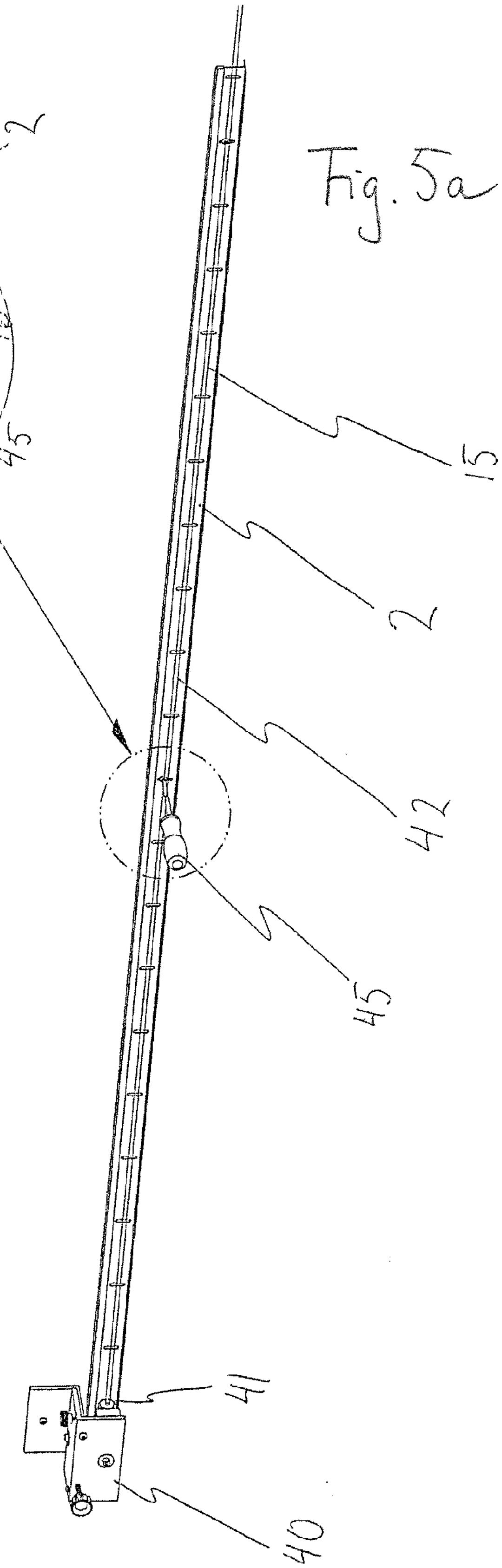


Fig. 6a

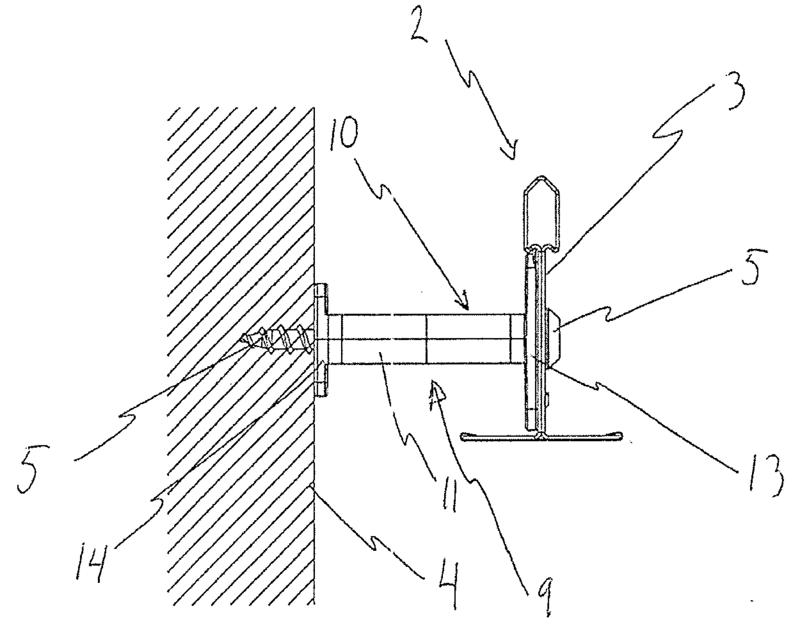


Fig. 6b

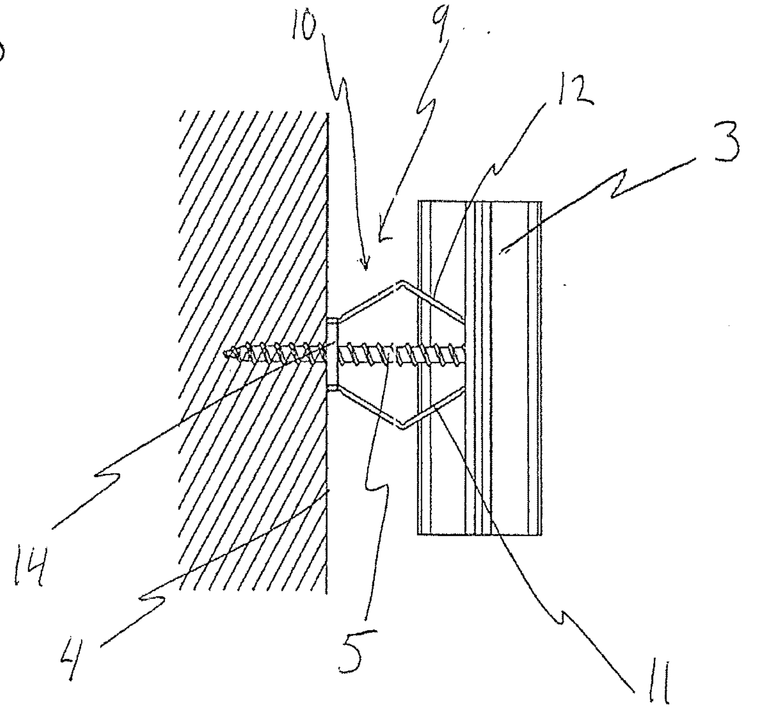
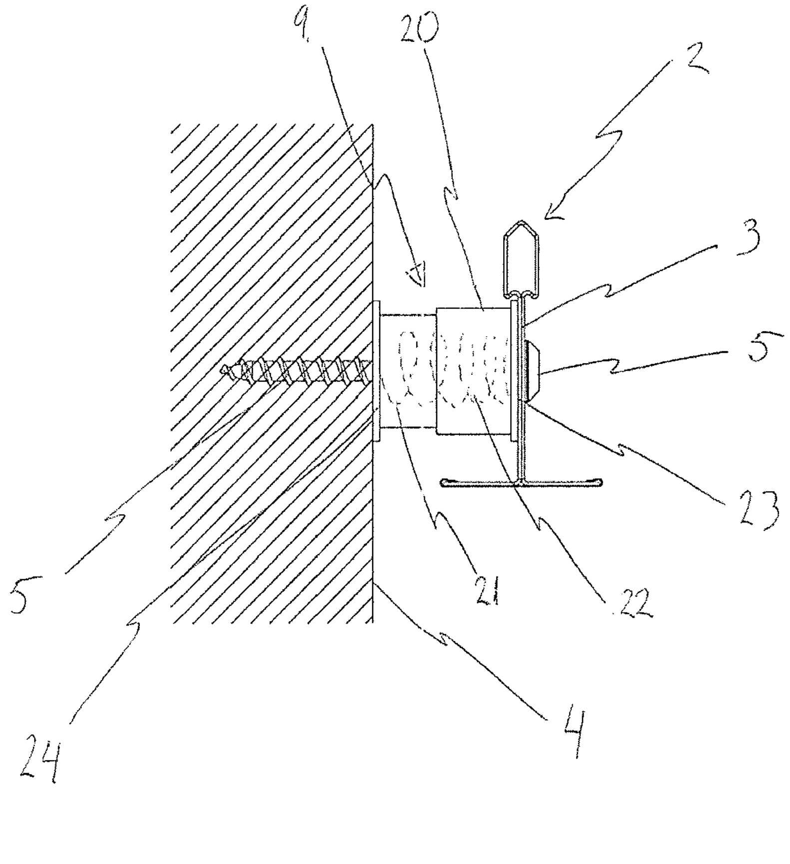


Fig. 7



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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
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