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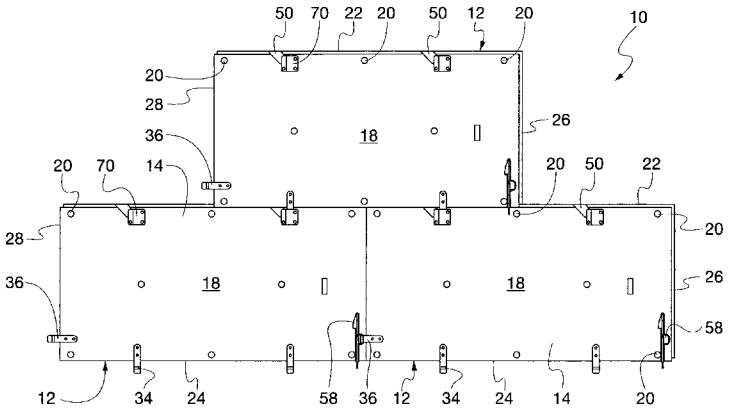


Fig. 2

(57) Abstract: The floor element (12) comprises: a treadable face (16) for bearing mechanical stresses; a mounting face (18) situated on the opposite side with respect to the treadable face (16) for being laid on a fixed floor; a coupling element (34, 36) fixed on the mounting face (18), laterally projecting beyond the mounting face (18) and elastically flexible in an approaching direction with respect to the mounting face (18); a seat (50, 56) provided on the mounting face (18), situated in a position (22, 28) opposite to the one (24, 26) wherein the coupling element (34, 36) is mounted, such seat arranged for being coupled with the coupling element (34, 36) of an adjacent floor element (12); a stop system (58, 70) arranged for facing a portion of the seat (50, 56) in a manner such that, when an associated coupling element (34, 36) of an adjacent floor element (12) is coupled with such seat (50, 56), the stop system is capable of receiving in abutment the associated coupling element (34, 36) so as to oppose a decoupling bending movement from the seat (50, 56) in a distancing direction from the mounting face (18).

WO 2012/164591 A1

"Floor element in particular for an interlocking modular floor suitable for use in sports"

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DESCRIPTION

Technical field

The present invention refers to a floor element, in particular for an interlocking modular floor suitable for use in sports. For example, the floor element is suitable for making trade fair/exhibition stand floors or floors for sports use (such as for basketball, volleyball, soccer and the like).

More specifically, the invention refers to a floor element according to the preamble of the enclosed claim 1.

Technological background

The floors for sports use are typically subjected to considerable stresses applied by floor users, in particular playing sports such as volleyball, basketball and soccer. For example, the stresses which are applied to the floor by a soccer player who suddenly stops running and changes direction are to be considered.

It is known in the field the use of floor elements for making floors for sports use by assembling several floor elements adjacent to each other.

One example of such floor elements is described and illustrated in the international patent application WO 2009/044299 A1 owned by the same Applicant. Such floor element type has proven to be particularly effective and allows obtaining optimal results with respect to the other known floor types, for example in terms of stress strength and speed of mounting and disassembly.

Nevertheless, it is still desirable to make further improvements to the aforesaid floor element type in order to allow improved performances.

Summary of the invention

One object of the invention is to obtain a floor element having improved performances in terms of stress strength with respect to those obtained with the floor elements manufactured according to the prior art.

According to the invention, these and other objects are attained by means of a floor element of the type specified above and provided with the technical features mentioned in the characterizing part of the enclosed claim 1.

It should be intended that the enclosed claims constitute an integral part of the technical teachings herein disclosed in the present description with regard to the present invention.

Brief description of the drawings

Further characteristics and advantages of the present invention will be made clear from the following detailed description, given as merely an exemplifying and non-limiting purpose, with reference to the enclosed drawings in which:

- Figure 1 is a top perspective view of a portion of a removable floor of modular type comprising a plurality of floor elements that can be assembled together according to a preferred embodiment of the present invention;
- Figure 2 is a partial, bottom plan view of the floor of figure 1;
- Figure 3 is a perspective view of a preferred embodiment of a floor element observed from below;
- Figures 3a and 3b are partial and enlarged view of details of the floor element shown in figure 3:
- Figure 4 is a bottom perspective view of a coupling element of the floor element shown in figure 3;
- Figure 4a is a bottom perspective view of another coupling element of the floor element shown in figure 3;
- Figure 5 is a perspective view of a first stop system for the floor element represented in the preceding figures;
- Figures 6 - 8 are respectively a top plan view, a side elevation view, a rear elevation view of the first stop system shown in figure 4;
- Figures 9 - 11 are, respectively, partial perspective views of the floor element according to the preceding figures, in which the first stop system is situated respectively in a standby position, a locking position and a disassembly position;
- Figures 9A - 11A are bottom plan views analogous to figures 9 – 11;
- Figure 12 is a perspective view of a second stop system for the floor element represented in the preceding figures;

- Figures 13 and 14 are partial, bottom perspective views of the floor element represented in the preceding figures, in which the second stop system shown in figure 12 is visible;
- Figure 15 is a partial, bottom perspective view in which a connection device is visible and mounted on two adjacent movement elements; and
- Figure 16 is a perspective view of a variant embodiment of the first stop system shown in figures 5 - 8.

Detailed description of a preferred embodiment of the present invention

With reference to figures 1 and 2, a removable floor of modular type (of which only a portion thereof is visible) is indicated 10 as whole and comprises a plurality of floor elements 12 assembled according to a preferred embodiment of the present invention.

According to the illustrated embodiment, the floor elements 12 are substantially of the type described and illustrated in the international patent application WO 2009/044299 A1 owned by the same Applicant. The floor elements 12 are made in a manner such to achieve, when assembled together, a so-called "interlocking modular floor".

In the illustrated embodiment, each of the floor elements 12 comprises a respective panel 14 on which a dorsal or treadable face 16 is defined (figure 1), arranged for bearing the mechanical stresses intended to be applied on its surface, and a ventral or mounting face 18 (figure 2) situated on the opposite side with respect to the treadable face 16 and arranged for being laid on a fixed floor (not shown). Clearly, during use, the treadable face 16 is directed upward and is visible to users who tread on the floor 10, while the mounting face 18 is directed downward and is hidden from the user's view.

Preferably, the panel 14 is made with wood material. More preferably, the mounting face 18 is defined in the panel 14 on a beech wood support layer having 24mm thickness, while the treadable face 16 is defined in the panel 14 on a finish layer superimposed on the support layer and which can be made of wood, rubber and laminated plastic.

With reference to figure 3, it is shown a preferred embodiment of the floor element 12 observed according to a bottom perspective view.

In figure 3, it can be observed that the floor element 12 preferably comprises a plurality of

support spacers 20 projecting from the mounting face 18 and by means of which the floor element 12 is capable of being laid on the fixed floor in a raised position with respect to the latter. Preferably, the support spacers 20 carry out a damping function between the fixed floor and the floor 10, for example they are feet made of soft and elastic material (such as a synthetic or natural rubber). Advantageously, the fixing of the support spacers 20 occurs by means of screwing on the mounting face 18.

In the illustrated embodiment, the mounting face 18 observed in bottom plan view has a quadrilateral plan defining a pair of longitudinal sides 22, 24 that are opposite each other and a pair of transverse sides 26, 28 opposite each other and adjacent to the longitudinal sides 22, 24. Preferably, the mounting face 18 has a plan substantially having the shape of a parallelogram, more preferably a rectangle, in which the longitudinal sides 22, 24 are opposite each other and the transverse sides 26, 28 are also opposite each other. In a preferred manner, the extension of the transverse sides 26, 28 is substantially half the extension of the longitudinal sides 22, 24.

Preferably, the pair of longitudinal sides includes a male longitudinal side 22 and a female longitudinal side 24 intended to be coupled with the female longitudinal side 24 and with the male longitudinal side 22, respectively, of the panels 14 adjacent in transverse direction. In an analogous manner, the pair of transverse sides includes a male transverse side 26 and a female transverse side 28 intended to be coupled with the female transverse side 28 and with the male transverse side 26, respectively, of the panels adjacent in longitudinal direction.

Preferably, the male sides 22, 26 have respective ribs (of which only one is indicated with the reference 30 in figure 3a) which are extended along their respective extension and the female sides 24, 28 have respective grooves (of which only one is indicated with the reference 32 in figure 3b) complementary to such ribs and which are extended along their extension. The ribs 30 and the grooves 32 are suitable for forming an interlocking coupling with each other when floor elements 12 adjacent to each other are fitted with each other. For example, the ribs of the male sides 22, 26 adjacent to each other are connected to each other in a continuous manner, forming a single projection 30 including two sections orthogonal to each other. Correspondingly, the grooves of the female sides 24, 28 adjacent to each other are connected to each other in a continuous manner, forming a single recess

32 including two sections orthogonal to each other.

In further preferred manner, the ribs and the grooves mentioned above are projecting from and recessing into, respectively, the corresponding male sides 22, 26 and female sides 24, 28 at an intermediate section of the panel thickness 14. For example, this arrangement can be obtained with a panel 14 having three layers of parallelepiped form superimposed on each other and having a same-size plan, but in which the intermediate layer is slightly offset in longitudinal direction and in transverse direction.

In the illustrated embodiment, the support spacers 20 are situated close to the corners defined by the substantially rectangular plan of the mounting face 18. Preferably, the support spacers 20 are situated on three rows parallel to each other and substantially oriented in a longitudinal direction and comprising a pair of lateral rows arranged along the longitudinal sides 22, 24 and an intermediate row substantially equidistant from the lateral rows. More preferably, the support spacers 20 belonging to the same row are equidistant from each other. Still more preferably, the support spacers 20 define overall an "checkerboard" pattern, since the spacers belonging to the lateral rows are also aligned along a transverse direction, while the spacers belonging to the intermediate row are offset in longitudinal direction by half a period (considering a "period" to be the distance that lies between two spacers of the same row). In the illustrated embodiment, the aforesaid lateral rows comprise three support spacers equidistant from each other, while the aforesaid intermediate row comprises two support spacers situated in an offset position with respect to the lateral rows, as described above.

The floor element 12 includes at least one coupling element 34, 36 fixed on the mounting face 18, laterally outwardly projecting (in other words, according to its position in longitudinal direction or in transverse direction) beyond such mounting face 18. The floor element 12 is made elastically flexible in an approaching direction with respect to the mounting face 18. Preferably, the approaching direction is substantially perpendicular to the mounting face 18.

In the illustrated embodiment, the floor element 12 includes a pair of lateral coupling elements 34 fixed on the mounting face 18. Preferably, the pair of lateral coupling elements 34 is fixed on the mounting face 18 close to one of the longitudinal sides 22, 24.

In the illustrated embodiment, the lateral coupling elements 34 are situated in proximity to the female longitudinal side 24. In addition, the floor element 12 preferably includes an end coupling element 36 fixed on the mounting face 18 in proximity to one of the transverse sides 26, 28. In the illustrated embodiment, the end coupling element 36 is fixed on the mounting face 18 close to the female transverse side 28.

In the illustrated embodiment, each lateral coupling element 34 is situated between a pair of consecutive support spacers 20 situated on the female longitudinal side 24. Preferably, each lateral coupling element 34 is substantially equidistant with respect to the support spacers 20, between which it is situated.

In the illustrated embodiment, the end coupling element 36 is situated near the intersection between the female transverse side 28 and one of the longitudinal sides 22, 24 (e.g., the female longitudinal side 24). Optionally, the end coupling element 36 is situated close to a support spacer 20 situated in angular position of the mounting face 18. Preferably, the end coupling element 36 is situated in the zone comprised between the pair of support spacers 20 situated in proximity to the corners of the female transverse side 28.

In figure 4, a preferred structural configuration is illustrated for the lateral coupling elements 34 relative to one of the longitudinal sides of the floor element 12. In the illustrated embodiment, each lateral coupling element 34 has a flexible body 38 fixed to the mounting face 18 and projecting transversely or longitudinally beyond the mounting face, and a coupling projection 40 projecting from one face of the flexible body 38.

Preferably, the flexible body 38 includes a proximal portion 42 fixed on the mounting face 18 and a distal portion 44 from which the projection 40 is projected. In a preferred manner, the proximal portion 42 is fixed close to the respective longitudinal side (e.g., the female longitudinal side 24) or the respective transverse side (e.g., the female transverse side 28). Preferably, the flexible body 38 is made of composite material, including plastic materials and rubber. In the illustrated embodiment, the lateral coupling element 34 includes a pair of pins 46 projecting from the proximal portion 42 of the flexible body 38. In a preferred manner, each of the pins 46 is mounted through the flexible body 38 and, for example, is internally hollow and optionally has a diameter slit 48 able to allow its elastic opening in order to facilitate its coupling via interference fit in associated holes (not illustrated) made

on the mounting face 18. In an optional manner, the pins 46 have an external lateral surface with a serrated section.

In the illustrated embodiment, the coupling projection 40 is obtained integral with the flexible body 38. Preferably, the coupling projection 40 is substantially hollow cylindrical, for example having an external lateral surface with a saw-tooth profile.

With reference to figure 4a, an end coupling element 36 is illustrated relative to one of the transverse sides of the floor element 12. Preferably, the end coupling element 36 is substantially analogous to the lateral coupling element 34. In a more preferred manner, the end coupling element has a coupling projection 40a equipped with a recess 41. Still more preferably, the coupling projection 40a has substantially cylindrical form and is sectioned along a diameter plane oriented in a substantially oblique direction with respect to the plane identified by the flexible body 38. In the preferred latter case, the recess 41 is a n inclined surface identified by the coupling projection 40a. The function of the recess 41 will be described hereinbelow in the present description.

The mounting face 18 has at least one seat situated in a position opposite to the one wherein the lateral coupling element 34 is mounted, such seat arranged for being coupled with the lateral coupling element 34 of an adjacent associated floor element 12. Below in the present description, for the sake of conciseness, with the term "associated" reference is made to an element or component belonging to a floor element 12 adjacent to that considered and intended to be coupled therewith.

Preferably, the mounting face 18 has a pair of lateral seats or notches 50 obtained on the mounting face 18 in proximity to the side opposite to the one wherein the lateral coupling elements 34 are mounted. In the illustrated embodiment, the lateral seats 50 are obtained, preferably by means of milling, in proximity to a longitudinal side (e.g. the male longitudinal side 22). Preferably, the lateral seat 50 has a distal section 52 which is outwardly open transversely through the respective longitudinal side (e.g. the male longitudinal side 22) and is extended in oblique direction, and a proximal section 54 which continues from the distal section 52 and is substantially extended in longitudinal direction. In a preferred manner, the distal section 52 terminates with a smoothed or rounded end, or an end in any case complementary to the coupling projection 40.

Preferably, the mounting face 18 has an end seat or notch 56 obtained on the mounting face 18 in proximity to the side opposite to the one wherein the end coupling element 36 is mounted. In the illustrated embodiment, the end seat 56 is obtained, preferably by means of milling, in proximity to a transverse side (e.g. the male transverse side 26). Preferably the end seat 56 is made as a closed groove that is substantially extended in transverse direction. In a more preferred manner, the end seat 56 has smoothed or rounded ends, or ends in any case complementary to the coupling projection 40. Preferably, the end seat 56 is situated close to the intersection between the male transverse side 26 and one of the longitudinal sides 22, 24. In the illustrated embodiment, the end seat 56 is situated close to the intersection between a transverse side (e.g. the male transverse side 26) and one of the adjacent longitudinal sides (e.g. il female longitudinal side 24), preferably in proximity to one of the support spacers 20 situated in angular position in the mounting face 18.

Preferably, the lateral seats 50 and/or the end seat 56 have a constant depth.

With particular reference to figure 2, it can be observed that each floor element 12 is connected with the floor elements 12 adjacent in transverse direction by means of a coupling between its lateral coupling elements 34 and the associated lateral seats 50 (i.e. the lateral seats 50 of a transversely-adjacent floor element 12), and respectively between its lateral seats 50 and the associated lateral coupling elements 34 (i.e. the coupling elements 34 of another floor element 12 transversely adjacent in opposite position). In addition, each floor element 12 is connected with the floor elements adjacent in longitudinal direction by means of a coupling between its end coupling element 36 and the associated end seat 56 (i.e. the end seat 56 of a longitudinally-adjacent floor element 12), and respectively between its end seats 56 and the associated end coupling element 36 (i.e. the end coupling element of the floor element 12 longitudinally adjacent in opposite position). Preferably, the mounting of the floor elements 12 occurs over longitudinal rows offset with each other by half-periods (considering a "period" to be the overall longitudinal extension of a floor element).

According to the present invention, the floor element 12 comprises a stop system mounted on the mounting face 18 and arranged to face at least one portion of the seat 50, 56 in a manner such that, when the associated coupling element 34, 36 is coupled with the

respective seat 50, 56, the stop system is capable of receiving in abutment the associated coupling element 34, 36 so as to oppose its decoupling bending movement from the seat 50, 56 in a distancing direction from the mounting face 18. Preferably, the distancing direction is substantially perpendicular to the mounting face 18.

With particular reference to figures 5 – 8, a first stop system 58 is illustrated, used in the floor element 12 depicted in the preceding figures.

The first stop system includes a slider, or slide, 58 movably mounted on the mounting face 18 between a standby position (figures 9 and 9A) and a locking position (figure 10 and 10A). In the standby position, the slider 58 frees the seat 56 and allows the coupling of the associated end coupling element 36 with the seat 56. In the locking position, the slider 58 faces the seat 56 and is capable of locking in abutment the possible bending of the associated coupling element 36. Clearly, the movement from the standby position to the locking position is carried out by an operator during the mounting of the floor 10.

In the illustrated embodiment, the slider 58 is coupled to the end seat 56 and is therefore able to cooperate with the associated end coupling element 36. Preferably, the locking position is an advanced position with respect to the standby position, i.e. in which the slider 58 is situated in a more internal position with respect to the mounting face 18.

Preferably, the slider 58 is slidably mounted in a guided manner on the mounting face 18 and laterally projects beyond the latter. In the illustrated embodiment, the slider 58 comprises an elongated base 60 having a tapered section which is coupled in a corresponding groove 59 obtained in the mounting face 18. In the illustrated embodiment, the coupling between the slider 58 and the mounting face 18 occurs by means of a dovetail coupling. Advantageously, the slider 58 is translatably mounted in a rectilinear direction, preferably parallel to the side of the mounting face 18 on which such slider 58 is mounted. In the illustrated embodiment, the slider 58 is translatable in a transverse direction, preferably parallel to the male transverse side 26. In a preferred manner, the slider 58 includes at a distal portion thereof a grip appendage 61 for facilitating the grip of the operator. For example, the grip appendage 61 has concave surfaces on both sides. In the illustrated embodiment, the grip appendage 61 is prominent with respect to the elongated base 60.

In a preferred manner, the slider 58 comprises a first abutment assembly 63 able to be engaged in a removable manner with a second abutment assembly (not shown) carried by the mounting face 18, locking such slider 58 when it is situated in the locking portion and in the standby position. Preferably, the first abutment member is a protrusion 63 and the second abutment member has a first standby cavity (not shown) complementary to such protrusion 63 and arranged for elastically receiving the protrusion 63 when the slider 58 reaches the rest position, and a second locking cavity (not shown) complementary to such protrusion 63 and arranged for elastically receiving the protrusion 63 when the slider 58 reaches the rest position. For example, the second locking cavity can be a recess (not shown) complementary to the protrusion 63. More preferably, the protrusion 63 is projecting from the elongated base 60, for example at the bottom thereof. In a still more preferred manner, the elongated base 60 laterally has, close to the protrusion, a slit 65 that crosses such elongated base 60 in the width direction. In this manner, an elastic deformation is allowed of the elongated base 60 in order to permit the elastically removable coupling between the protrusion 63 and the standby and locking cavities.

Preferably, the slider 58 comprises a cover wing 62 laterally projecting from the slider 58 and facing the seat 56 when the slider 58 is situated in locking position. In the illustrated embodiment, the cover wing 62 projects into an intermediate section of the slider. In this manner, when the slider 58 is situated in locking position, if the stresses to which it is subjected during floor use tended to make the coupling element 36 bend away from the mounting face 18, the latter would encounter the abutment of the cover wing 62 and thus its decoupling from the seat 56 would be prevented.

In a preferred manner, the slider 58 has a notch 64 delimited by the wing 62 and arranged to be laterally crossed by the coupling element 36 of an adjacent floor element 12 when the slider 58 is situated in the locking position (see figure 10). In this manner, the notch 64 retains the coupling element 36 in position, preventing its possible bending away from the mounting face 18. In the illustrated embodiment, the notch 64 is obtained between the elongated base 60 and the wing 62.

Preferably, the slider 58 has a further notch 67 obtained between the grip portion 61 and the elongated base and situated in opposite position with respect to the notch 64. The

further notch 67 allows a frame (not visible) situated at the perimeter edge of the floor 11 to be applied to the longitudinal sides 24. In this manner, the frame passes through the further notch 67 and thus avoids abutting against the slider 58, compromising its regular functioning.

Advantageously, said slider 58 is movable on the mounting face 18 in a disassembly position (figures 11 and 11A), in which it is arranged for forcedly bending in decoupling the associated coupling element 36 coupled with the seat 56. In the illustrated embodiment, the slider is arranged for lifting the distal portion of the coupling element 36 from the seat 56. Preferably, the disassembly portion is receded with respect to the standby position and, consequently, with respect to the locking position.

In the illustrated embodiment, the slider 58 has a ridge 66 projecting in a distancing direction from the mounting face 18 and arranged for cooperating with the coupling element 36 of an adjacent floor element 12 coupled with said seat 56, in a manner such to bend it in decoupling during the passage of the slider 58 towards the receded disassembly position.

Preferably, the ridge 66 is progressively projecting in a distancing direction from the mounting face 18, e.g. projecting in a direction perpendicular to the mounting face 18. The ridge 66 is arranged for progressively bending the coupling element 36 of an adjacent floor element 12 coupled with the seat 56. Indeed, starting from the advanced locking position, going beyond the (intermediate) standby position and proceeding backwards towards the receded mounting position, the gradual increase of the slope of the ridge 66 obliges an always-greater bending of the coupling element 36, lifting it in decoupling from the coupled seat 56.

Preferably, the slider 58 also comprises an end stop wing 68 laterally projecting at the ridge 66, for example perpendicular to the ridge 66. The end stop wing 68 is arranged to abut against a projecting portion of the mounting face 18 in a manner such to prevent the decoupling of the slider 58 from the floor element 12 (e.g. from the seat 56) during the passage of the slider 58 towards the receded disassembly position. In a further preferred manner, the end stop wing 68 has a curved or tilted insertion section 68a that is progressively laterally enlarged in a manner such to cooperate with the projecting portion

in order to allow the insertion of the slider 58 on the mounting face 18. More in detail, when the slider 58 is driven into coupling with the mounting face 18, the insertion section 68a of the end stop wing 68 abuts against the projecting portion, until this insertion section 68a goes beyond such projecting section. In this condition, when the slider 58 is driven in opposite direction, the stop section 68b of the end stop wing 68 is intended to abut against the projecting portion, in order to prevent that there is an undesired decoupling from the mounting face 18.

In a preferred manner, the first abutment assembly 63 and the second abutment assembly cooperate in a manner such to removably lock the slider 58 even when it is situated in the disassembly position. Preferably, the protrusion 63 is arranged for being engaged in a releasable manner in a further disassembly cavity, when the slider 58 is situated in the disassembly position.

With regard to the preferred structure of the end coupling element 36, the recess 41 obtained in the associated coupling projection 40a is made in a manner such to allow the slider 58 to be able to pass below the flexible element 38. For example, the recess 41 is crossed by the elongated base 60 (and preferably also by the ridge 66) during the movement of the slider 58 between its different operative positions. In this manner, when the ridge 66 cooperates with the flexible element 38 by bending it upward, the coupling projection 40a being lifted does not interfere with the remaining portion of the slider 58 and allows the overall lifting of the end coupling element 36 from its respective seat.

With particular reference to figures 12 - 14, the floor element 12 preferably comprises a second stop system, including a fixed cover element 70, e.g. with dome form, mounted on the mounting face 18 and facing the seat 50. Preferably, the cover element 70 is mounted in proximity to both lateral seats 50. For example, the cover element 70 includes a top 71 against which the coupling element 34 of a floor element 12 is intended to abut so as to oppose the decoupling bending movement of the latter from the respective seat 50.

In the illustrated embodiment, the cover element 70 has a laterally open portion 72 that the coupling element 34 of an adjacent floor element 12 is capable of crossing in order to be coupled with the respective seat 50. Preferably, the laterally open portion 72 includes a pair of open flanks 74, 76, more preferably a first transverse flank 74 directed towards one of

the transverse sides (e.g. the male transverse side 22) and a second longitudinal flank 76 directed towards one of the longitudinal sides (e.g. the female longitudinal side 28).

Preferably, the top 71, for example having a quadrangular plan, comprises a tilted part 78 oriented in a direction descending towards the remaining portion of the top 71 and arranged to abut against the coupling element 34 of an adjacent floor element 12 and make it progressively bend towards the respective seat 50 for the purpose of facilitating the coupling thereof. In the illustrated embodiment, the tilted part 78 terminates and is outwardly opened at the laterally open portion 72, e.g. at one of the open flanks (advantageously, the second longitudinal flank 76).

In the illustrated embodiment, the remaining portion of the top 71 comprises a substantially flat part 80 which is connected with the tilted part 78 preferably in the direction of the second longitudinal flank 76. Preferably, the substantially flat part 80 and the tilted part 78 are opened in the direction of one of the open flanks, for example of the first longitudinal flank 74.

In an advantageous manner, the cover element 70 is screwed on the mounting face 18 by means of a plurality of screws. Preferably, such screws are situated at three of the corners of the top 71.

With reference in particular to figure 15, the floor element 12 preferably comprises at least one connection projection and at least one connection device 82 arranged for being coupled with the connection projection and an associated connection projection of an adjacent floor element 12. For example, the connection projection is one of the support spacers 20.

Preferably, the connection device 82, for example made of elastomer material, comprises two hook-like appendages 84 situated on mutually opposite sides and each being able to hold a respective support spacer 20 in order to allow the coupling between two adjacent floor elements 12. More preferably, the connection device 82 also includes a grip appendage 86 situated between the hook-like appendages 84 and intended to be held by an operator. In the illustrated embodiment, the hook-like appendages 84 are projecting from the same side of the connection device 82.

In the illustrated embodiment, the connection device 82 is arranged for coupling two support spacers belonging to two floor elements 12 adjacent in longitudinal direction. Preferably, the connection device 82 is arranged for being coupled with a first support spacer 20 belonging to a first floor element 12 and situated close to the intersection between a longitudinal side (e.g. the male longitudinal side 22) and a transverse side (e.g. the female transverse side 28), and respectively with an associated support spacer 20 situated close to the intersection between an associated longitudinal side (e.g. the associated male longitudinal side 22) and an associated transverse side (e.g. the associated male transverse side 26).

The manner and the sequence in which the floor elements 12 are assembled together for obtaining the floor 11 are substantially the same as those described in the abovementioned international patent application WO 2009/044299 A1. Therefore, for the sake of brevity, they will not be described in detail hereinbelow.

In brief, the coupling between two adjacent floor elements 12 at the transverse sides occurs by means of fitting in longitudinal direction, in a manner so as to couple the associated end coupling element 36 with the end seat 56. The coupling between two adjacent floor elements 12 at the longitudinal sides instead occurs by means of an initial fitting in transverse direction of the adjacent longitudinal sides and a subsequent sliding in longitudinal direction, in a manner such that the associated lateral coupling element 34 is transversely coupled with the associated lateral seat 50. As is clear to a man skilled in the art, each longitudinal side of a floor element 12 is coupled with two associated floor elements in order to give rise to the configuration "with offset longitudinal rows" illustrated in particular in figures 1 and 2.

Listed hereinbelow, as a non-limiting example, are several variant possibilities of the present invention.

In further embodiments of the floor element, this can include only the first stop system including one or more movable sliders, or only the second stop system including one or more fixed cover elements.

In further embodiments of the floor element, the mounting face can have a plan with different geometry with respect to a substantially rectangular plan defining the pair of longitudinal sides 22, 24 and the pair of transverse sides 26, 28 of the mounting face 18 described with reference to the illustrated embodiment.

In further embodiments, the floor element can include further end coupling elements fixed on the panel instead of the single end coupling element 36 illustrated on the mounting face 18.

In further embodiments, the floor element can possibly include only one lateral coupling element, instead of the pair of lateral coupling elements 34.

With reference to figure 16, a preferred embodiment variant is illustrated of the first stop system 58. To indicate elements that are identical or similar to those of the first stop system 58 illustrated in the preceding figures, the same reference numbers were used. In this embodiment variant, the grip appendage 61 has a laterally enlarged form, for example with hammer shape. In this case, the grip appendage 61 is particularly suitable for being used in combination with equipment suitable for facilitate the movement of the stop system in its entirety.

In addition, in figure 16, the end stop wing 68 has more reduced dimensions in longitudinal direction, with a predominantly lateral extension. In the illustrated embodiment variant, similar to that shown in the preceding figures, the end stop wing 68 has a curved or rounded insertion section 68a and a corresponding stop section 68b which carries out the same previously described function. Preferably, the end stop wing 68 has a substantially parallelepiped shape, in which the insertion section 68a includes a chamfer situated at a laterally external, front edge thereof.

Naturally, the principle of the invention remaining the same, the embodiments and details of construction could be widely varied with respect to that described and illustrated as a mere non-limiting example, without departing from the scope of the invention as defined in the appended claims.

CLAIMS

1. A floor element (12) particularly for an interlocking modular floor (10) suitable for use in sports; said floor element (12) comprising:

- a treadable face (16) arranged for bearing the mechanical stresses intended to be applied on its surface;
- a mounting face (18) situated on the opposite side with respect to said treadable face (16) and arranged for being laid on a fixed floor;
- at least one coupling element (34, 36) fixed on said mounting face (18), laterally outwardly projecting beyond said mounting face (18) and elastically flexible in an approaching direction with respect to said mounting face (18);
- at least one seat (50, 56) provided on said mounting face (18), situated in a position (22, 28) opposite to the one (24, 26) wherein said coupling element (34, 36) is mounted, such seat arranged for being coupled with the coupling element (34, 36) of an adjacent floor element (12);

characterized in that said floor element also comprises:

- stop means mounted on the mounting face (18) and arranged for facing at least one portion of said seat (50, 56) in a manner such that, when an associated coupling element (34, 36) of an adjacent floor element (12) is coupled with said seat (50, 56), said stop means are capable of receiving in abutment said associated coupling element (34, 36) so as to oppose a decoupling bending movement thereof from said seat (50, 56) in a distancing direction from said mounting face (18).

2. Element according to claim 1, wherein said stop means comprise a slider (58) that is movable on said mounting face (18) between a standby position, in which it frees said seat (56) and allows the coupling of said associated coupling element (36) in said seat (56), and a locking position, in which it faces said seat (56) and is capable of locking in abutment the possible bending of said associated coupling element (36).

3. Element according to claim 2, wherein said slider (58) includes a laterally projecting cover wing (62) facing said seat (56) when said slider (58) is situated in the locking position.

4. Element according to claim 3, wherein said slider (58) has a notch (64) delimited by said cover wing (62) and arranged for being laterally crossed by said associated

coupling element (36) when said slider (58) is situated in the locking position.

5. Element according to any one of the claims from 2 to 4, wherein said slider (58) is slidably mounted in a guided manner on said mounting face (18).

6. Element according to claim 5, wherein said slider (58) is slidable on said mounting face (18) by means of a dovetail coupling.

7. Element according to any one of the claims from 2 to 6, wherein said slider (58) is movable on said mounting face (18) into a disassembly position, in which it is arranged for cooperating with said associated coupling element (36) in a manner such to bend it in decoupling from said seat (56).

8. Element according to claim 7, wherein said slider (58) comprises a ridge (66) projecting in a distancing direction from the mounting face (18) and arranged to cooperate with said associated coupling element (36) during the passage of said slider (58) towards the disassembly position.

9. Element according to claim 8, wherein said ridge (66) is progressively projecting in a distancing direction from the mounting face (18) and is arranged for progressively bending said associated coupling element (36).

10. Element according to claim 8 or 9, wherein said slider (58) comprises an end stop wing (68) laterally projecting from said ridge (66) and arranged to abut against a projecting portion (20) of said mounting face (18) in a manner such to prevent the decoupling of said slider (58) from said floor element (12) during the passage of said slider (58) towards said disassembly position.

11. Element according to claim 10, wherein said end stop wing (68) has a curved or tilted insertion section that is progressively laterally enlarged and arranged to cooperate with said projecting portion (20) in order to allow the insertion of said slider (58) on the mounting face (18).

12. Element according to any one of the preceding claims, wherein said stop means

also comprise a cover element (70) that is fixed and mounted on said mounting face (18) and facing said seat (50).

13. Element according to claim 12, wherein the cover element (70) comprises a top (71) against which said associated coupling element (34) is intended to abut, so as to oppose the decoupling bending movement of the latter from the respective seat (50).

14. Element according to claim 13, wherein said top (71) comprises a tilted part (78) oriented in a direction descending towards the remaining portion (80) of said top (71), arranged for abutting against said associated coupling element (34) and progressively bending said element (34) towards the respective seat (50) for the purpose of facilitating the coupling thereof.

15. Element according to claim 14, wherein the remaining portion of said top (71) comprises a substantially flat part (80) which is connected with said tilted part (78).

16. Element according to any one of the claims from 12 to 15, wherein said cover element (70) has a laterally open portion (72) which said associated coupling element (34) is capable of crossing in order to be coupled with the respective seat (50).

17. Element according to claim 16, wherein said laterally open portion (72) comprises two open flanks (74, 76).

18. Element according to any one of the preceding claims, also comprising at least one connection projection (20) and at least one connection device (82) arranged for being coupled with said connection projection (20) and an associated connection projection (20) of an adjacent floor element (12).

19. Element according to claim 18, wherein said connection projection is a support spacer (20) projecting from said mounting face (18) and by means of which said floor element (12) is capable of being laid on a fixed floor in a raised position with respect to the latter.

20. Element according to claim 18 or 19, wherein the connection device (82) includes a

pair of hook-like appendages (84) situated on mutually opposite sides, each of said hook-like appendages (82) being able to hold a respective connection projection (20).

21. Element according to claim 20, wherein the connection device (82) also includes a grip appendage (86) situated between said hook-like appendages (84) and intended to be held by an operator.

22. Floor (10) comprising a plurality of floor elements (12) according to any one of the preceding claims.

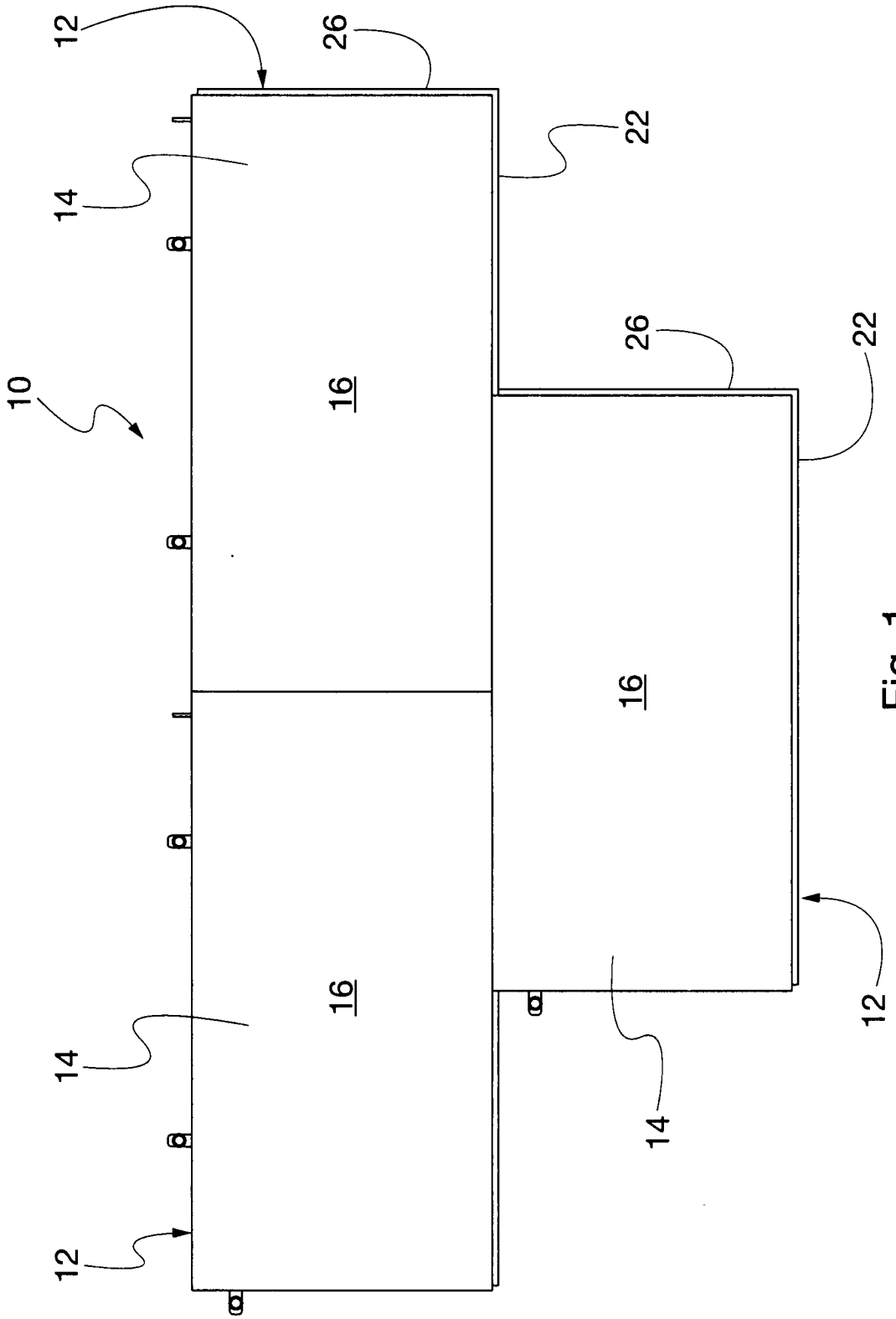


Fig. 1

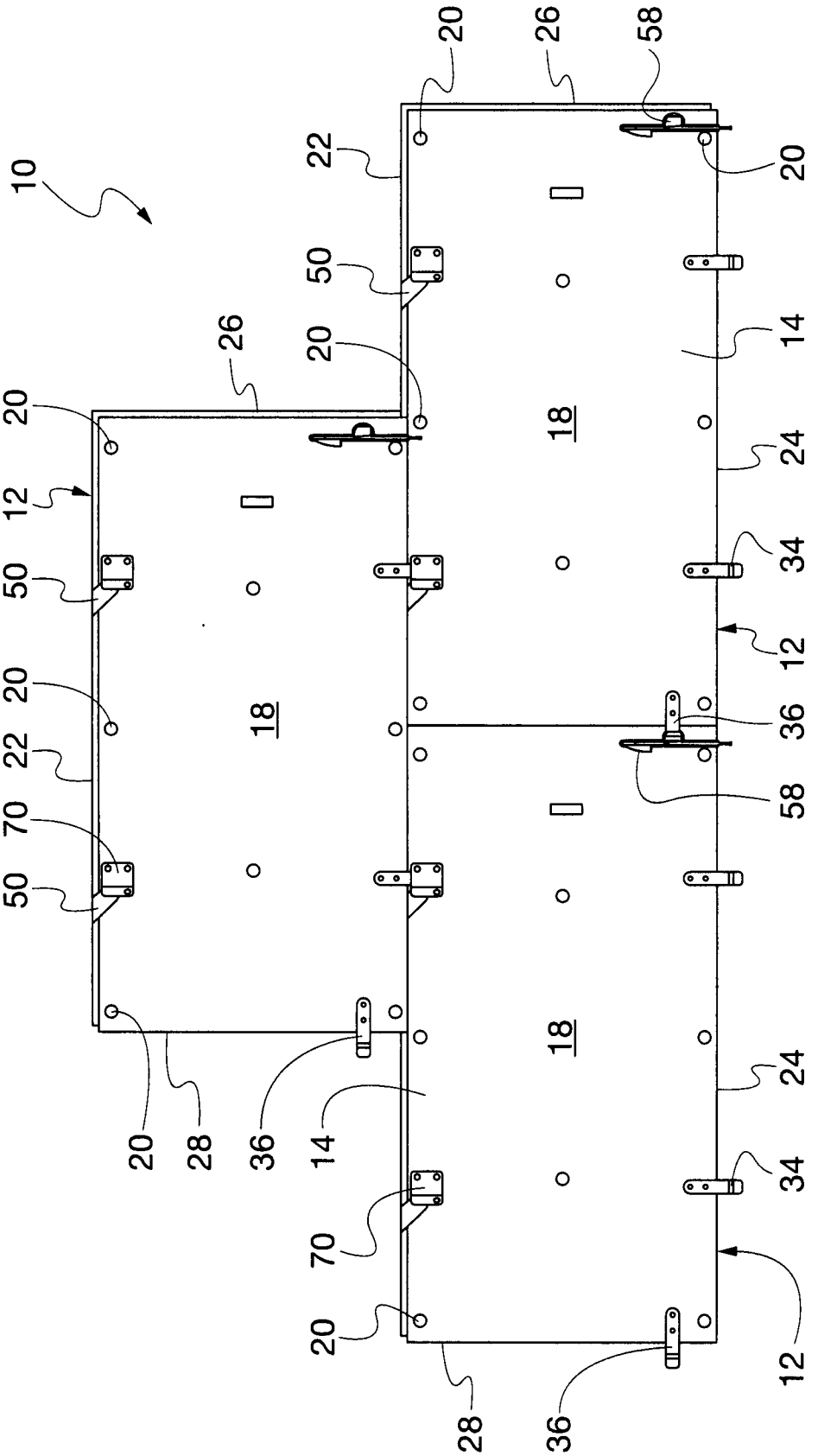


Fig. 2

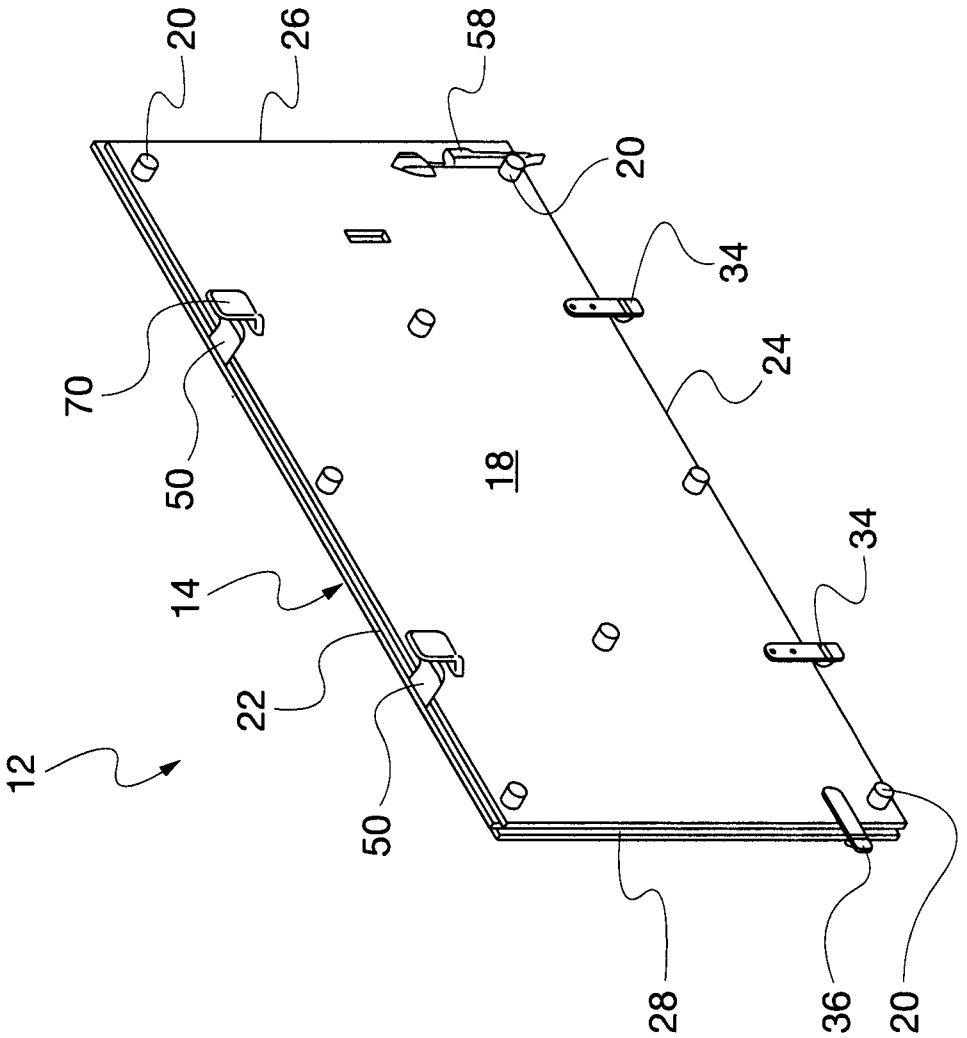


Fig. 3

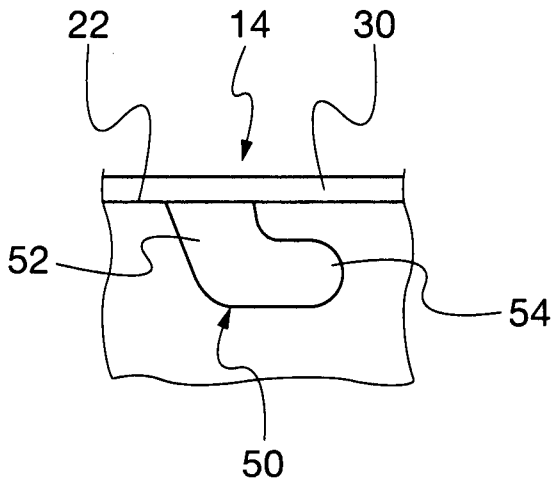


Fig. 3a

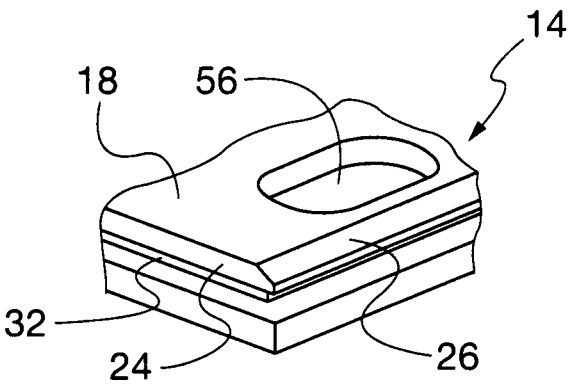


Fig. 3b

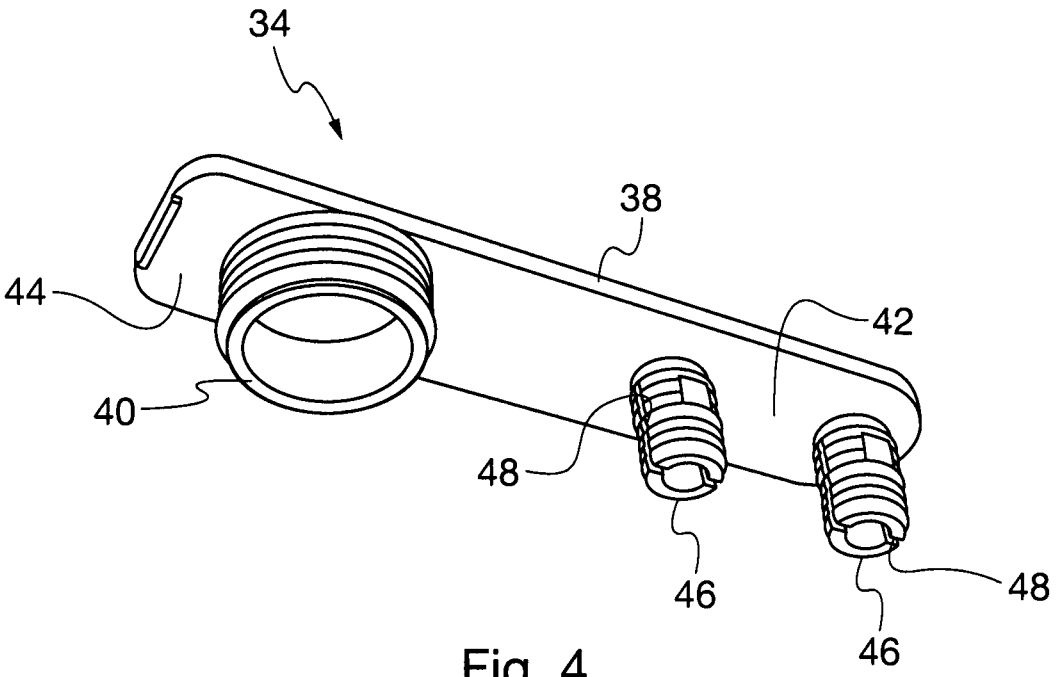


Fig. 4

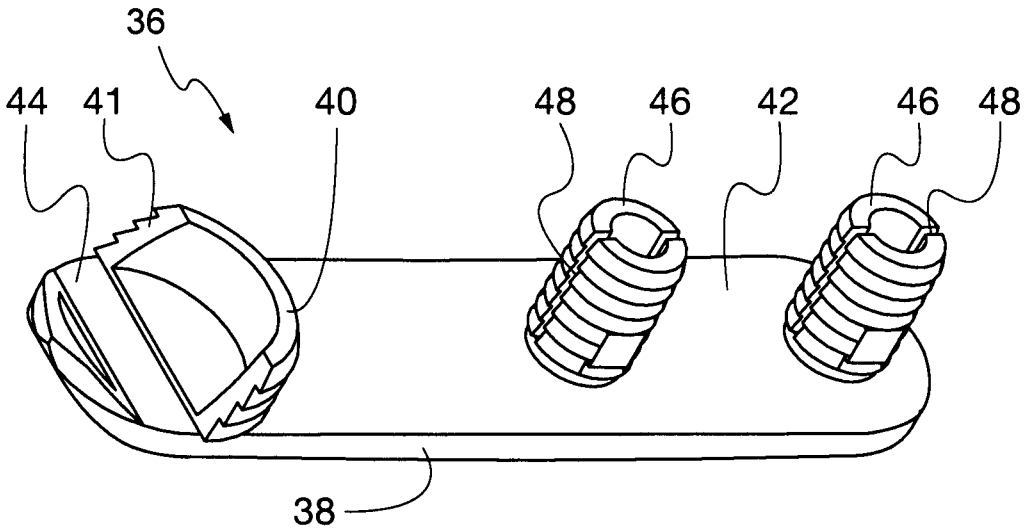


Fig. 4a

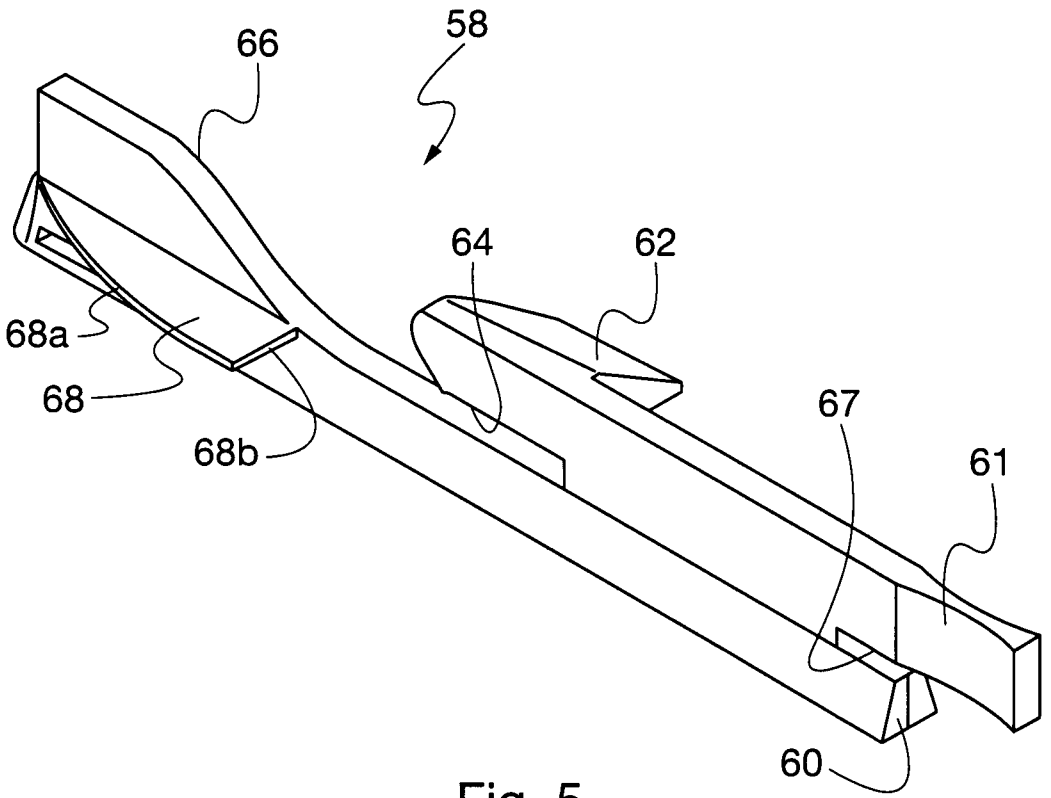


Fig. 5

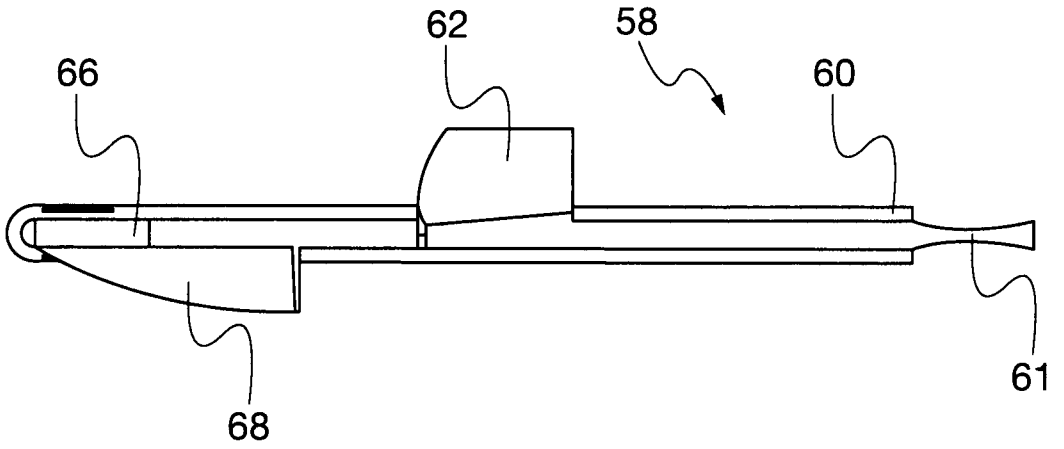


Fig. 6

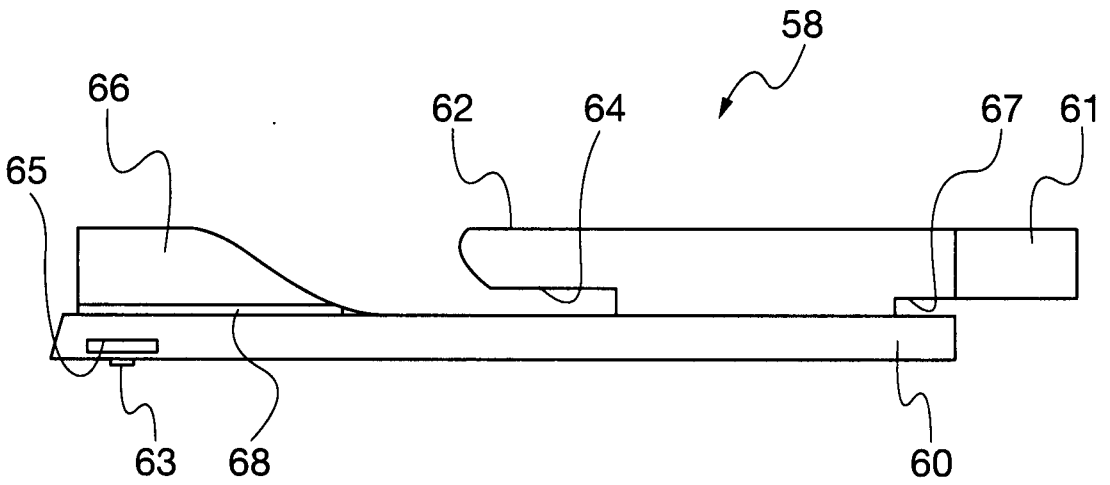


Fig. 7

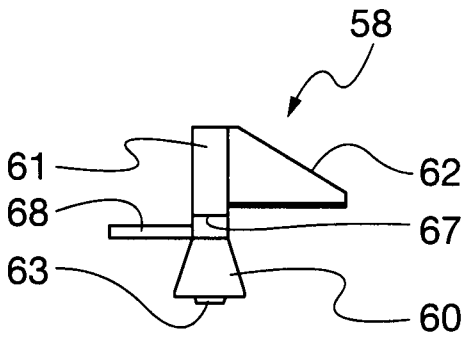


Fig. 8

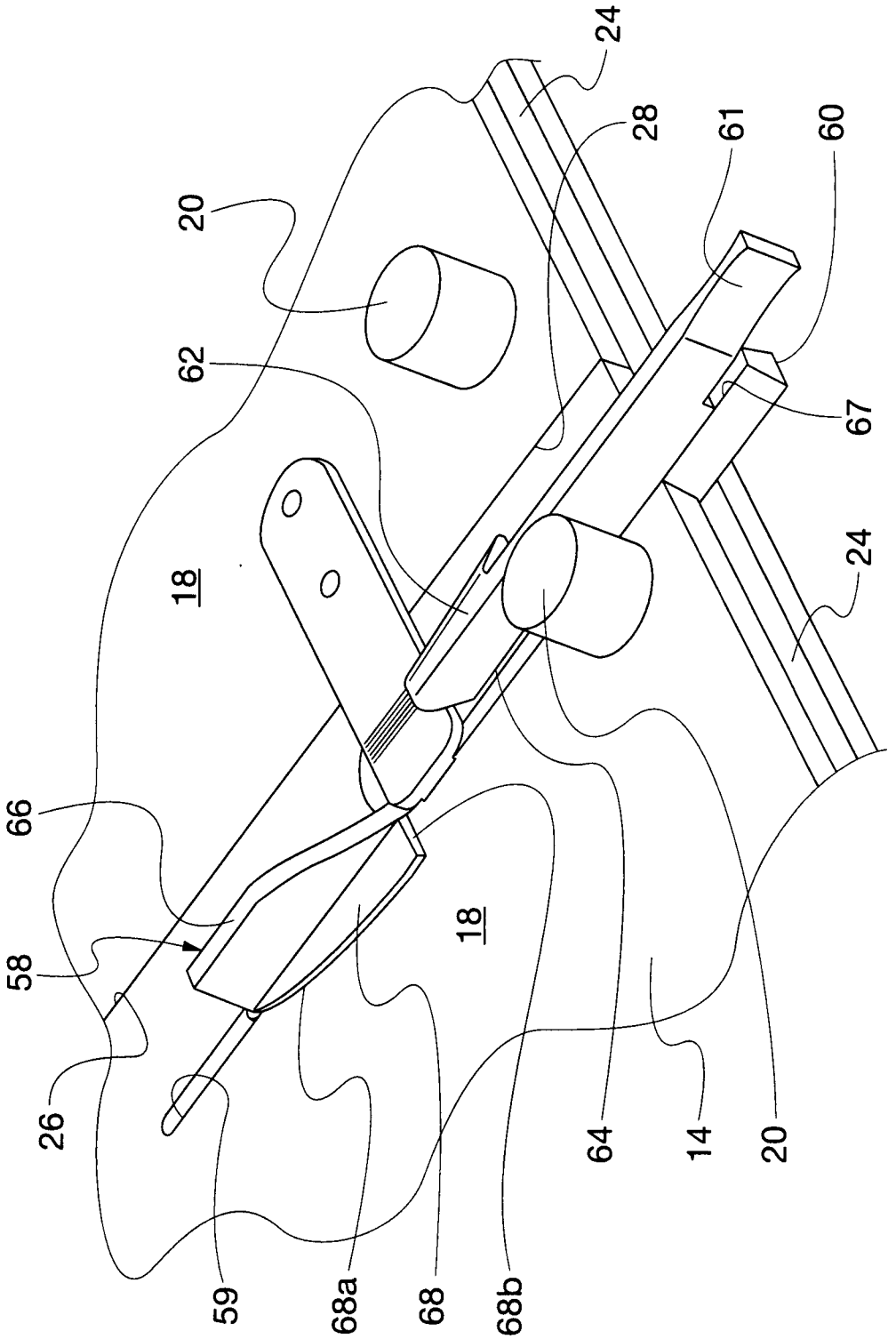


Fig. 9

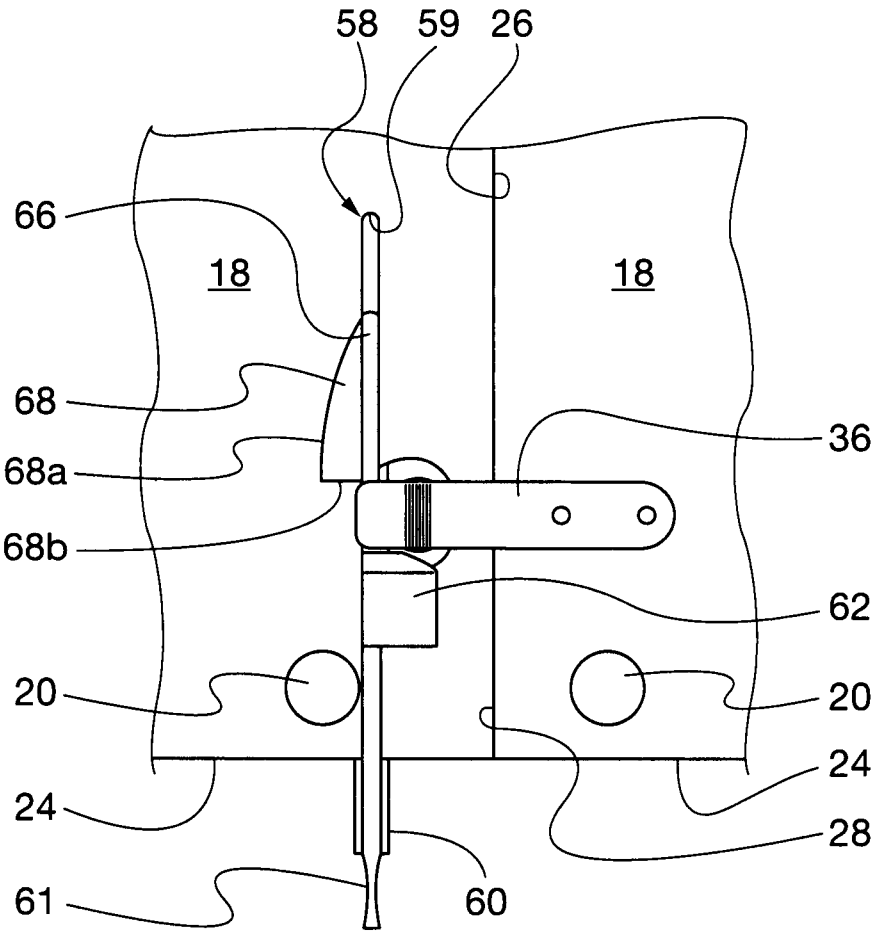


Fig. 9a

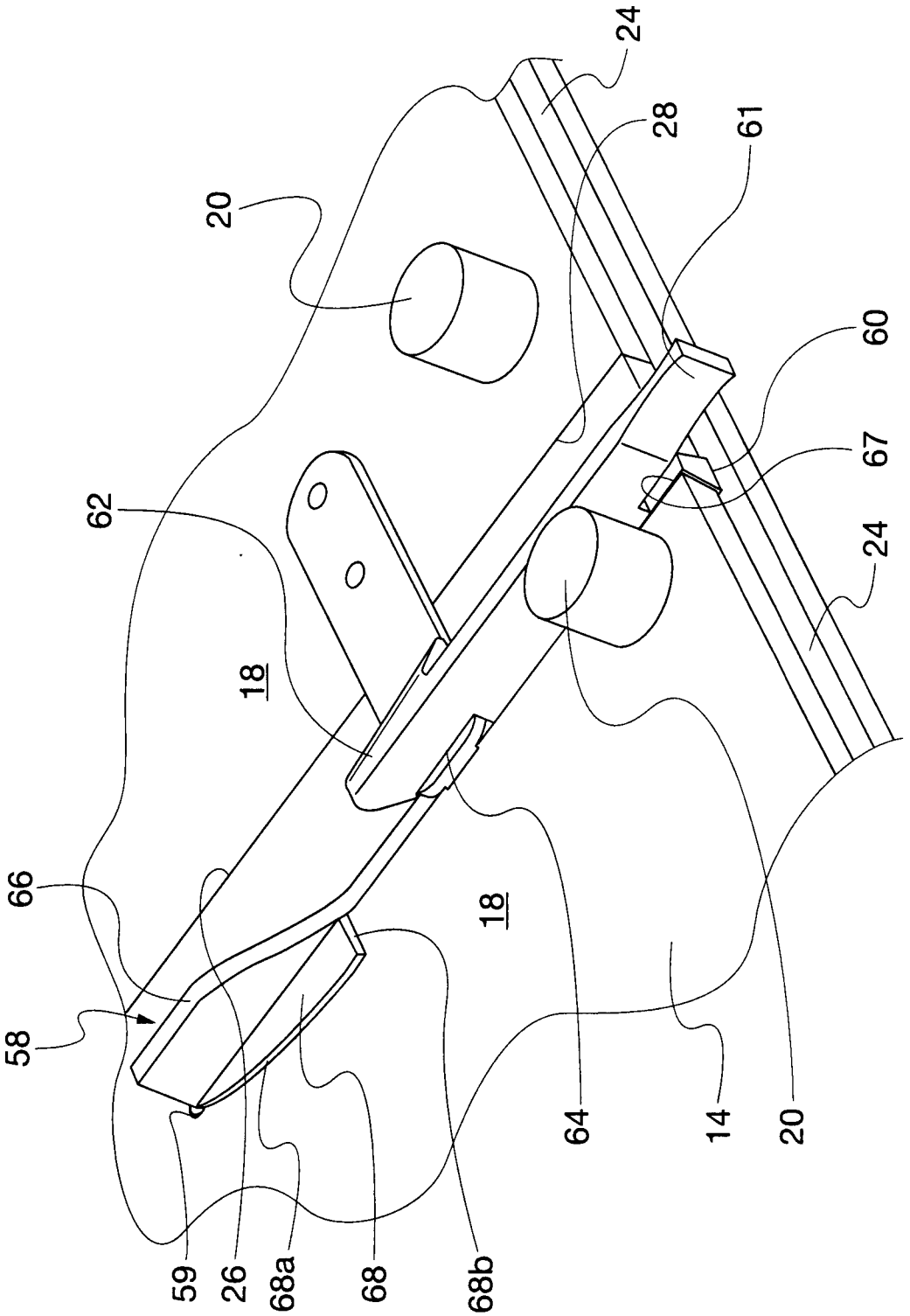


Fig. 10

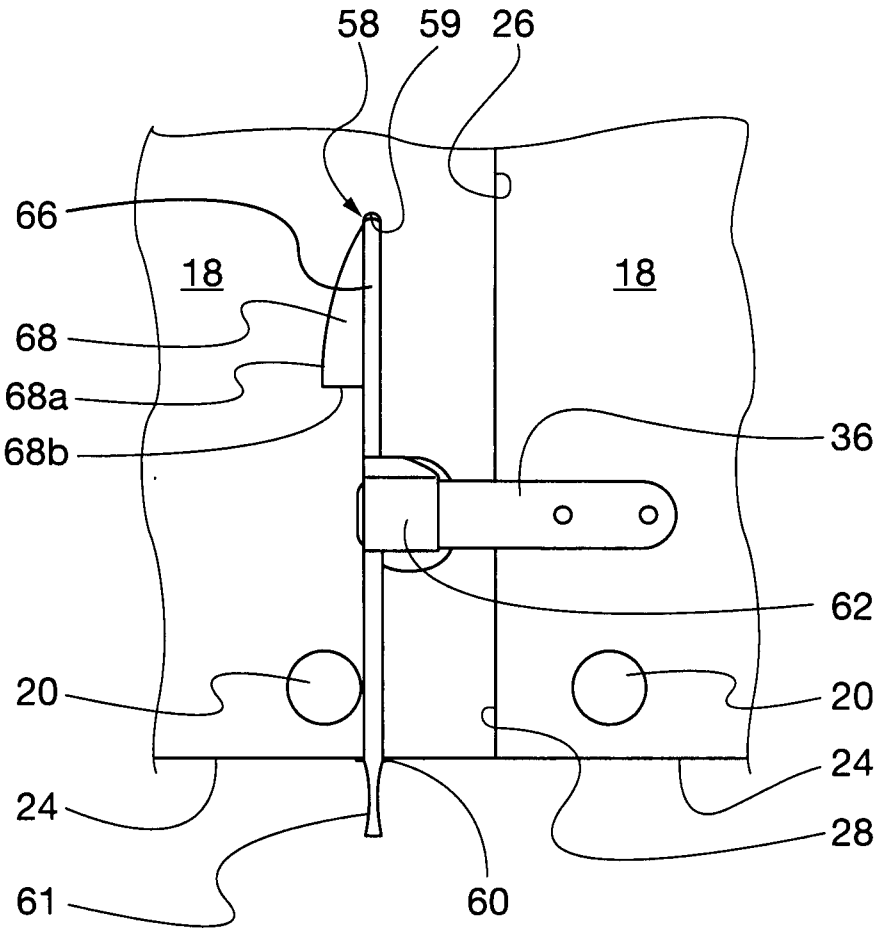


Fig. 10a

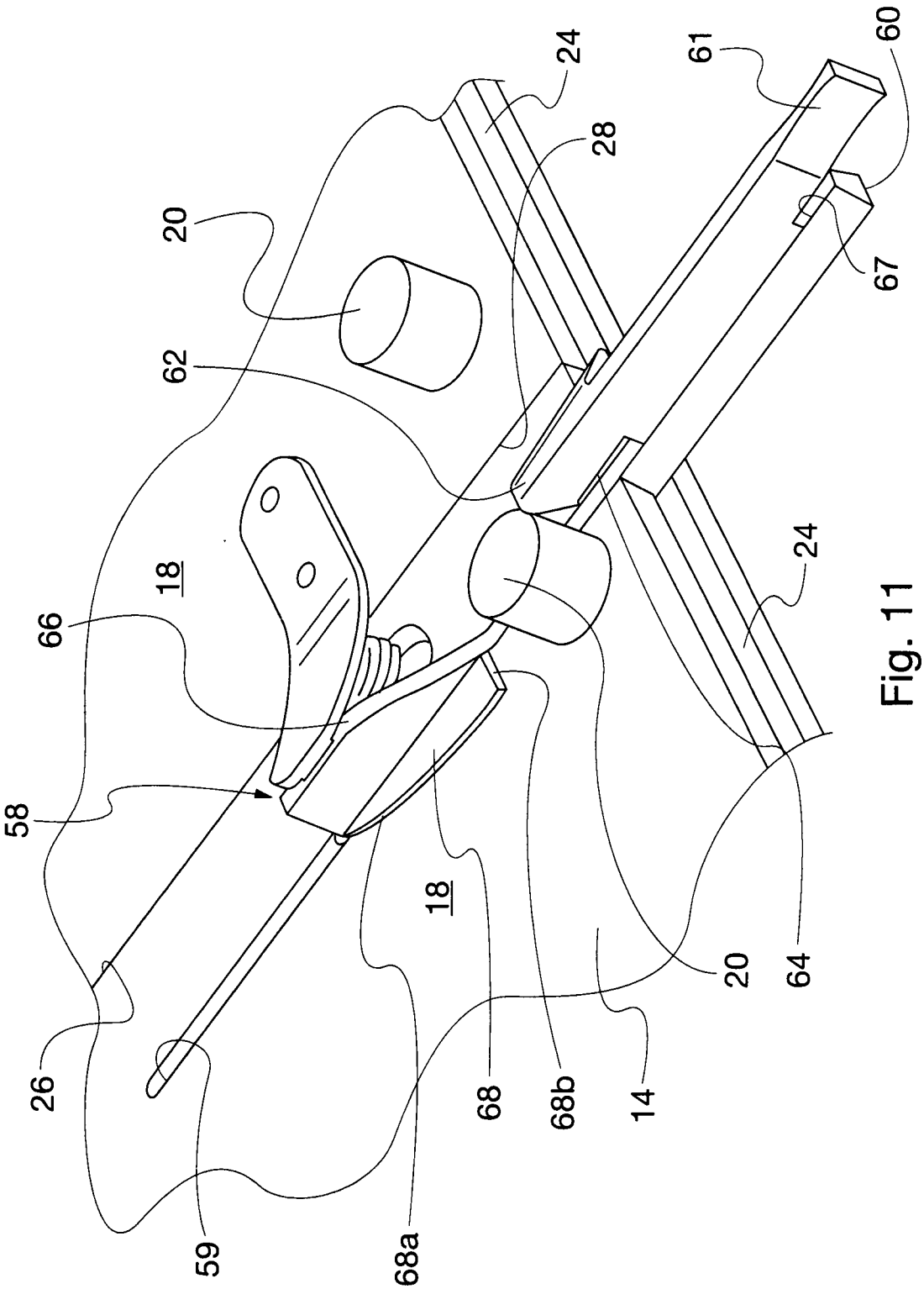


Fig. 11

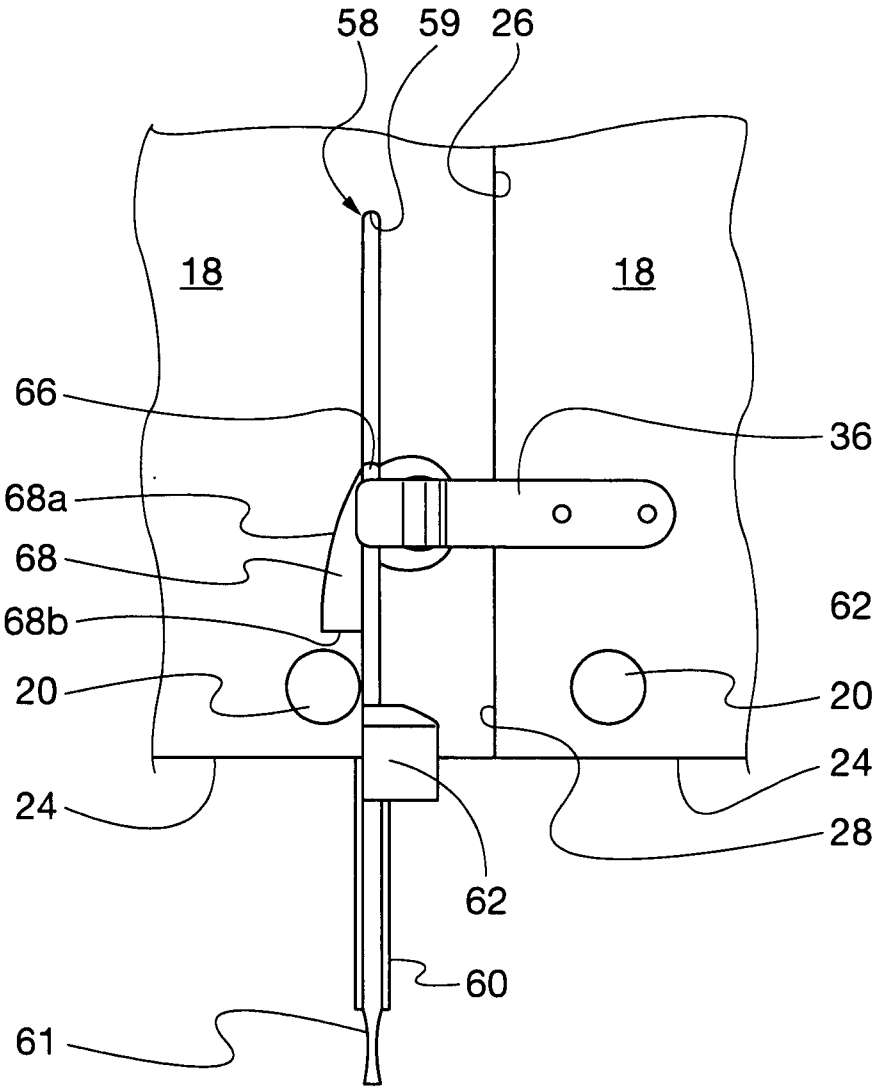


Fig. 11a

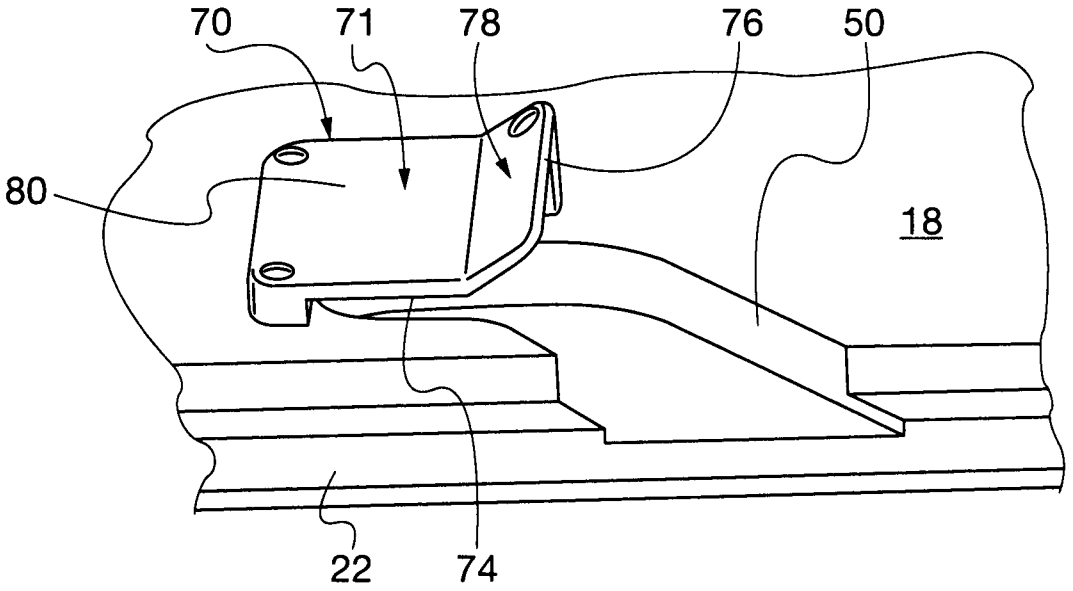


Fig. 12

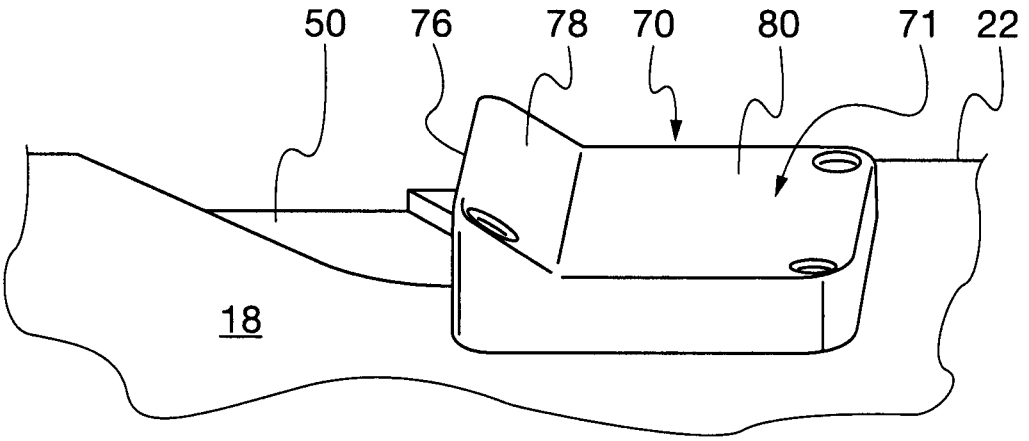


Fig. 13

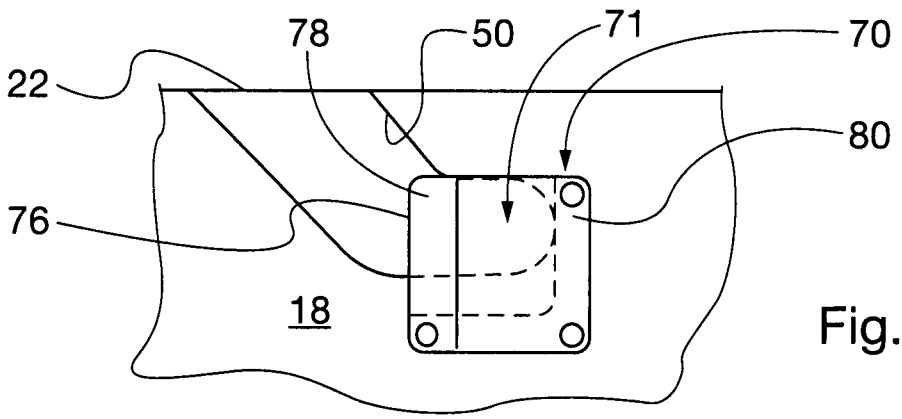


Fig. 14

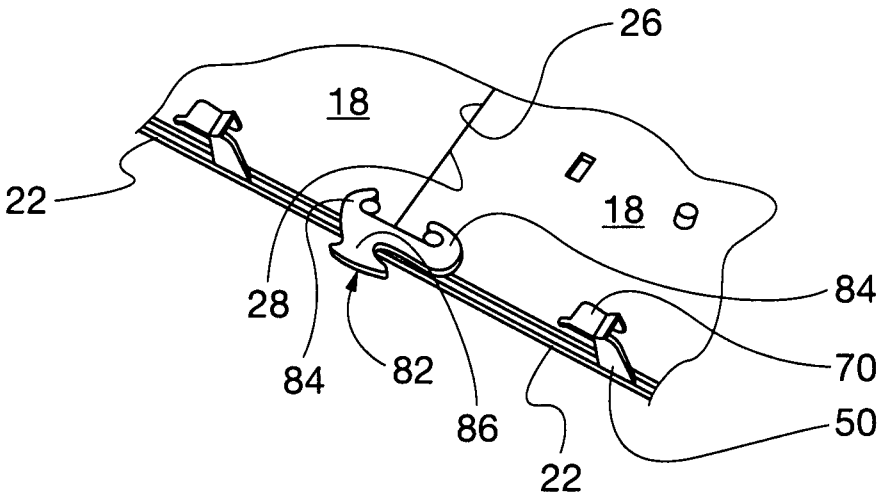


Fig. 15

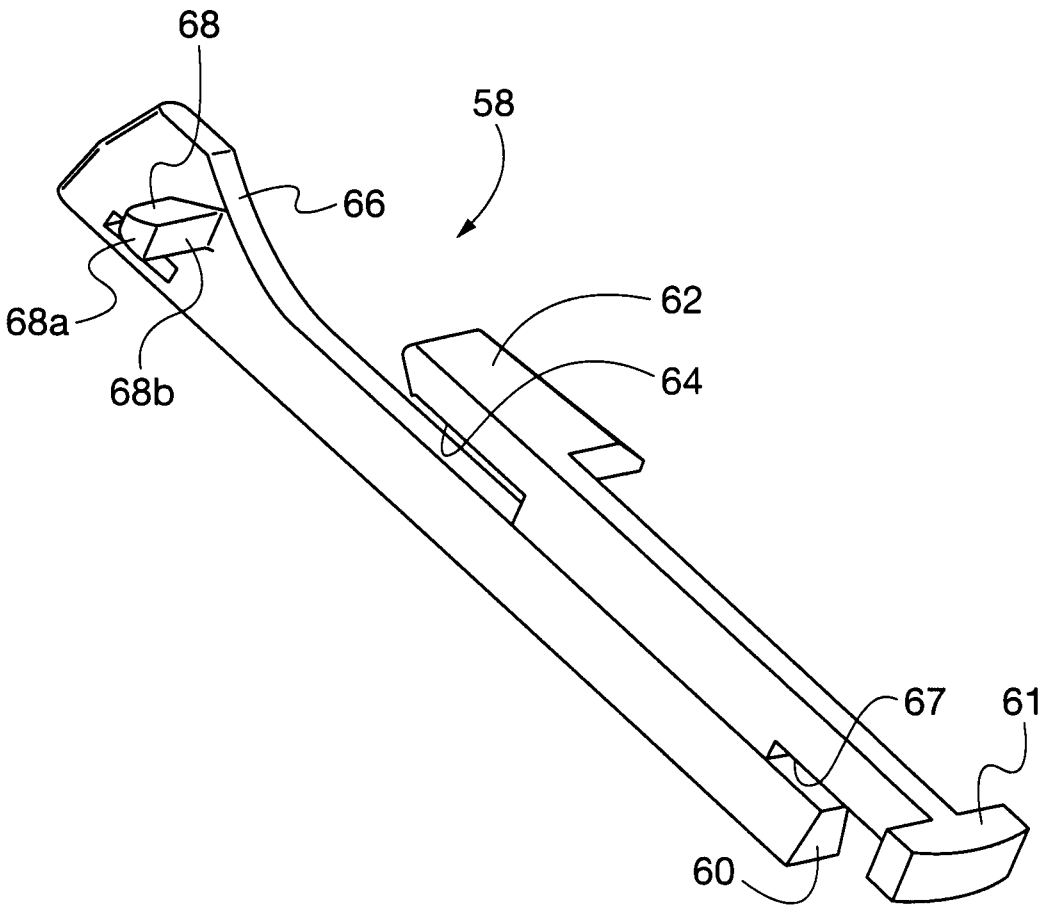


Fig. 16

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2011/000185

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04F15/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04F E01C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2009/044299 A1 (SEPA SRL [IT]; FRANCHINI GUIDO [IT]) 9 April 2009 (2009-04-09) figures 1-3	1
A	US 2009/077918 A1 (BAN KAZUO [JP] ET AL) 26 March 2009 (2009-03-26) figure 4b	1
A	US 2 834 065 A (MUELLER HERBERT B) 13 May 1958 (1958-05-13) figure 3	18
A	WO 2007/058875 A1 (SICO INC [US]; DICKEY CHRISTOPHER C [US]; SCHILLING TODD A [US]) 24 May 2007 (2007-05-24) figures 6-8	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 March 2012	27/03/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Severens, Gert

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IT2011/000185

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