

SCREWED FRAME

The invention relates to a screwed frame for holding fitted elements, comprising a first and a second external frame element and at least one so-called first transverse strut arranged between said two external frame elements, and a bracing device which has at least one so-called bracing rod and connects the first to the second external frame element, wherein the bracing device extends from the first to the second external element and braces the first transverse strut between the external frame elements.

Conventionally, such screwed frames are substantially formed from aluminum elements which are screwed together by means of self-tapping screws. For this, external frame elements are screwed to transverse struts arranged between said elements. In contrast to a welded frame, said known screwed frame can be disassembled without material damage and therefore can be screwed together again after disassembly.

However, after screwing the screwed frame together again with the self-tapping screws, the threads previously cut by the self-tapping screws are usually expanded whereby the stability of the frame is affected because the force, by means of which the frictionally locked connection between a screw and one of these threads can be unscrewed, can be reduced. Thus, when repeatedly screwing the screwed frame together, the screws can be unscrewed with a lower force and can unintentionally become loose more easily. In particular when the screwed frame is subjected to vibrations, the screws can self-actingly become loose. Such screwed frames thus have a reduced stability, whereby they are at least not suitable for reassembly with an intended use in movable objects such as water vehicles.

From FR 2 367 451, a mobile shelf is known, wherein above a frame, a first plane of first vertically arranged tubes and thereabove, a second plane of vertically arranged tubes are carried. Continuously threaded rods extend through holes in the frame, the planes, and in the tubes, wherein each of the threaded rods brace by means of nuts a first and a second tube as well as the first plane between the frame and the second plane. Due to the length of the threaded rods, even if it is disassembled, the known shelf could not or only with difficulties be transported in a hull, in particular submarine, or assembled therein. Even if it would not be mobile, the known shelf would not be suitable for the use in a hull.

Further, from the same FR 2 367 451, a mobile frame is known in which individual, comparatively short transverse bolts are braced horizontally by means of threaded rods between external, comparatively long transverse tubes. Due to its dimensions, in particular the shortness of the transverse bolts, even if it would be suitable for receiving console elements, the known frame could only receive individual console elements. For the arrangement of a plurality of console elements next to one another, a plurality of individual frames would be necessary which would require a comparatively large floor space and would increase the weight. Both would be undesirable in a hull so that also this known mobile frame would not be suitable for the use in a hull.

Therefore, the invention is based on the object to provide a screwed frame which is suitable for the use in hulls, in particular submarines, can in particular be disassembled, and which even after repeated disassembly and reassembly as well as under the influence of shock and vibration stress has a high stability and can be transported in the disassembled state through narrow spaces and hatches, and

can be assembled in narrow spaces, in particular from one side.

The invention solves this problem with a screwed frame according to claim 1. Said screwed frame comprises a first external frame element, a second external frame element, and a so-called first transverse strut which is arranged between these two external frame elements. Further, the screwed frame comprises at least one bracing device which has at least one so-called first bracing rod and connects the first external frame element with the second external frame element, wherein said first bracing device extends from the first external frame element to the second external frame element and braces said first transverse strut between said external frame elements.

According to the invention, the screwed frame has at least one screwed frame extension device which is braced between the transverse strut and the second external frame element and which comprises an internal frame element and at least one second transverse strut and extends the width of the screwed frame. Further, the bracing device comprises at least one bracing rod lengthening device which has a second bracing rod and a sleeve by means of which the second bracing rod is connected to the first bracing rod and/or to a further bracing rod. The length of the first transverse strut corresponds to the length of the first bracing rod and the length of the second transverse strut corresponds to the length of the second bracing rod in such a manner that the sleeve is arranged in the region, in particular in a through-bore, of the internal frame element.

Here, the bracing pulls the two external frame elements towards each other. The first and the second transverse struts, which are not part of the bracing device, however, are clamped or braced together with the internal frame element between these two external frame elements and thus

effect that that said external frame elements remain spaced apart at a distance which is equal to the sum of the length of the first transverse strut and the second transverse strut and a width of the internal frame element. The bracing device is substantially stressed by a tensile force while on the first and the second transverse strut as well as on the internal frame element, a compressive force is exerted which counteracts said tensile force. Hereby, the screwed frame according to the invention has a high stability which, compared to known screwed frames, is not reduced even when stressed by shock and vibrations and after repeated disassembly and assembly. Moreover, due to the more stable structure thanks to the bracing device, the screwed frame has a smaller width than conventional screwed frames with the same distance between said external frame elements.

The length of the first transverse strut corresponds to the length of the first bracing rod, and the length of the second transverse strut corresponds to the length of the second bracing rod in such a manner that the sleeve is arranged in the region, in particular a through-bore, of the internal frame element. Thus, the first bracing rod ends in the region of a first internal frame element where it is connected to the second bracing rod by means of the sleeve and thus is extended. The second bracing rod ends either in the region of the second external frame element or in the region of a further internal frame element where it is extended by means of the sleeve and a further second bracing rod to increase the width of the screwed frame. Thereby, the width of the screwed frame can be flexibly extended by means of the screwed frame extension device and the bracing rod lengthening device. Also, a transport of the disassembled screwed frame is possible in a very simple manner because even in the case of a larger width of the screwed frame, it is not necessary to use or transport longer bracing rods or transverse struts.

Between the two external frame elements, any number of internal frame elements can be arranged. It is possible here, in particular in narrow spaces, to carry out the assembly from only one side. By means of said screwed frame extension device or by means of a plurality of said screwed frame extension devices arranged next to one another, thus, a wide screwed frame can be provided which has a high stability.

Because it can be disassembled and reassembled without losing resistance against shock and vibration stress, the screwed frame according to the invention is ideal for a use in hulls, in particular submarines in which the spaces are very narrow and separated from one another by small hatches through which all components have to be transported. In submarines there is in addition the specific problem that even the access into the interior of the boat, namely through a hatch in the pressure hull, is very narrow and all articles have to be conveyed through said hatch. Therefore, it is of advantage for such uses of the screwed frame, i.e. in hulls or submarines, if the frame can be disassembled and reassembled in such a manner that its stability and resistance against shock and vibration stress does not suffer. This is the case for the screwed frame according to the invention.

Particularly preferred, the bracing device has at least one so-called first nut, wherein the first bracing rod has an external thread on both of its ends, onto which thread said first nut is screwed in the region of the first external frame element. Here, the nut is at least partially arranged between the external frame element's inner wall facing towards the center of the screwed frame and the external frame element's outer wall facing away from said center. Alternatively, the nut can also be arranged in such a

manner that it abuts directly against the first external frame element.

In any case, said first nut exerts a tensile force on the first bracing rod, while the first nut exerts a compressive force on the first transverse strut and the screwed frame extension device. By screwing the first nut onto the external thread of the first bracing rod, said bracing rod can be braced, wherein said first nut presses the first external frame element against the first transverse strut or, respectively, pulls said first transverse strut indirectly towards the first external frame element.

In a particular embodiment, the second bracing rod has an external thread on both of its ends and the sleeve has an inner thread. Said inner thread of the sleeve corresponds to the external thread of the second bracing rod and/or the first bracing rod in such a manner that said second or first bracing rod can be screwed into said sleeve. By means of said sleeve, thus, the second bracing rod can be connected to the first bracing rod and/or to a further bracing rod. The bracing device and in particular the first bracing rod extended by means of the second bracing rod and the sleeve, thus extends always, and in particular in the case of the screwed frame with the extended width, from the first external frame element to the second external frame element.

While the first end of the first bracing rod is arranged in the region of the first external frame element, the first bracing rod is extended at its second end by means of the sleeve and the second bracing rod. In this case, the sleeve is arranged in the region of the first end of the second bracing rod while the second end of the second bracing rod is arranged in the region of the second external frame element.

Preferably, the second bracing rod has an external thread at least in the region in which said second bracing rod is arranged in the region of the second external frame element. A second nut is screwed onto said external thread, wherein said second nut exerts a tensile force on the first bracing rod and the bracing rod lengthening device and a compressive force on the first transverse strut and the screwed frame extension device. The bracing device can thus be braced by means of the first nut and by means of the second nut, i.e. in the region of the first external frame element as well as in the region of the second external frame element.

Preferably, the first external frame element or, respectively, the second external frame element has a cup for reinforcing the inner wall of the first external frame element or an inner wall of a second external frame element. Said cup has a bottom which abuts at least partially against said inner wall. The bracing device presses by means of the first or, respectively, second nut against said bottom, further against the inner wall of the first or, respectively, second external frame element and further against the first or, respectively, second transverse strut. The cup counteracts here a deformation of the first or, respectively, second external frame element, in particular a pushing of the inner wall into the first or second transverse strut.

Said cup is welded into the first or, respectively, second external frame element and has a hole in its bottom through which the first or, respectively, second end of the first or, respectively, second bracing rod is guided. The advantage of this construction is the arrangement of the first or, respectively, second screw between the inner wall and an outer wall of the first or, respectively, second external frame element because hereby, the first or, respectively, second nut is arranged in a space saving

manner in the region of the first or, respectively, second external frame element, whereby the width of the screwed frame is reduced compared to an arrangement of the screw outside of the respective external frame element.

The nuts are configured as special nuts by means of which the transverse struts and bracing rods can be centered with the cups in the external frame elements.

Preferably, the first and, if necessary, the second transverse strut have a hollow space, wherein the first and/or the second bracing rod is guided through this hollow space. This arrangement of the first or, respectively, second bracing rod is of advantage because the tensile forces of the bracing lengthening device and the compressive forces of the first or, respectively, second transverse strut thus are transmitted on average substantially along the same straight line which prevents a deformation of the first or, respectively, second external frame element or keeps it at least low. Moreover, the respective hollow space is advantageously utilized for receiving the bracing rod which therefore does not require any space outside of further components of the screwed frame.

Preferably, at its two ends, the first or, respectively, second transverse strut has an end cap with a hole through which the first or, respectively, second bracing rod is guided via the aforementioned nut or sleeve. By means of said end cap or end caps, the first or, respectively, second bracing rod is centered in the first or, respectively, second transverse strut, whereby the compression stress of the braced first or, respectively, second transverse strut is distributed substantially uniformly over the outer walls of said transverse strut. Overstress on said first or, respectively, second transverse strut by one-sided compressive stress and

deformation of said first or, respectively, second transverse strut is thus counteracted. Thanks to its end caps, the first or, respectively, second transverse strut serves in this manner also for the fixation of the aforementioned nut and sleeve.

Preferably, the screwed frame has an anti-rotation protection which counteracts a rotation of the first and/or second transverse strut with respect to the first or, respectively, second external frame element and/or, if applicable, with respect to the internal frame element. Said anti-rotation protection is provided by a positive locking between the external frame element or, respectively, internal frame element and the transverse strut or, respectively, the first or second end cap of said transverse strut. Said anti-protection counteracts a rotation of the first or, respectively, second transverse strut about a longitudinal axis of said transverse strut and thus increases the stability of the screwed frame.

It is advantageous if the first and second bracing rods have a uniform standardized length or if each has one of a plurality of standardized lengths. Thereby it is achieved in an advantageous manner that the sleeve is arranged at least in a region, in particular in a through-bore, of the internal frame element. Thus, the first or, respectively, second transverse strut has also a standardized length, wherein the length of the first or, respectively, the second transverse strut corresponds to the length of the first or, respectively, second bracing rod in such a manner that the sleeve is arranged in the region of the internal frame element. Hereby, the screwed frame can be flexibly extended by means of only a few standardized components and can be adapted to different required widths. On the one hand, this keeps the costs low and, in addition, allows a simple assembly of the screwed frame.

Preferably, the screwed frame has at least two, in particular at least four first transverse struts and, if necessary, an adequate number of second transverse struts. By means of this number of transverse struts, a high stability of the screwed frame is achieved. Preferably, two of said transverse struts are arranged in one plane one behind the other or one on top of the other. In particular, the screwed frame has a plurality of planes with transverse struts arranged in pairs one behind the other.

In a preferred embodiment, the screwed frame has at least one transverse connecting element which comprises the first or second transverse strut and a further first or, respectively, second transverse strut, wherein said first or, respectively, second transverse struts are fixed to one another, in particular, are connected to one another by means of a flat element. Said transverse connecting element is arranged and braced between the external frame elements. If the internal frame element is arranged and braced between said external frame elements, here, the transverse connecting element can be arranged between the first or second external frame element and said internal frame element or, in case of a further internal frame element arranged between said external frame elements, between said internal frame element and the further internal frame element. The transverse connecting element increases the stability of the screwed frame. In fact, preferably, the two transverse struts of the transverse connecting element are arranged one above the other, wherein their fixation to one another counteracts a lateral tilting of the external frame element and, if applicable, of the internal frame element. Moreover, said transverse connecting element can serve as support for further components.

Preferably, the screwed frame has damping means which are arranged on the transverse connecting element. Thus, the screwed frame can abut in the region of the transverse

connecting element against a wall, wherein the damping means counteracts a transmission of vibrations from the wall to the screwed frame or from the screwed frame to the wall. Alternatively or additionally, a ventilator can be arranged on the transverse connecting element, which ventilator circulates the air for cooling the screwed frame or appliances arranged in the region of said screwed frame. In particular, the screwed frame can be arranged in front of a hollow space which provides air for an air exchange.

In a preferred embodiment, the distance between the first and the second external frame element or, respectively, between the first or second external frame element and the internal frame element or, respectively, between the internal frame element and an adjacent further internal frame element is a standardized distance. The width of said distance is in particular 19 inch. Thus, fitted console elements having a standardized width, in particular 19 inch, can be mounted in the screwed frame. The screwed frame serves as support for said fitted console elements. Thus, by means of said screwed frame, a console can be assembled, disassembled and reassembled, wherein the configuration of the screwed frame allows a high stability of said screwed frame or the console after the re-assembly.

Further embodiments arise from the claims and the exemplary embodiment illustrated in more detail by means of the drawing. In the drawing:

Fig. 1 shows a screwed frame in a simplified schematic illustration;

Fig. 2 shows a cut-out of a first external frame element of the screwed frame of Fig. 1 with a welded-in cup and a first nut;

Fig. 3 shows a cut-out of a first transverse strut of the screwed frame of Fig. 1 with an end cap, and

Fig. 4 shows a cut-out of an internal frame element of Fig. 1 with a sleeve into which a second end of a first bracing rod and a first end of a second bracing rod is screwed.

Fig. 1 shows a screwed frame 1 comprising a first external frame element 2, a second external frame element 4 and a first transverse strut 6 which - preferably together with further components which are described hereinafter - is arranged between said external frame elements 2 and 4. According to the invention, the screwed frame 1 has a bracing device 8 which connects the first external frame element 2 to the second external frame element 4, wherein said bracing device 8 extends from said first external frame element 2 to said second external frame element 4 and braces said first transverse strut 6 - preferably together with further components which are described hereinafter - between said external frame elements 2 and 4. For illustration purposes of the structure of the screwed frame 1, in particular for illustrating the bracing device 8, the screwed frame 1 is partially shown in an exploded view of the components.

The screwed frame 1 has a screwed frame extension device 10 which extends the width of said screwed frame 1. Said screwed frame extension device 10 has internal frame element 12 and a second transverse strut 14, wherein said screwed frame extension device 10 is braced between the first transverse strut 6 and the second external frame element 4. Thus, overall, the first transverse strut 6, the internal frame element 12 and the second transverse strut 14 are braced between the first external frame element 2 and the second external frame element 4. Moreover, further first transverse struts 16, 18, 20, 22, 24 and 26 are

braced between the first external frame element 2 and the internal frame element 12. The screwed frame extension device 10 too has further transverse struts, namely further transverse struts 28, 30, 32, 34, 36 and 38 which are braced between the internal frame element 12 and the second external frame element 4.

The bracing device 8 has a so-called first bracing rod 40 which is configured as round rod and which has on each of its two ends one external thread. Alternatively, a round or angular rod can also be provided, or a rod which has an external thread substantially over its entire length.

Thus, on its first end 42, the first bracing rod 40 has an external thread onto which a first nut 44 is screwed in the region of the first external frame element 2. The first bracing rod 40 is guided here through an opening, in particular a borehole, through an inner wall of the first external frame element 2 and projects preferably not more than with half of its length into a hollow space of said first external frame element located between the inner wall and the outer wall. The outer wall of said first external frame element has also an opening or borehole, wherein said opening has a larger diameter than the opening on the inner wall. In the region of said openings, a cup 46 is welded into the first external frame element 2, which cup has a bottom with a hole therein. Here, the bottom abuts against the inner wall of the first external frame element 2 and thus reinforces said inner wall. Moreover, said cup 46 has a hole in the center of its bottom, through which hole the first bracing rod 40 is guided. In the cup 46, the first nut 44 is arranged and is screwed onto the first end 42 of the first bracing rod 40. For this, the first nut 44 has an internal thread which corresponds to the external thread on the first end 42 of the first bracing rod 40.

With its second end 48, the first bracing rod 40 projects not more than with half of its length into the internal frame element 12. Said second end 48 has an external thread which is screwed into a sleeve 50 which has an internal thread corresponding to said external thread. Said sleeve 50 is part of a bracing rod lengthening device 52 which comprises said sleeve 50 and furthermore a second bracing rod which is substantially arranged in a hollow space of the second transverse strut 14 and thus is not visible. Said second bracing rod is formed analog to the first bracing rod 40. Said second bracing rod projects with its ends into the internal frame element 12 and into the second external frame element 4.

The second external frame element 4 is substantially configured as the first external frame element 2, in particular mirror-imaged to a mirror plane which is perpendicularly penetrated by the bracing device 8. In this exemplary embodiment according to Fig. 1, the entire screwed frame 1 is formed mirror-imaged, wherein the mirror plane is arranged in the region of the internal frame element 12. The first transverse struts 6, 16, 18, 20, 22, 24 and 26 have a uniform standardized length of greater than 19 inch which results in a uniform shortest distance between the first external frame element 2 and the internal frame element 12, which distance is greater than 19 inch as well. Analog to this, the second transverse struts 14, 28, 30, 32, 34, 36, and 38 have also a standardized length of greater than 19 inch which also results in a shortest distance of 19 inch between the internal frame element 12 and the second external frame element 4. Thus, the screwed frame 1 is suitable as support for receiving fitted console elements with a width of 19 inch which can be arranged between the first external frame element 2 and the internal frame element 12 or, respectively, between said internal frame element 12 and the second external frame element 4.

For reasons of stability and, at the same time, low material usage, the external frame elements 2 and 4 as well as the internal frame element 12 are structured in a grid-like manner. In particular the frame elements 2, 4 and 12 each have two vertical and at least two horizontal elements which are connected to one another in a material bonding manner, in particular are welded together.

The bracing device 8 extends from the first external frame element 2 to the second external frame element 4. Said bracing device 8 is braced by means of the first nut 44. Furthermore, the screwed frame 1 or the bracing device 8 has a second nut which is arranged in the region of the second external frame element 4 and is covered in Fig. 1 by the second external frame element 4. Said second nut 44 too braces the bracing device 8. The nuts 44 have faces which push against the bottom of the cup 46 which is arranged as first cup 46 in the region of the first external frame element 2 or, respectively, against a bottom of a further cup which is arranged as second cup in the region of the second external frame element 4. Thus, the nuts 44 compress in series the bottom of the first cup 46, the inner wall of the first external frame element 2, the first transverse strut 6, the internal frame element 12, the second transverse strut 14, an inner wall of the second external frame element 4, and the bottom of the second cup, whereby a high stability of the screwed frame 1 is achieved which, in addition, can be assembled in an advantageous manner.

The screwed frame 1 has further bracing devices 58, 60, 62, 64, 66 and 68 which are structured analog to the bracing device 8. In particular, to each first transverse strut 6, 16, 18, 20, 22, 24, 26 or, respectively, second transverse strut 14, 28, 30, 32, 34, 36, 38 of the screwed frame extension device 10, exactly one bracing device 8, 58, 60, 62, 64, 66, 68 is allocated. Through each first transverse strut 6, 16, 18, 20, 22, 24, 26, the first bracing rod 40

or, respectively, a further first bracing rod 70, 72, 74, 76, 80 is guided substantially centrally along a mirror axis of said first transverse strut. Analog to this, the second bracing rod is guided through the second transverse strut 6 and further second bracing rods are guided through the further second transverse struts 28, 30, 32, 34, 36, and 38. All first bracing rods 40, 70, 72, 74, 76, 78, and 80 as well as the second bracing rods which are not visible in the figure have a uniform standardized length and project with their first end 42 into the first external frame element 2 and with their second end 48 into the internal frame element 12 or, respectively, with a first end into said internal frame element 12 and with a second end into the second external frame element 4. The sleeve 50 and further sleeves 86, 88, 90, 92, 94 and 96 are arranged in the region of the region of the internal frame element 12.

All transverse struts have end caps 98 and 100. Said end caps 98 and 100 are attached on openings at ends of an elongated hollow body of the first transverse strut 6 and subsequently welded to said hollow body. Said end caps 98 and 100 each have an opening or through-bore in their center through which the first bracing rod 40 is guided. Hereby, the first bracing rod 40 is centered in the hollow body of the transverse strut 6. Analog to this, all other transverse struts also have end caps for centering each of the bracing rods substantially arranged therein.

At its ends or, respectively, at the end caps 98 and 100, the first transverse strut 6 has an anti-rotation protection which counteracts a rotation of the first transverse strut about its longitudinal axis with respect to the first external frame element 2 or, respectively, with respect to the internal frame element 12. In particular, the first transverse strut 6 is secured in a positive-locking manner with the first external frame

element 2 or, respectively, the internal frame element 12 via the anti-rotation protection. The same applies to all further transverse struts between the first external frame element 2 and the internal frame element 12 as well as to all second transverse struts between internal frame element 12 and the second external frame element 4 as well as in a non-illustrated embodiment to all second transverse struts between the internal frame element 12 and a potentially present further internal frame element.

The screwed frame 1 has a transverse connecting element 102 and a further transverse connecting element 104. Said transverse connecting element 102 or, respectively, 104 comprises the first transverse struts 24 and 26 or, respectively, the second transverse struts 36 and 38. Said first transverse struts 24 and 26 or, respectively, the second transverse struts 36 and 38 are connected to one another by means of a flat element and a plurality of struttings. Here, said struttings and said flat element fix the first transverse strut 24 to the first transverse strut 26 or, respectively, the second transverse strut 36 to the second transverse strut 38. Thus, a high stability of the transverse connecting element 102 or, respectively, 104 and the screwed frame 1 is achieved.

Moreover, the transverse struts 102 and 104 each have a round opening in the flat element in which a ventilator can be inserted. Furthermore, non-illustrated damping means for absorption of shocks and/or vibrations are provided on the transverse connecting elements 102 and 104. Said damping means can be provided on a back wall of the screwed frame or, respectively, on a back wall flat element on the transverse connecting element 102 or, respectively, 104.

Fig. 2 shows a section of the first external frame element 2 of Fig. 1 which has an opening into which the first cup 46 is welded. In the assembled screwed frame 1, the first

nut 44 is arranged in the first cup 46 and thus does not project on the outside of the screwed frame 1 out of said first cup 46 or out of the first external frame element 2. On the inside of the screwed frame 1, the nut 44 projects out of the frame element 2 and centers in this manner the longitudinal axis of the transverse strut or, respectively, bracing rod with the nut 44. For this purpose, the nut 44 is configured as special nut which has differently shaped sections. A first section has a shape for receiving a tool, for example - as illustrated in Fig. 2 - a section with the shape of an outside hexagon. Alternatively, however, this can involve a section with the shape of an outside triangle or outside square, or a section with the shape of an inside triangle, square, or hexagon, or a torx-like section. A second section is disk-shaped. A third section has an internal thread which is adapted to the external thread of the bracing rod 40. A screw connection by means of the first nut 44 thus does not increase the width of the screwed frame 1. Overall, with respect to the distance between the frame elements 2, 4 and 10, said screwed frame 1 has a small width compared to the known screwed frames.

Fig. 3 shows a section of the first transverse strut 6 with the end cap 98 in an enlarged illustration.

Fig. 4 shows a section of the internal frame element 12 of Fig. 1 and a portion of the bracing device 8 which is arranged in the region of said internal frame element 12 or in adjacent regions. A region around an opening or through-bore of the internal frame element 12, in which the sleeve 50 is arranged, is illustrated in a sectional view.

The sleeve 50 has an internal thread. The first bracing rod 40 is screwed with its second end 48 into the sleeve 50 up to the middle of the sleeve 50. On an other side of said sleeve 50, the first end 108, which is not yet designated and which is mentioned in the description of Fig. 1, of the

second bracing rod 110, which is also mentioned therein and is not yet designated, is screwed into said sleeve 50 up to the middle of the sleeve 50. Thus, the first bracing rod 40 is connected to the second bracing rod 110 by means of the sleeve 50.

The bracing rods 40 and 54 have holding regions 112 and 114 which are preferably located in the region of their ends. For simplifying the assembly of the screwed frame 1, a positive locking connection can be established in each of these holding regions 112 and 114 by means of an assembly tool, in particular wrench or spanner. Hereby, when screwing the screwed frame 1 together, in particular when connecting the bracing rods 40 and 54 by means of the sleeve 50, i.e. when extending the bracing device 8, a torque or counter torque can be generated in an effective manner. The holding regions 112, 114 each are preferably formed by two opposing faces which are parallel to one another and are milled into the bracing rod 40, 54.

All bracing rods are advantageously formed in the same manner as the bracing rod illustrated in connection with the reference number 40. Further, all nuts are advantageously formed in the same manner as the nut illustrated in connection with the reference number 44. Further, advantageously, all transverse struts are formed identically. The same applies to all external frame elements as well as to all internal frame elements. Further, advantageously, all sleeves are formed identically. The same applies to the end caps as well as to the transverse connecting elements. In this manner, the screwed frame according to the invention can be structured with uniform components, whereby storage and assembly are simplified and production costs are reduced.

Alternatively to the exemplary embodiment shown here according to the Figs. 1, 2, 3 and 4, the screwed frame 1

can comprise at least one further screwed frame extension device and/or at least one further bracing rod lengthening device. Hereby, without changing the dimensions of the screwed frame extension device 10 or, respectively, bracing rod lengthening device 52, a screwed frame can be provided which has a greater width than the screwed frame 1 illustrated herein. Thus, in particular, a screwed frame can be provided which is suitable in each case for receiving a desired number of console elements.

In case that the screwed frame has at least one further screwed frame extension device with a further internal frame element, analog to Fig. 4, two second bracing rods are connected to one another in the region of said further internal frame element by means of a sleeve.

The screwed frame 1 is very stable and insensitive to shock and vibration stress. It can be disassembled and, in the disassembled state, is easy to transport, in particular in a space-saving manner. After reassembly, the screwed frame 1 has a high stability again. In particular, the transverse struts 6 and 14 are firmly braced again by the bracing device, wherein a holding force of the nuts 44 does not decrease or only insignificantly after repeated assemblies of the screwed frame 1.

The screwed frame 1 according to the invention has small dimensions because in the region of the internal frame element 12 of the assembled screwed frame 1, no screw or nut has to project out of said internal frame element 12 or the transverse struts 6 and 14. Only the nuts 44 have to be accessible from outside; however the nuts are arranged in a space-saving manner in the cups 46 in the hollow spaces in the first external frame element 2 or, respectively, in the second external frame element 4. By means of said nuts 44, the transverse struts 6 and 14 arranged therebetween and the internal frame element 12 are firmly braced or can be

braced. As a result of the construction, the existing risk of the known screwed frames that individual regions of the screwed frame become loose and the screwed frame thus becomes unstable can be counteracted. In fact, the bracing device of the screwed frame according to the invention connects the two external elements 2 and 4 to one another and braces all components arranged in series therebetween, in particular the transverse struts 6 and 14 and the internal frame element 12 arranged therebetween, with the same strength so that a homogeneous force distribution and a uniform stability of the screwed frame is achieved.

All features mentioned in the aforementioned description of the drawings, the claims and in the introductory part of the specification can be used individually as well as together in any combination. Thus, the invention is not limited to the described or claimed feature combinations. In fact, all feature combinations are to be considered as disclosed.

CLAIMS

1. A screwed frame for holding fitted elements, comprising a first external frame, a second external frame, at least one so-called first transverse strut which is arranged between said external frame elements, and

at least one bracing device which has at least one so-called first bracing rod and connects the first external frame element with the second external frame element, wherein said bracing device extends from said first external frame element to said second external frame element and braces said first transverse strut between said external frame elements, wherein the screwed frame has at least one screwed frame extension device braced between the first transverse strut and the second external frame element, wherein said screwed frame extension device has an internal frame element and at least one second transverse strut and extends the width of the screwed frame, and the bracing device has at least one bracing rod lengthening device which comprises a second bracing rod and a sleeve by means of which the second bracing rod is connected to the first bracing rod and/or to a further bracing rod, wherein the length of the first transverse strut corresponds to the length of the first bracing rod and the length of the second bracing rod corresponds to the length of the second transverse strut in such a manner that the sleeve is arranged in the region of the internal frame element,

wherein

the bracing device is designed to be braceable by a first nut of the bracing device in the region of the first external frame element as well as by a second

nut of the bracing device in the region of the second external frame element for bracing the first transverse strut, the internal frame element and the second transverse strut in series between the first external frame element and the second external frame element with the same strength.

2. The screwed frame according to claim 1,

wherein

on its two ends, the first bracing rod has external threads onto which said first nut is screwed in the region of the first external frame element, wherein said first nut exerts a tensile force on the first bracing rod and a compressive force on the first transverse strut and the screwed frame extension device.

3. The screwed frame according to claim 2,

wherein

on its two ends, the second bracing rod has external threads and the sleeve has at least one internal thread, wherein said second bracing rod and/or the first bracing rod or, respectively, a further bracing rod are/is screwed into the sleeve.

4. The screwed frame according to claim 2 or claim 3,

wherein

a second end of the second bracing rod is arranged in the region of the second external frame element and has an external thread onto which the second nut is screwed, wherein said second nut exerts a tensile

force on the first bracing rod and the bracing rod extension device and exerts a compressive force on the first transverse strut and the screwed frame extension device.

5. The screwed frame according to any one of the preceding claims,

whereby

at least one cup for reinforcement of an inner wall of the first or, respectively, second external frame element against the compressive force exerted by the first nut or, respectively, second nut, wherein said cup is welded into said first or, respectively, second external frame element and has a bottom which abuts at least partially against said first or, respectively, second external frame element, which bottom has a hole through which the first or, respectively, second end of the first or, respectively, second bracing rod is guided.

6. The screwed frame according to any one of the preceding claims,

wherein

the first and the second transverse struts have a hollow body through which the first and/or the second bracing rod is guided.

7. The screwed frame according to claim 6,

wherein

on each of its two ends, the first or, respectively, second transverse strut has one end cap with a hole

through which the first or, respectively, second bracing rod is guided via the nut or, respectively, sleeve.

8. The screwed frame according to any one of the preceding claims.

whereby

an anti-rotation protection which counteracts a rotation of the first and/or second transverse strut with respect to the first or, respectively, second external frame element and/or, if applicable, the internal frame element.

9. The screwed frame according to any one of the preceding claims,

wherein

the first and the second bracing rod have a uniform, standardized length or in each case one of a plurality of standardized lengths.

10. The screwed frame according to any one of the preceding claims,

wherein

besides the first or, respectively, second transverse strut, said screwed frame has at least one further first or, respectively, second transverse strut and said first or, respectively, second transverse struts have a uniform, standardized length or in each case one of a plurality of standardized lengths.

11. The screwed frame according to any one of the preceding claims,

whereby

at least one transverse connecting element which comprises the first or, respectively, second transverse strut and a further first or, respectively, second transverse strut, wherein said first or, respectively, second transverse struts are fixed relative to one another and wherein said transverse connecting element is arranged and braced between the external frame elements.

12. The screwed frame according to claim 11, whereby damping means and/or at least one ventilator which are/is arranged on the transverse connecting element.

13. The screwed frame according to any one of the preceding claims,

whereby

a standardized distance which is in particular greater than 19 inches in width between the first and the second external frame element or, respectively, between the first or second external frame element and the internal frame element or, respectively, between the internal frame element and a further internal frame element for receiving at least one fitted console element which has in particular a width of 19 inches.

14. A screwed frame for holding fitted elements substantially as hereinbefore described with reference to the accompanying drawings.