Construction profile and support system

A hook support system consists of a retaining rail 1 for fastening to walls, ceilings and floors and different support arms, which can be attached to the retaining rail (1) so as to be lockable-displaceable. The rail may have an undercut channel for receiving fixings. The system also includes a construction profile having an undercut channel. The mouth of the undercut channels may be stepped to accommodate different widths of fixings. Brackets and fixings having stepped back plates are also described.
The present invention relates to:

a) a construction profile comprising a closed cross section and at least one surface profile in the form of an undercut longitudinal groove as well as an inner cavity in longitudinal direction of the construction profile,

b) a profile connector comprising two sides connected to one another arranged so as to be at right angles to one another as well as a side connecting the free ends of both sides to one another,

c) a retaining rail for fastening to walls, ceilings and floors, wherein the retaining rail encompasses a rear wall, from which two parallel journals of the same length stick out at right angles, at the front ends of which provision is made for rear wall parallel bars facing one another, which define a through gap of an open chamber,

d) different support arms, which can be attached to the construction profile or the retaining rail so as to be lockable-displaceable, wherein the support arms are embodied so as to be supported against the construction profile or the retaining rail, as well as

e) a system consisting of the afore-mentioned components.

Construction profiles and profile connectors are used for producing simple tools but also for the construction of more complex objects such as machine tables, shop equipment or for the construction of objects such as booths, the spatial shape of which is constructed in an ever changing manner.

Construction profiles, profile connectors and support arms are also used for producing objects in the area of organization, storing, hobby, for example for building shelves, wardrobes, base frames, ladders, trellises, bicycle hangers. It is desirable herein to fasten as many different types of support arms as possible to the construction profiles so as to enable the most diversified constructions. The support arms thereby serve as trays, coat hooks, towel rails, hinge supports, fastening possibilities for information boards and so forth.
Construction profiles as construction elements are oftentimes used repeatedly, in particular in booth construction. They are connected to one another by means of rigid or jointed profile connectors. Construction profiles are rod-shaped products, the cross section geometry of which does not change or changes insubstantially across their entire length. They typically encompass a surface profile in the shape of more or less undercut longitudinal grooves, wherein known construction profiles can also encompass a plurality of parallel longitudinal grooves per construction profile side. The undercut longitudinal grooves serve the purpose of accommodating sliding blocks of profile connectors, wherein other construction profiles are braced against these sliding blocks, thus leading to a frictional-locked connection of the profiles. Typically, the construction profiles encompass an inner cavity, which is sealed outwardly, which also extends in longitudinal direction of the construction profile typically concentrically about the longitudinal axis thereof and serves the purpose of accommodating therein objects with or without a thread. This cavity is also referred to as a core hole. Such construction profiles typically consist of extruded aluminum. Such known construction profiles are described in DE 10 2004 043 964 A1 or in DE G 93 13 596.3, for example.

These documents also describe profile connectors for two profiles oriented at right angles to one another. One of these connectors consists of two sliding blocks arranged in the first construction profile, each of which encompasses, at its side facing the second construction profile, a recess provided with a threaded hole. They are thereby oriented to each other in such a manner that these recesses can be connected by means of a rail, which is fastened to the second construction profile. The rail encompasses four through-holes, two of which serve the purpose of fastening in the cavities of the second profile by means of screws. The other two through-holes are penetrated by screws, which in each case engage with a threaded hole of the sliding blocks and which are in each cases guided in a longitudinal groove of the first construction profile.

These known construction profiles and connectors encompass a number of disadvantages. The design of the known connector is complicated, for example, and its assembly is laborious. It is a disadvantage of the known construction profile that it is difficult to connect it to others as further construction profiles, which furthermore only simply stand on the first construction profile. In
particular, support arms can be securely fixed to these construction profiles for the most part only by damaging them.

In the area of organization, storing, hook support systems consisting of retaining rails and support arms are used in many cases. A hook support system, which encompasses a retaining rail is known, for example, from DE 44 47 208 A1. Said retaining rail is embodied so as to be c-shaped and where a chamber is arranged in such a manner that a retaining journal of a support arm encompasses the retaining rail and directly supports itself on the housing wall or on the rear wall of the retaining rail. The chamber known from this document serves the purpose of accommodating sliding blocks, against which the support arms can be clamped. The disadvantage of this and the other known hook support systems is that they cannot be used universally and do not enable a secure mounting of the support arms.

It is thus the object of the present invention to specify a construction profile, a profile connector and a support arm as well as a system consisting of a construction profile, a profile connector and different support arms, which avoid these disadvantages. According to the invention, it is to be possible to produce a plurality of different objects from these component parts and from this system, respectively, wherein these objects always encompass a defined and secure construction. It is furthermore the object of the present invention to create a novel hook support system, where the different support arms are capable of being fastened to the retaining rail in a friction-locked manner and wherein the retaining rail can be fastened to a wall, ceiling or floor under any angle.

This object is solved with the construction profile in that the groove slot is defined by two bars facing away from one another, which are embodied in a step-like manner such that one step of a bar is in each case located on a plane with a step of the other bar, wherein provision is made for at least two spaced-apart steps, the planes of which are arranged parallel to one another. With the retaining rail, the object is solved in the same technical manner in that provision is made on the parallel journals for two bars facing away from one another, which are embodied in a step-like manner such that one step of a bar is in each case located on a rear wall parallel plane with a step of the other bar, wherein provision is made in particular for a plurality of spaced-apart steps. In other words, the invention proposes briefly, to provide at least two steps spaced apart
in parallel to one another in the region of the groove slot for the construction profile as well as for the retaining rail.

Highly advantageously, the construction profile according to the invention provides for a further bearing surface for fastening objects, which is a sensible addition to the sliding block channel, by means of the steps, which are spaced apart from one another and which are located on one plane. Highly advantageously, a much greater surface and material thickness, respectively, is available for a force transmission, wherein the bearing surface advantageously furthermore also prevents the twisting of the objects. Due to the fact that the planes are arranged in parallel to one another, different wide objects can be securely fastened to the construction profile so that support arms of different sizes can be used without requiring auxiliary means for the exact perpendicular orientation thereof. In the same manner, provision is hereby made for means for tilt-resistant positive fastening of the different support arms on the retaining rail, because the different support arms can be guided in the at least one chamfer formed by the steps in a positive manner and can be clamped in the chamber in the known manner by means of the sliding blocks. Highly advantageously, provision is made for a plurality of steps so that a plurality of chamfer widths is available for guiding support arms of different widths. It is thus possible to adapt the connection support arm-retaining rail and support arm-construction profile, respectively, to different stresses. The more steps are provided, the more versatile the width of the objects, which are to be securely attached, can be chosen. Due to the fact that the steps are embodied so as to be recessed from the actual surface of the construction profile, a lateral guide of support arms forms, but mainly an invisible bearing surface, so that no visible damages to the construction profile remain in response to a renewed assembly or change of the support arm. Due to the fact that the construction profile and the retaining rail are embodied so as to be continuous, the support arms can be adjusted in a continuous manner thereon. Together with the horizontal, vertical or beveled attachment of the retaining rails on the walls, ceilings, floors or pitches of roofs, the result is thus a very large variation possibility for the hook support system according to the invention.

Advantageous developments of this invention, which is the same with reference to the embodiment of the steps in the construction profile and retaining rail, are specified in the subclaims.
As an embodiment of the construction profile according to the invention, provision is made for the inner cavity to be embodied so as to be cylindrical and so as to encompass an inner diameter, which allows for the accommodation of a threaded rod, in particular an M8 threaded rod comprising transfer tolerance or an M10 threaded rod so as to be screwed in. The cylindrical inner cavity, also called a core hole, is thus embodied according to the invention in such a manner that a threaded rod can be accommodated therein, thus allowing for the loose or fixed connection of two construction profiles in their longitudinal direction.

If, as provided according to the invention, the bar of an undercut longitudinal groove by means of a transition region is embodied so as to be connected to the bar of another undercut longitudinal groove of the construction profile according to the invention and if the transition region has a radius, the result is a profile without sharp flanges in the region which is visible from the outside, which reduces the risk of injuries and which is particularly advantageous in particular with constructions comprising contact to the public, such as booths, for examples. At the same time, it is much more difficult to damage a rounded surface than a flange so that the construction profile according to the invention encompasses a clear surface, even with a repeated use.

Provision is furthermore made for the undercut longitudinal groove embodied with steps to be provided only on one side or on two adjacent sides or on two opposite sides or on three sides or on all sides of the construction profile. With this feature of \( n, n-1, n-2 \) etc. undercut longitudinal grooves per construction profile, with \( n = \) number of the sides of the construction profile, two things can be advantageously achieved: on the one hand, an otherwise necessary covering of a non-required undercut longitudinal groove is no longer necessary, on the other hand, the result is a continuous surface on the side without undercut longitudinal groove, which is advantageous for example in response to the assembly in corners or on walls, because the construction profile according to the invention then abuts across its entire contact surface and can thus be securely fastened. It goes without saying that the invention also includes such construction profiles, where provision is made on each side for at least one undercut longitudinal groove embodied according to the invention.
As an embodiment of the invention, provision is made for the first corresponding pair of steps to encompass a width of 12.5 mm and for the second one to encompass a width of 16.5 mm. This highly advantageously permits the use of other profiles by the applicant, which are exactly adapted to this uncommon and non-standardized dimension so that the construction profile according to the invention can be connected by means of a plurality of fastening hooks, metal sheets, pipes, etc., which in turn can be embodied so as to be connected to one another. A retaining profile according to DE 10 2007 030 925, for example, can be fastened, which results in an additional possibility for fastening the object, which is constructed from the construction profiles according to the invention, to walls, ceilings or floors.

If the construction profile according to the invention is embodied as a triangle, square, pentagon or a regular polygon, it can particularly advantageously be adapted to many fields of application and the different geometries enable honeycomb structures or pentagonal or triangular structures, for example. This advantageously allows for the most versatile constructions, which do not require any special angles or remedies, but for which the invention, which is reliable and which is protected from visible damages, can instead always be used.

If the wall of the inner cavity and of the undercut longitudinal groove of the construction profile according to the invention are connected to one another, the result is a particularly stable construction profile.

If the undercut longitudinal grooves have a V-groove arranged in the center of the groove slot on the side located opposite the groove slot, as assembly can always take place in the center in a highly advantageous manner without large efforts, because the V-groove facilitates the positioning and guide of a drill or the like.

The object is also solved by means of a profile connector comprising two sides, which are connected to one another and which are arranged at right angles to one another as well as by means of a side, which connects the free ends of the two sides to one another, where each side encompasses an integrally molded profile bar, which is embodied for engaging with the undercut longitudinal groove of the construction profile according to the invention and which is embodied so as to be adapted to the inner form thereof with displacement
tolerance, wherein the profile bar encompasses a stepped embodiment, the step width and height of which is embodied so as to correspond to that of the construction profile according to the invention. The full integral molding of a profile bar comprising a sliding block cross section, in cooperation with the stepped embodiment of the profile bar abutting on the stepped embodiment of the construction profiles causes a reliable non-positive hold and, at the same time, a flange-free transition of the two profiles. Even though it is generally disadvantageous, such a profile connector according to the invention leads to a constructively more reliable and optically more appealing connection of two connection profiles than do known connectors. The disadvantages result from the necessity of having to insert profile connectors according to the invention into the sliding block channel in an exact number prior to the connection of the construction profiles, whereas it is possible with the known connectors to simply insert any number of sliding blocks and to only use those, which are required. That is, a later change of the originally provided construction is much simpler with the known connectors than with the invention.

If the connecting side is equipped with a radius, the result is a transition, which is free from the risk of injuries and which furthermore more than sufficiently removes the loads.

If the profile bar encompasses at least one recess in the part of the profile bar embodied as sliding block on each side, and if the connecting side encompasses at least one through-hole corresponding with the recess, the result is a clamping mechanism, which is easily accessible from outside of a construction profile according to the invention, but which is stable. Said clamping mechanism is formed by means of a screw, which is provided in the through-hole and which penetrates said through-hole, respectively, and by means of a screw nut provided in the recess, which is embodied so as to be twist-resistant and so as to be adjustable in its position for the stepped embodiment of the profile connector by means of the screw and via which the clamping force is inserted into the construction profile.

If the profile bar does not encompass a sliding block profile in the connection region of the two sides arranged at right angles to one another, two construction profiles can be connected to one another approximately without distance.
As an embodiment of the retaining rail according to the invention, provision is made for the bars to be embodied so as to be connected to the rear wall, in particular by means of a rounded transition region. This advantageously increases the stability of the retaining rail and of the hook support system according to the invention, because a second force transmission into the rear wall and thus into the wall is made possible next to the parallel journals. If this connection of the bars to the rear wall is embodied so as to be rounded and if it is mainly provided in the end region of the bars, the result is a particularly advantageous force transmission with a considerably reduced risk of injury and considerably increased user friendliness. A cleaning of the rounded regions without a cutting danger on flanges or the like is easily possible; cutting injuries caused by slipping retaining rail cannot occur in response to the assembly. The connection according to the invention leads to the formation of closed chambers in the retaining rail so that the retaining rails is particularly stable and corrosion-free; moisture and dirt have a hard time accumulating or cannot accumulate at all.

Due to the fact that the rear wall of the retaining rail according to the invention encompasses one or a plurality of grooves, preferably V-grooves, on the side facing away from the chamber, a particularly simple and accurate assembly of the retaining rails is possible. According to the invention, the V-grooves run through the center of the bore, thus leading to an accurate bore into the wall at right angles.

Highly advantageously, provision is made for the retaining rail to be embodied as an extrusion profile, in particular aluminum extrusion profile, preferable anodized aluminum extrusion profile. This material is non-sensitive to moisture and can thus be assembled in damp locations, moist cellars or in the outer region without having to expect corrosions. At the same time, an extrusion profile enables a simple, cost-efficient production and packing in certain lengths, widths, depths so that an entire series of differently sized and stable retaining rails is easily possible.

According to the invention, a support arm for fastening to a construction profile according to the invention is part of the invention. Said support arm encompasses an integrally molded profile bar, which is embodied for the purpose of engaging with the undercut longitudinal groove of the construction
profile according to the invention or the retaining rail according to the invention and which is embodied so as to be adapted to the inner form thereof with displacement tolerance, wherein the profile bar encompasses a stepped embodiment, the step width and height of which is embodied so as to correspond to that of the construction profile according to the invention. Such a support arm is fastened in the construction profile according to the invention and the free end thereof can be embodied arbitrarily, for example as a support arm, as a coat hook, as a tray or the like. According to the invention, a profile connector can also be used as a support arm.

When a support arm is embodied as a connector for two retaining rails, which are oriented to one another at right angles and, for this purpose, encompasses at least one profile bar engaging with the chamber and being adapted to the inner form thereof with displacement tolerance and encompassing two surfaces spaced apart parallel to one another for the respective abutting on a retaining rail, wherein the at least one profile bar is embodied so as to be connected to one of the two surfaces, a simple and reliable assembly of two retaining rails at a right angle to one another is made possible in a highly advantageous manner. The connector is positively and reliably guided on the first retaining rail via the profile bar and the first surface. The second retaining rail, which is arranged at right angles thereto, can easily be connected to the second surface, which is spaced apart in parallel. The distance of the two surfaces to one another ensures that the second retaining rail can glide over the first retaining rail without noteworthy contact with the wall, the ceiling, the floor or the first retaining rail.

In an embodiment of the invention, provision is made for the connector to be embodied exactly as wide as the retaining rail and/or to encompass a rounded region, in particular end region, which is adapted to the rounded transition region and/or one or a plurality of bores and/or a second profile bar at the other one of the two surfaces. If the connector is exactly as wide as the retaining rail, the result is a reliable flange and step-free connection of both of the retaining rails. Due to the rounded region, an approximate gap-free overlap of the first retaining rail is possible while maintaining the advantages of the rounded embodiment. The bores, arranged so as to be preferably mirror-symmetrical to the longitudinal axis of the connector, enable a reliable fastening of the second retaining rail.
If a support arm is embodied as a fixation adapter for storing hooks and as a U-profile, the bar of which encompasses a width corresponding to the width, which encompasses a chamfer, which is defined by interacting steps of the retaining profile, a fastening of storing hooks arranged at right angles to the longitudinal of the retaining rail is made possible in a highly advantageous manner without play and thus being twist-free. By means of the fixation adapter, it becomes possible hereby to use any storage hook geometry, because the twist-free connection to the retaining rail always takes place by means of the fixation adapter and the inner geometry of which can be adapted to any storage hook. According to the invention, a storage hook having a compatible cross section can also be anchored directly in the chamfer of the retaining rail. A sliding block-threaded rod-screw nut combination could be used for this purpose. The fixation adapter, however, could also be provided with a profile bar, which positively engages with the chamber of the retaining rail. According to the invention, such a connection would be used with storing hooks, which are to be held so as to be displaceable. The orientation of the storing hook is then coaxial to the retaining rail longitudinal axis or at right angles thereto, provided that the storing hook encompasses a fastening region, which is at an angle to the free end.

If the bar of the fixation adapter encompasses a material thickness, which corresponds to the height of a step, a slip is avoided highly advantageously; the free ends of the fixation adapter are advantageously kept from bending open in response to a tightening of a storing hook fastening, which is too forceful.

If the inner width of the U-profile and the inner surface thereof is adapted to the outer dimensions and shapes of the storing hooks, in particular embodied so as to be round, oval, square or rectangular, any storing hook can be used highly advantageously.

In an embodiment of the invention, provision is made for a support arm to be embodied as a hook, in particular a device hook, wherein it encompasses a free journal adapted to the rounded transition region and/or a profile bar and/or a device hook accommodation, wherein the free end of the profile bar and the end of the free journal are embodied so as to be aligned. Highly advantageously, the alignment leads to a defined, wiggle-free connection of the hook/device hook to the retaining rail and thus makes it possible to fasten the hook/device hook.
directly on a wall, because it abuts to this wall in a defined manner at two locations, which are spaced apart from one another.

If the device hook encompasses a threaded hole for a fixing pin, a lateral displacement in response to the insertion/removal of devices is advantageously prevented.

In an embodiment of the invention provision is made for a support arm to be embodied as a tray support, the width of which corresponds to the width, which encompasses a chamfer, which is defined by interacting steps of the retaining profile, wherein the tray support can preferably be fastened to the retaining rail by means of a sliding block, a threaded pin and a screw nut. As a tray support, the support arm encompasses a bearing surface and a wrap-around for a shelf. In this embodiment of the support arm, the thickness of the tray support is also chosen in such a manner that its surface is aligned with that of the retaining rail.

In an embodiment of the invention, provision is furthermore made for a support arm to be embodied as a suspension knob, the diameter of which corresponds to the width, which encompasses a chamfer, which is defined by interacting steps of the retaining profile, wherein the suspension knob can be fastened to the retaining rail by means of an integrally molded thread and a sliding block. Advantageously, the hook support system thus also encompasses a device for storing articles of clothing, towels or the like.

In an embodiment of the invention, provision is furthermore made for a support arm to be embodied as an accommodating profile, wherein the accommodating profile encompasses a profile bar engaging with the chamber and being adapted to the inner form thereof with displacement tolerance and a disk arranged at right angles to the profile bar, the width of which corresponds to the width, which encompasses a chamfer, which is defined by interacting steps of the retaining profile and encompasses two parallel journals, which are connected to the disk and which are spaced apart to one another. With the help of this accommodating profile, a structure, which is flat for the most part, such as a perforated plate, a Plexiglas® pane or the like, can highly advantageously be arranged along the longitudinal axis of the retaining rail, thus resulting in screens, dividing walls or the like.
In particular, when a panel, preferably a T-shaped panel is accommodated between the journals of the accommodating profile and when it is in particular embodied on the accommodating profile by means of rivets, the hook support system turns into a shelf or the like using simple means, because the panel is suitable for supporting a tray, perforated plate or the like.

Finally, provision is made according to the invention for a covering strip, wherein the covering strip encompasses a covering bar comprising a top side, from which two journals stick out, which form a conical gap between them and wherein the covering strip encompasses a material tapering in the region between the journals. In so doing, an improved resilience is attained in a highly advantageous manner so that the covering strip in cooperation with the conical journal pair as a threading aid can be inserted in a simple manner and is securely retentive. By means of the covering step, a uniform surface is generated without flanges and contamination-susceptible depressions, wherein provision can be made for a coloring of the covering strip for marking different fields of application of the hook support system. The coloring of the different covering strips could be used for defining the storing hook region of a user from that of another user of the same hook support system. In the alternative, a tool storing region could also be differentiated from another tool storing region.

The invention is described in an exemplary manner in a preferred embodiment with reference to a drawing, wherein further advantageous details can be found in the figures of the drawing.

Parts having the same function are thereby provided with the same reference numerals.

In detail,

Figure 1a shows a retaining rail in a perspective view,

Figure 1b shows a retaining rail in cross section,

Figure 2a shows a connector in a perspective view,
Figure 2b shows a connection between two retaining rails by means of a connector,

Figure 2c shows a side view of the illustration according to Figure 2B,

Figure 3a shows a perspective view of two fixation adapters comprising storing hooks,

Figure 3b shows a side view thereof,

Figure 4 shows a universal hook in a perspective view,

Figure 5 shows a device hook in a perspective view,

Figure 6a shows a panel support in a perspective view,

Figure 6b shows a panel support in top view,

Figure 7 shows a suspension knob in side view,

Figure 8 shows a covering profile in a perspective view and

Figure 9 shows a section of a retaining rail according to the invention equipped with different support arms.

Figure 10a shows a panel according to the invention,

Figure 10b shows a section of a retaining rail according to the invention equipped with two panels,

Figure 11, 11a show a cross section through a construction profile according to the invention and a perspective view,

Figure 12 shows a profile connector according to the invention in side view,

Figure 13 shows a profile connector according to the invention in perspective view,
Figure 14 shows two construction profiles connected to a profile connector in perspective view,

Figure 15 shows a support arm,

Figure 16 shows a base plate,

Figure 17 shows a further support arm,

Figure 18, 18a show a perspective view of a construction profile according to the invention comprising three support arms and

Figure 19 shows a connection of a profile connector comprising a retaining rail.

Figure 1a shows a retaining rail 1 of the hook support system according to the invention in perspective view. The retaining rail 1 encompasses a rear wall 3, from which two parallel journals 4 of equal lengths stick out at right angles. At their front ends, the parallel journals 4 encompass rear wall parallel bars 5, which face one another and which define a passage gap 6 of an open chamber 7. Bars 8 are available, which face away from one another and which are embodied in a curved transition region 10 so as to be connected to the rear wall 3, which results in a reliable flange-free transition. The curved shape is particularly suitable for introducing forces into the rear wall 3. According to the invention, this transition region can be embodied as a corner connection, in particular a recessed corner connection. In this case, the free ends of the rear wall 3 would be visible and could be used for attaching a signposting, for introducing fastening bores or the like. The bars 8 facing away from one another are embodied so as to be step-like symmetrical to one another. The steps 9 of a bar 8 are hereby located in a plane with the corresponding step 9 of the other bar 8. In so doing, the steps 9 of the bars 8 belonging to one another form bearing surfaces, which encompass different widths 21. These bearing surfaces serve the purpose of accommodating support arms 2 of different widths or storing hooks 19. The step-like embodiment leads to a form closure of the retaining rail 1 with the different support arms 2, resulting in a wiggle-free connection. Depending on the orientation of the retaining rail on a wall, a horizontally as well as vertically wiggle-free connection is made possible. The retaining rail 1 encompasses hollow chambers 40 as well as two V-shaped
grooves 11 on the side of the rear wall 3 facing away from the chamber 7. These grooves 11 are thereby arranged on the rear wall 3 in such a manner that they run through the center of a bore 41 in the bar 8 projected to the rear wall. The bore 41 can be covered by a cap 42, as is illustrated in Figure 1a. The V-shaped groove 11 serves the purpose of introducing an accurate right-angled bore into a non-illustrated wall so as to reliably fasten the retaining rail 1 of the hook support system according to the invention. The rear wall 3 is thereby equipped with a smooth bearing surface for a reliable connection to walls, ceilings or floors. Sliding blocks, among others, are glidingly held in the chamber 7 and are used for fastening support arms 2.

Figure 1b shows a side view of the retaining rail 1 according to the invention in which a cover 42 seals a bore 41 in the bar 8. A bore 41 used for fastening in a non-illustrated wall is furthermore illustrated, wherein a screw/stud connection 43 is illustrated as a fastening means. The different widths 21 of the step 9 are easy to identify. In this embodiment, two widths 21 are realized. However, only one or more than two widths can also be realized according to the invention by changing the number of steps. Even though not illustrated in Figure 1b, the bars 8 must not be located symmetrically to the center plane of the retaining rail 1. It indeed lies within the scope of the invention to embody the bars 8 so as to be offset to the center plane. Furthermore, it is not necessary according to the invention for the bars 8 to attach at the free end of the parallel journals 4. It is indeed included in the invention to arrange them closer towards the rear wall 3 or further away from the rear wall 3.

Figure 2a shows a support arm 2, which is embodied as connector 12 for two retaining rails 1, which are arranged at right angles to one another. For this purpose, the connector 12 encompasses a width, which corresponds to the width of a retaining rail 1. A profile bar 13, which is embodied with a Y-shaped end in such a manner that it engages with the chamber 7 in a displacement-tolerant and positive manner, is arranged on a first surface 14. The first surface 14 abuts on the side of the bar 8, which faces away from the rear side 3. Provision is made for a second surface 15 so as to be spaced apart from said side, wherein the offset between first and second surface is preferably embodied so as to be arranged at right angles and thus defines a stop 44. A second retaining rail 1 is fastened to the second surface 15 by means of non-
illustrated fastening means, which pass through the boreholes 17 into the second retaining rail 1.

This situation is illustrated in Figure 2b. The accurate bearing situation is clarified in Figure 2c. The distance 46 of the two surfaces to one another has the effect that the second retaining rail 1 can glide below the first retaining rail 1 in a contact-free manner. The contact-free state is thereby present compared to the first retaining rail 1 as well as compared to the non-illustrated wall/ceiling/floor.

Figure 3a shows a fixation adapter 18 as a support arm 2. For this purpose, the fixation adapter 18 is embodied as a U-profile, the bar of which encompass a width, which corresponds to that of the first or second chamfer width 21 of the retaining rail 1. The bar 20 thereby encompasses a material thickness, which corresponds to the height of a step 9. This creates a plane, which is aligned with the visible surface of the retaining rail 1, which causes the freely tapering journals 47 to unintentionally bend open in response a very forceful tightening of the storing hooks 19. The inner width of the U-profile is thereby adapted to the outer dimensions of the storing hooks 19, so as to be free of play for the most part, wherein this adaptation can be a square pipe, rectangular pipe or oval pipe adaptation, among others. A threaded pin 24, which ends in a sliding block 23 and the other end of which is encompassed by a screw nut 25, enters through the storing hooks 19. The screw nut 25 can thereby be a knurled nut, square nut, hexagonal nut or winged nut. This sliding block 23 is thereby located in the chamber 7, whereby the storing hook 19 is fixed against the retaining rail 1. This situation can be seen in Figure 3b. Due to the presently presented embodiment, it is possible to fasten the storing hooks 19 under any angle. This is highly advantageous in particular with pitched roof areas. The storing hook 19 is fastened to the retaining rail 1 via the fixation adapter 18 so as to be displaceable and removable. It can be fastened in horizontal or vertical orientation in a continuous manner, thus resulting in a surprisingly high flexibility of the hook support system. According to the invention, a storing hook 19 can also be fastened directly in one of the chamfers 21, provided that its width corresponds to one of the chamfers 21 of the retaining rail 1. In this case, a fixation adapter 18 is not provided because the lateral fixation and the form closure takes place via the journal length of the storing hook 19 and the steps 9.
Figure 4 shows a universal storing hook, which encompasses a hook region 48, a rounded bearing region 16 and a profile bar 13. This profile bar 13 is embodied so as to be similar to that of the connector 12 and engages with the chamber 7. The end of the journal tapering on top with rounded outer contour is aligned with the end of the profile bar 13, thus resulting in a clearly defined, wiggle-free bearing surface. Due to the alignment and thus due to the two bearing locations, the hook 26 can also be fastened to a wall in a wiggle-free manner without retaining rail 1, for example by means of drilling and screwing through the profile bar 13 or, better yet, through the free journal. Highly advantageously, the hook 26 can also be used for assembling two retaining rails 1 so as to be aligned to one another in line.

Figure 5 shows a device holding hook 27, which is embodied similar to the universal hook 26. Contrary thereto, the device holding hook 27 encompasses a closed hollow profile 29, which engages with a non-illustrated device holding hook. The device holding hook 27 also encompasses an aligned connecting line between the journal tapering on top with rounded outer contour and the profile bar end 13, thus resulting in a clearly defined, wiggle-free bearing surface. A non-illustrated threaded hole 31 together with fixing threaded pin prevent a lateral slipping of the device holder in response to a continuous insertion of storing devices.

Figures 6a and 6b show support arms 2 as tray support 32 in a perspective view and in a top view. The tray supports 32 encompass a total width, which is displacement-tolerant to one of the two guide chamfers 21 and which are height-fixable in a stepless manner by means of sliding block-threaded pinscrew nut 23, 24, 25.

Figure 7 finally shows a suspension knob 33, which is embodied so as to be cylindrical, the width of which is embodied in such a manner that it engages with one of the two guide chamfers 21 so as to be free of play and so that it can be adjusted and fixed in a stepless manner by means of threads 34 and sliding block 23 integrally molded on the suspension knob 33.

Figure 8 shows a covering strip 35 comprising a conical clip-in journal pair 37 as threading aid and a V-shaped material tapering 39 for an improved resilience. This covering strip 35 is inserted into the chamber 7 in regions of the retaining
rail 1, in which support arms 2 are not supposed to be arranged. The lugs 45 available at the journals 37 secure the covering strip 35 against being unintentional removed from the retaining rail 1.

Figure 9 shows a section of a hook support system according to the invention comprising different support arms 2. Two retaining rails 1 are connected to one another at right angles via a connector 12. Covering strips 35 are arranged between regions of support arms 2. A universal hook 26 and a device hook 27 comprising an installed device holding hook are illustrated as support arms 2. The retaining rail 1 is thereby laterally covered by means of a covering bar 36 so that the inside thereof is protected against contamination and the flanges of the end region of the retaining rail 1 are simultaneously protected against being touched.

Figure 9 furthermore shows an accommodating profile 49, the two parallel journals 51 of which are located on a disk 50, which in turn engages with a profile bar 13 into the chamber 7 of the retaining rail 1. Two through-holes for each journal 51 are easy to identify, which serve the purpose of fastening a non-illustrated disk or the like by means of non-illustrated fastening means.

Figure 10a shows this accommodating profile 49 as being connected to a panel 52 so as to be incapable of being removed, wherein the panel is accommodated between the journals 51 of the accommodating profile 49 and is connected by means of rivets 53 so as to be incapable of being removed. The panel 52 is hereby embodied as a T-shaped support comprising a wider and a narrower end.

Figure 10b shows three retaining rails 1 connected to one another via two connectors 12, wherein two panels 52 support one tray 54. In so doing, a hard support system becomes a shelf by means of simple means. The tray can thereby be a wooden board, a metal sheet, a grating or the like. L-shaped panels can also be used according to the invention instead of T-shaped panels 52.

Figure 11 shows a cross section through an embodiment of a construction profile 57 according to the invention. This peripherally closed construction profile 57 is an embodiment comprising in each case one undercut longitudinal
groove 55 for each side of the construction profile 57, which has a square cross section. A cavity 56, which is embodied so as to be cylindrical and which is referred to as a core hole, is located concentrically around the longitudinal axis of the construction profile 57. Said cavity 56 encompasses an inner diameter, which is designed in such a manner that it can accommodate a M8 threaded rod comprising transfer tolerance or a M10 threaded rod so as to be screwed in, for the purpose of which the cavity 56 would have to encompass an inner thread. Two construction profiles 57 can be connected in their lengths via such a non-illustrated threaded rod. The undercut longitudinal grooves 55 encompass in each case a V-groove 11 in the ground of the groove, which runs in longitudinal direction of the construction profile 57 and which is arranged in the center to the groove slot 58. The walls of the core hole 56 and of the four undercut longitudinal grooves 55 are connected to one another, thus resulting in a peripherally closed stable construction profile 57. The groove slot 58 of an undercut longitudinal groove 55 is defined and formed, respectively, by means of two bars 8, 8, which are embodied in a step-like manner away from one another in such a manner that the steps 9 of a bar 8 correspond to the steps 9 of the other bar 8 in such a manner that they result in a common plane 59 and 59', respectively, in the case of the second step. The bar 8 is hereby connected to the bar of an adjacent undercut longitudinal groove 55 via a rounded transition region 10, which increases the stability of the profile. In a non-illustrated embodiment, provision can be made for a direct connection to the next rounded region 10 instead of for an adjacent undercut longitudinal groove 55. In this case, the undercut longitudinal groove 55 would be missing on the corresponding construction profile side and would instead result in a straight connection as bearing surface to a wall, floor or ceiling and a corner, respectively. The width of the inner (shorter) corresponding step 59 is 12.5 mm, the outer wider one is 16.5 mm. This embodiment results in two differently dimensioned bearing surfaces for support arms or profiles, which are to be attached, which are positively guided in a highly advantageous manner. These channels are particularly easy to identify in Figure 11a, which represents a perspective illustration of a construction profile section according to the invention. According to the invention, provision can also be made for more than two planes 59, 59', the width of which increases with the increasing distance of the plane from the ground of the groove and which is in particular 20.5 mm, 24.7 mm and 30.7 mm.
Figure 12 shows a profile connector 60 according to the invention in the side view. It consists of two sides 61, 62 standing on top of one another at right angles, which are connected to one another at their respective free end 63, 64 by means of a connecting side 65, wherein this side 65 encompasses a radius.

Figure 13 shows a perspective view of the profile connector 60 according to the invention. The through-hole 66 through the connecting side 65, the position of which corresponds to the respective recess 67 in the respective profile bar 13, is easy to identify. The cross section of the profile bar 13 is molded here as a sliding block, which fits into the corresponding sliding block chamber of the construction profile 57 according to the invention with a displacement tolerance. The profile bar 13 furthermore encompasses a stepped embodiment 68, the dimensions of which correspond precisely to the steps of the construction profile 57 and to the retaining rail 1, respectively. In the connecting region of both profile bars 13, the profile bars 13 of the sides 61, 62 encompass a region without sliding block profile 69. The thickness of this region 69 corresponds to a sliding block width 58 and is embodied to be so long with reference to the respective side 61, 62 that it can be inserted and displaced without problems in a construction profile 57, which is provided at right angles to this side. The position of a clamping block 70, which is embodied so as to be twist-proof, in a recess 67 relating to the stepped embodiment 68, can be changed by means of a screw, which is arranged in the through-hole 66 and which penetrates said clamping block 70 so that a non-positive connection to a construction profile 57 according to the invention is possible via said clamping block 70. Only one recess 67 is thereby illustrated for each side 61, 62. According to the invention, provision can also be made for two or more recesses 67, depending on the size of the profile connector 60. In so doing, a reliable clamping is always attained even for very large profile connectors 60.

Figure 14 shows two construction profiles 57 according to the invention, which are connected to a profile connector 60 according to the invention. An end cap 71 and a connection cap 72, which, on the one hand, are inserted into the cavities of the horizontal construction profile 57 and which, on the other hand, sit on the outer surface of the construction profile 57 arranged at right angles, are easy to identify. It is easy to identify that the stepped embodiment 68 of the profile connector 60 accurately engages with the stepped embodiment 9 of the construction profile 57 and that the lateral bank of the profile connector flanges
by means of the steps do not result in sharp flanges or the like. The rounded embodiment of the construction profile 57, which reduces the risk of injury, is also easy to identify. This applies all the more, when the longitudinal grooves 55, which are not required, are covered by a non-illustrated cover profile.

Figure 15 shows an embodiment of a support arm 2, which also encompasses a profile bar 13 comprising a stepped embodiment 68. On its one free end, this support arm 2 according to the invention is provided with the profile 13 and on its other free end with a sleeve for accommodating threaded rods and the like, for example. This sleeve is embodied so as to be offset to a bearing surface 73, which is adapted to the rounded transition region 10. Each support arm 2 according to the invention has a profile 13 at its one end and a stepped embodiment 68 and can be embodied arbitrarily at its other end. Preferably, it has in each case a V-groove 11, which is arranged in the center of the sliding block and which serves the purpose of securely positioning and guiding a drill or the like and which ensures that a fastening of the support arm 2 always takes place in a non-visible region of the construction profile 57.

Figure 16 shows a base plate 74 in top view, which is arranged below or above a construction profile 57 according to the invention and which enables the transition to a floor, a ceiling or a wall. In its center, this base plate 74 encompasses a bore 75, in which a threaded rod arranged in the core hole can be fastened, for example. The base plate 74 encompasses a recessed region 76, the dimensions of which are adapted to the outer periphery of a construction profile 57 and which thus represents an anti-twist protection for the latter. The base plate 74 could be screwed to a wall or a floor by means of four through-holes 77 arranged in the corners.

Figure 17 shows a further support arm 2 according to the invention comprising stepped embodiment 68 and profile bar 13 as well as a region 73, which is adapted to the transition region of the construction profile 57. The free journal of this support arm 2 is embodied as an angle, which also encompasses a V-groove 11 in the center of its surface. This support arm 2 serves as fastening for information boards or the like, for example.

Finally, Figure 18 shows a perspective view of a construction profile 57 according to the invention, into which two support arms 2 according to Figure 15
are inserted. Both support arms 2 are connected to one another by their sleeves by means of a hinge pin 78, wherein a section 80 provided offset with a sleeve 79 is arranged between these two support arms 2. As is illustrated in Figure 18a, a rectangular profile can be fastened to the section 80, for example. In so doing, a hinge, which can support a door, for example, on a booth, is realized by means of simple constructive means.

Figure 19 shows a holding profile according to Figure 1b, which in turn is provided with a corresponding end cap 71 and a connection cap 72. This retaining rail 1 is connected to a profile connector 60 according to the invention and can thus be used as a tray, for example, which is arranged in the undercut longitudinal groove 55 according to the invention of a construction profile 57 according to the invention. The end cap 71 and the connection cap 72 are made of plastic, preferably of an injection molding plastic and they are so hard that they can also withstand the stresses of repeated uses, if possible without deformation.
LIST OF REFERENCE NUMERALS

1 retaining rail
2 support arm
3 rear wall
4 parallel journals
5 rear wall parallel bars
6 passage gap
7 chamber
8 bars facing away
9 landings/steps
10 transition region
11 V-shaped grooves
12 connector
13 profile bar
14 first surface
15 second surface
16 rounded region
17 boreholes
18 fixation adapter
19 storing hooks
20 bar
21 defined chamfer
22 inner surface
23 sliding block
24 threaded pin
25 screw nut
26 hook
27 device holder
28 free journal
29 device hook accommodation
30 free end
31 threaded hole
32 tray support
33 suspension knob
34 integrally molded threads
35 covering strip
36 covering bar
37 two journals
38 conical gap
39 material tapering
40 cavity
41 bore
42 cover
43 screw/stud
44 stop
45 clip shoulder/lug
46 distance
47 journal
48 hook region
49 accommodating profile
50 disk
51 journal
52 panel
53 rivet
54 tray
55 undercut longitudinal groove
56 cavity
57 construction profile
58 groove slot
59 plane
60 profile connector
61 side
62 side
63 free end
64 free end
65 connection side
66 through-hole
67 recess
68 stepped embodiment
69 sliding block profile
70 clamping block
71 end cap
72 connection cap
73    bearing surface
74    base plate
75    bore
76    recessed region
77    through-hole
78    hinge pin
79    sleeve
80    section
PATENT CLAIMS

1. A construction profile comprising a closed cross section and at least one surface profile in the form of an undercut longitudinal groove (55) as well as an inner cavity (56) in longitudinal direction of the construction profile (57), characterized in that the groove slot (58) is defined by two bars (8) facing away from one another, which are embodied in a step-like manner such that one step (9) of a bar (8) is in each case located on a plane (59) with a step (9) of the other bar (8), wherein provision is made for at least two spaced-apart steps, the planes of which are arranged parallel to one another.

2. The construction profile according to claim 1, characterized in that the inner cavity (56) is embodied so as to be cylindrical and encompasses an inner diameter, which allows for the accommodation of a threaded rod, in particular an M8 threaded rod comprising transfer tolerance or an M10 threaded rod so as to be screwed in.

3. The construction profile according to claim 1 or 2, characterized in that the bar (8) of an undercut longitudinal groove (55) is embodied so as to be connected to the bar (8) of another undercut longitudinal groove (55) by means of a transition region (10), wherein the transition region (10) encompasses a radius.

4. The construction profile according to claim 1, 2 or 3, characterized in that it encompasses the undercut longitudinal groove (55) embodied with steps (9) only on one side or on two adjacent sides or on two opposite sides or on three sides, generally on n-x sides, wherein n = number of sides of the construction profile 57 and x is an integral number between 0 and n.

5. The construction profile according to one of the preceding claims, characterized in that the first corresponding pair of steps (9) encompasses a width of 12.5 mm and the second pair encompasses a width of 16.5 mm.
6. The construction profile according to one of the preceding claims, characterized in that it is embodied as a triangular, square, pentagonal or regular polygonal profile.

7. The construction profile according to one of the preceding claims, characterized in that the wall of the inner cavity (56) and of the undercut longitudinal grooves (55) are embodied so as to be connected to one another.

8. The construction profile according to one of the preceding claims, characterized in that the undercut longitudinal grooves (55) encompass a V-groove (11) arranged in the center of the groove slot on their side located opposite the groove slot (58).

9. A profile connector comprising two sides (61, 62) connected to one another arranged so as to be at right angles to one another as well as a side (65) connecting the free ends (63, 64) of the two sides (61, 62) to one another, characterized in that each side (61, 62) encompasses an integrally molded profile bar (13), which is embodied for engaging with the undercut longitudinal groove (55) of the construction profile according to the invention and which is embodied so as to be adapted to the inner form thereof with displacement tolerances, wherein the profile bar (13) encompasses a stepped embodiment (68), the step width and height of which is embodied so as to correspond to that of the construction profile according to the invention.

10. The profile connector according to claim 9, characterized in that the connecting side (65) is embodied with a radius.

11. The profile connector according to claim 9 or 10, characterized in that the profile bar (13) encompasses on each side at least one recess (67) in the part of the profile bar (13) embodied as sliding block.

12. The profile connector according to claim 9, 10 or 11, characterized in that the connecting side (65) encompasses at least one through-hole (66), which corresponds to a recess (67).
13. The profile connector according to one of claims 9 to 12, characterized in that the profile bar (13) does not encompass a sliding block profile in the connection region of both sides.

14. A hook support system consisting of a retaining rail (1) for fastening to walls, ceilings and floors and different support arms (2), which can be fixed to the retaining rail (1) so as to be lockable-displaceable, wherein the retaining rail (1) encompasses a rear wall (3), from which two parallel journals (4) of the same length stick out at right angles, at the front ends of which provision is made for rear wall parallel bars (5) facing one another, which define a through gap (6) of an open chamber (7) and wherein the support arms (2) are embodied so as to be supported against the retaining rail (1), characterized in that provision is made on the parallel journals (4) for two bars (8) facing away from one another, which are embodied in a step-like manner such that one step (9) of a bar (8) is in each case located on a rear wall parallel plane with a step (9) of the other bar (8), wherein provision is made in particular for a plurality of spaced-apart steps (9).

15. The retaining rail (1) according to claim 14, characterized in that the bars (8) are embodied so as to be connected to the rear wall (3), in particular by means of a rounded transition region (10).

16. The retaining rail (1) according to claim 14 or 15, characterized in that the rear wall (3) encompasses one or a plurality of grooves (11), preferably V-grooves, on the side facing away from the chamber (7).

17. The retaining rail (1) according to claim 14, 15 or 16, characterized in that the retaining rail (1) is embodied as an extrusion profile, in particular aluminum extrusion profile, preferable anodized aluminum extrusion profile.

18. A support arm (2) for fastening in a construction profile (57) according to the invention or a retaining rail (1) according to the invention, characterized in that it encompasses an integrally molded profile bar (13), which is embodied for engaging with the undercut longitudinal groove (55) of the construction profile according to the invention and
which is embodied so as to be adapted to the inner form thereof with displacement tolerance, wherein the profile bar (13) encompasses a stepped embodiment (68), the step width and height of which is embodied so as to correspond to that of the construction profile according to the invention.

19. The support arm according to claim 18, characterized in that it is embodied as a connector (12) for two retaining rails (1), which are oriented to one another at right angles and for this purpose, encompasses at least one profile bar (13) engaging with the chamber (7) and being adapted to the inner form thereof with displacement tolerance and having two surfaces (14, 15) spaced apart parallel to one another for the respective abutting on a retaining rail (1), wherein the at least one profile bar (13) is embodied so as to be connected to one of the two surfaces (14, 15).

20. The support arm according to claim 19, characterized in that the connector (12) is embodied to be exactly as wide as a retaining rail (1) and/or encompasses a rounded region (16) adapted to the rounded transition region (10), in particular end region, and/or one or a plurality of bores (17) and/or a second profile bar (13) on the other one of the two surfaces (14, 15).

21. The support arm according to one of claims 18 or 20, characterized in that a support arm (2) is embodied as a fixation adapter (18) for storing hooks (19) and is embodied for this purpose as a U-profile, the bar (20) of which encompasses a width corresponding to the width, which encompasses a chamfer (21), which is defined by interacting steps (8) of the retaining profile (1).

22. The support arm according to claim 21, characterized in that the bar (20) encompasses a material thickness, which corresponds to the height of a step (8).

23. The support arm according to claim 21 or 22, characterized in that the inner width of the U-profile and the inner surface (22) thereof is adapted
to the outer dimensions and shapes of the storing hooks (19), in particular embodied so as to be round, oval, square or rectangular.

24. The support arm according to claim 21, 22 or 23, characterized in that the fixation adapter (18) can be fastened to the retaining rail (1) by means of a sliding bar (23), a threaded pin (24) and a screw nut (25).

25. The support arm according to claim 18, characterized in that a support arm (2) is embodied as a hook (26), in particular a device hook (27), wherein it encompasses a free journal (28) adapted to the rounded transition region (10) and/or a profile bar (13) and/or a device hook accommodation (29), wherein the free end (30) of the profile bar (13) and the end of the free journal (28) are embodied so as to be aligned.

26. The support arm according to claim 25, characterized in that the device holder (27) encompasses a threaded hole (31) for a fixing pin.

27. The support arm according to claim 18, characterized in that a support arm (2) is embodied as a tray support (32), the width of which corresponds to the width, which encompasses a chamfer (21), which is defined by interacting steps (8) of the retaining profile (1), wherein the tray support can preferably be fastened to the retaining rail (1) by means of a sliding block (23), a threaded pin (24) and a screw nut (25).

28. The support arm according to claim 18, characterized in that a support arm (2) is embodied as a suspension knob (33), the diameter of which corresponds to the width, which encompasses a chamfer (21), which is defined by interacting steps (8) of the retaining profile (1), wherein the suspension knob (33) can be fastened to the retaining rail (1) by means of an integrally molded thread (34) and a sliding block (23).

29. The support arm according to claim 18, characterized in that a support arm (2) is embodied as an accommodating profile (49), wherein the accommodating profile (49) encompasses a profile bar (13) engaging into the chamber (7) and being adapted to the inner form thereof with displacement tolerance and a disk (50) arranged at right angles to the profile bar (13), the width of which corresponds to the width, which
encompasses a chamfer (21), which is defined by interacting steps (8) of the retaining profile (1) and encompasses two parallel journals (51), which are connected to the disk (50) and which are spaced apart to one another.

30. The support arm according to claim 29, characterized in that a panel (52), preferably a T-shaped panel (52), is accommodated between the journals (51) of the accommodating profile (49) and is embodied so as to be fastened on the accommodating profile (49) in particular by means of rivets (53).

31. The hook support system according to one of the preceding claims, characterized in that it encompasses a covering strip (35), wherein the covering strip (35) encompasses a covering bar (36) comprising a top side, from which two journals (37) stick out, which form a conical gap (38) between them and wherein the covering strip encompasses a material tapering (39) in the region between the journals (37).

32. A construction set consisting of at least one construction profile according to one of claims 1 to 8, at least one profile connector according to one of claims 9 to 12 and at least one support arm according to claim 14.

33. A construction profile substantially as hereinbefore described with reference to and as shown in figures 1a to 3b, 6a, 6b, 7, 9, 10b and 19 or figures 11, 11a, 14, 18 and 18a of the accompanying drawings.

34. A profile connector substantially as hereinbefore described with reference to and as shown in figures 2a, 2b and 2c or 12 to 14 and 19 of the accompanying drawings.

35. A hook support system substantially as hereinbefore described with reference to and as shown in any of figures 1a, 1b, 3a to 7 or 9 to 10b of the accompanying drawings.
36. A support arm substantially as hereinbefore described with reference to and as shown in any of figures 6a, 6b, 7, 15, 17, 18 and 18a of the accompanying drawings.

37. A construction set substantially as hereinbefore described with reference to and as shown in the accompanying drawings.
### Patents Act 1977: Search Report under Section 17

**Documents considered to be relevant:**

<table>
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<th>Category</th>
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| X        | 1-8                | US3782048 A  
Corman  see figures                                      |
| X        | 1-8                | DE19849876 A  
Bosch  see figures                                    |
| X        | 1-8                | US2001/037612 A  
Striker  see figures                                   |
| X        | 1-8                | FR2685403 A  
Bosch  see figures                                     |
| X        | 1-8                | DE3829306 A  
Prettl  see figures                                    |
| X        | 1-8                | FR2545163 A  
Grunler  see figures                                   |
| X        | 1-8                | GB2275485 A  
GGI  see figures                                     |
| X        | 1-8                | US5152113 A  
Guddas  see figures                                   |
| X        | 1-8                | EP0460360 A  
Phoenix Mecano  see figures                             |
| X        | 1-8                | WO2005/079146 A  
Hawes  see figures                                    |
| X        | 1-8                | US6185887 A  
Strassle  see figures                                 |
X 1-8 EP0805241 A  
Havelock Europa  see figures

X 1-8 EP0118411 A  
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Search of GB, EP, WO & US patent documents classified in the following areas of the UKC:

Worldwide search of patent documents classified in the following areas of the IPC:
A47B; E04B; F16S

The following online and other databases have been used in the preparation of this search report:
EPODOC, WPI

International Classification:

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