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Description

Prior Art

The invention relates to a door device, in particular a clean room door device.

A door device, in particular a clean room door device, with at least one frame unit, with at least one partially translucent door leaf, and with at least one lighting unit that is at least partially integrated into the frame unit, comprises at least one lighting means, and is configured for an at least partial lighting, in particular illumination, of the door leaf has already been proposed.

DE 10 2016 101 461 A1 discloses a door device according to the preamble of Claim 1.

The object of the invention is in particular to provide a generic door device having improved properties with respect to an advantageously uniform and in particular advantageously variable lighting of the door leaf. The object is achieved according to the invention by the features of claim 1, while advantageous designs and refinements of the invention can be inferred from the dependent claims.

Advantages of the Invention

The invention is directed to a door device, in particular a clean room door device, with at least one frame unit, with at least one partially translucent door leaf, and with at least one lighting unit that is at least partially integrated in the frame unit, comprises at least one lighting means, and is configured for an at least partial lighting, in particular illumination, of the door leaf, wherein the lighting unit is configured for introducing light of the lighting means into the door leaf at least substantially parallel to a main extension plane of the door leaf.

The lighting unit is preferably configured for introducing light of the lighting means into the door leaf at least substantially parallel to a main extension plane of the door leaf. The lighting unit is preferably configured for introducing at least 20%, preferably at least 40%, and particularly preferably at least 60% of a light of the lighting means into the door leaf at least substantially parallel to a main extension plane of the door leaf.

A “clean room door device” is to be understood in this context in particular as a door device, preferably a door, for a clean room device, in particular for a clean room system. Various designs of the clean room device which appear reasonable to a person skilled in the art are conceivable, for example, as a clean room access door or a clean room airlock door. In this case, a “clean room device” is to be understood in this context in particular as a device which forms at least a part of a clean room system. This is preferably to be understood to mean in particular a device which comprises at least one room of a clean room system. However, it would also be fundamentally conceivable that the clean room device only comprises components for a room of a clean room system. A “frame unit” is to be understood in this context in particular as a unit which forms at least one frame, in particular a doorframe, of the door device. The frame unit preferably forms in particular a doorframe delimiting the door opening of the door device for the door leaf. The frame unit is preferably configured for accommodating the door leaf at least in a closed state of the door device. An “at least partially transparent door leaf” is to be understood in this context in particular as a door leaf which is light-transmissive at least in one portion. This is preferably to be understood in particular as a door leaf which transmits at least more than 10%, preferably more than 50%, and particularly preferably more than 80% of a spectral range of a visible light in at least one portion. The spectral range of the visible light preferably has a wavelength λ of approximately 350 nm to 800 nm. According to the invention, the door leaf is at least partially translucent,

i.e., in particular light-transmissive, but not transparent, i.e., in particular not transmissive to images or vision.

Furthermore, in this context a "lighting unit" is to be understood in particular as a unit which is configured for an at least partial lighting, in particular illumination, of an object, in particular of the door leaf. The lighting unit is preferably configured in particular for at least partially lighting, in particular illuminating, the object, in particular the door leaf, for a display of an item of information, in particular a status. The lighting unit is preferably configured for lighting the door leaf at least partially from the inside out. "At least substantially parallel" is to be understood in this context in particular to mean that a deviation from parallel is in particular 0°, less than 25°, preferably less than 10°, and particularly preferably less than 5°. A "main extension plane" of a structural unit is to be understood in particular as a plane which is parallel to a largest lateral surface of a smallest imaginary cuboid which still just completely encloses the structural unit, and in particular extends through the center point of the cuboid. "Configured" is to be understood in particular as specially programmed, designed, and/or equipped. An object being configured for a defined function is to be understood in particular to mean that the object fulfills and/or executes this defined function in at least one application and/or operating state.

By way of the design according to the invention of the door device, in particular an advantageous uniform and particularly advantageously variable lighting of the door leaf can be configured. Furthermore, in particular a constructively simple lighting of the door leaf can be achieved.

According to the invention, the lighting unit comprises at least one linear optics unit, which is configured for introducing light of the lighting means into the door leaf at least substantially parallel to the main extension plane of the door leaf. The linear optics unit is preferably configured for

introducing at least a substantial part of a light of the lighting means into the door leaf at least substantially parallel to a main extension plane of the door leaf. The linear optics unit is preferably configured for introducing at least 20%, preferably at least 40%, and particularly preferably at least 60% of a light of the lighting means into the door leaf at least substantially parallel to a main extension plane of the door leaf. A “linear optics unit” is to be understood in this context in particular as an optical unit, in particular a light-conducting optical unit, which is configured for light guiding and/or light conducting. This is preferably to be understood in particular as an optics unit which is configured for bundling a light incident from at least one side. The optics unit is preferably configured for linear bundling of the light, so that at least a substantial part of the incident light beams are aligned at least substantially parallel to one another. The linear optics unit can be formed in this case in particular both to be passive, for example, as a lens, or active, for example, as a mirror array. The linear optics unit is particularly preferably formed to be passive. In particular, a constructively simple light guiding can thus be achieved. In particular, an advantageously uniform lighting of the door leaf can be achieved. An advantageously high efficiency can be achieved using the optimized light guiding. The component of the coupled-in light, in particular of a light coupled into the door leaf, can be increased by means of the linear optics unit to 64%, in relation to 24% without any optics unit.

Furthermore, it is proposed that the frame unit comprises at least one frame leg having a groove, in which at least one lighting means of the lighting unit is arranged. The frame unit preferably comprises at least two, preferably at least three frame legs. Preferably, at least one of the frame legs of the frame unit is configured for a vertical arrangement. The frame leg preferably has a groove in which at least one lighting means of the lighting unit is arranged, which is configured for a vertical arrangement. The groove preferably has an at least substantially consistent cross section along a main extension

direction of the frame leg. A “vertical arrangement” is to be understood in this context in particular as an arrangement in which a main extension direction of the frame leg extends at least substantially vertically. A “main extension direction” of an object is to be understood here in particular as a direction which extends in parallel to a longest edge of a smallest geometrical cuboid, which still just completely encloses the object. “At least substantially” is to be understood in this context in particular to mean that a deviation from a predetermined value is in particular less than 25%, preferably less than 10%, and particularly preferably less than 5% of the predetermined value. An advantageous arrangement of the lighting unit, in particular at least of the lighting means of the lighting unit, can thus be achieved in particular. In particular, an advantageous positioning of the lighting means in relation to the door leaf can be achieved. Furthermore, in particular an arrangement in the movable door leaf can be avoided.

Furthermore, it is proposed that the lighting unit comprises at least one cover for covering the groove of the frame leg. The cover is preferably configured in particular to lock directly with the frame leg. The cover is preferably configured for covering and sealing the groove of the frame leg. The cover is preferably configured in particular for sealing off the lighting means in relation to an environment. “Sealing off” is to be understood in this context in particular to mean that an unintentional material transfer from one room into another is prevented or at least limited. This is preferably to be understood in particular to mean that an exchange of fluids between rooms is prevented or at least limited. The cover particularly preferably comprises at least one main body and at least one seal extruded onto the main body. The seal is preferably formed by a TPE seal. The at least one seal is preferably deformed, in particular bent, during an installation of the cover. The cover particularly preferably comprises at least two seals, which are arranged on opposing sides of the main body. An “extruded-on seal” is to be understood in this context in particular to mean that the at least one seal is

produced jointly with or after the main body in an extrusion process. This is preferably to be understood in particular to mean that the seal and the main body are produced in a joint multi-component extrusion process. A particularly advantageous cover of the lighting means can thus be achieved in particular. An advantageous cleaning capability of the door device can be provided. A GMP-conformable door device can thus preferably be provided in particular.

It is furthermore proposed that the linear optics unit of the lighting unit is realized at least partially integrally with the cover of the lighting unit. The linear optics unit of the lighting unit is preferably realized integrally with the main body of the cover of the lighting unit. “Integrally” is to be understood in particular as materially bonded, for example, by a welding process and/or adhesive process, etc., and particularly advantageously molded on, as by the production from a cast and/or by the production in a single-component or multi-component injection process. An advantageously simple installation of the door device can thus be achieved in particular. An advantageously reliable positioning of the linear optics unit, in particular above the cover, can be achieved in particular. Furthermore, a number of components can thus be kept low. The linear optics unit and a seal can advantageously be realized with the same element.

Furthermore, it is proposed that the linear optics unit and the cover are produced in a multi-component extrusion process. An integral formation can thus particularly advantageously be produced already during a production. Preferably, various properties of the linear optics unit and the cover can thus advantageously be realized.

Furthermore, it is proposed that the linear optics unit has a much higher translucency than the cover. The linear optics unit is preferably translucent and the cover is opaque. The cover is preferably configured in particular to avoid radiation of the lighting means past the door leaf. The linear optics unit is

particularly preferably arranged between the lighting means and the door leaf, at least in a closed state of the door leaf. An advantageous light conduction can thus be achieved in particular. Radiation past the door leaf can be avoided in particular. A large amount of scattering can be avoided in this way.

According to the invention, the linear optics unit has an at least substantially trapezoidal cross section, wherein the legs of the trapezoid are shaped convexly. The linear optics unit preferably at least substantially has the shape of an equilateral trapezoid in a cross section, in particular in a plane perpendicular to a main extension direction. A base side of the trapezoid preferably terminates flush with a front side of the cover. The legs of the trapezoid are preferably shaped convexly. The legs of the trapezoid are in particular shaped mirror-symmetrical in relation to one another. The linear optics unit particularly preferably has a consistent cross section along the main extension direction. In particular, a particularly advantageous shaping of the linear optics unit can thus be configured. In particular, a mechanically simple linear optics unit having an advantageously high efficiency can be provided. In particular, an advantageously simple production of the linear optics unit can thus be achieved.

It is furthermore proposed that the door leaf comprises at least one glass pane, which takes up at least a substantial portion of a main extension plane of the door leaf. The door leaf is preferably formed completely by the glass pane. The glass pane is in particular a frosted glass pane and/or a satin-finish glass pane. Due to the matting of both door surfaces of the glass pane, light of the lighting unit can in particular be coupled out in a planar manner and is thus visible from both sides. The glass pane preferably consists of glass. However, it would also be conceivable that the glass pane at least partially consists of a material different from glass, for example, acrylic glass. A particularly advantageous door leaf can thus be provided in particular. In particular, an advantageously planar door leaf which is easy to clean can be provided.

Moreover, it is proposed that the lighting unit is configured for a planar illumination of the glass pane. The lighting unit is configured in particular for illuminating the glass pane at least substantially uniformly. The glass pane is preferably lighted by means of the lighting unit from the inside out. The lighting unit is particularly preferably configured for introducing light of the lighting means into the glass pane at least substantially parallel to a main extension plane of the door leaf, wherein the light refracts in each case in an edge region of the glass pane, in particular in a satin-finish edge region of the glass pane, and is scattered outward. In particular an advantageously large-area and homogeneous lighting of the door leaf can thus be achieved. Good visibility of the lighting can be ensured.

Furthermore, it is proposed that the lighting unit comprises at least one lighting means carrier, on which the lighting means is fixedly arranged and which is held in the groove of the frame leg by a snap-in connection. The lighting means carrier preferably comprises at least one snap-in unit with at least one snap-in element for producing the snap-in connection. The groove particularly preferably comprises at least one corresponding snap-in element. A “lighting means carrier” is to be understood in this context in particular as a carrier for accommodating a lighting means. The carrier is preferably used for stabilizing and position-fixed arranging of the lighting means. The carrier is preferably formed to be substantially rigid. The carrier is particularly preferably used in particular for a heat dissipation of heat occurring at the lighting means. The carrier preferably has a high thermal conductivity in particular. The carrier consists in particular at least partially of aluminum. A “snap-in unit” is to be understood in this case in particular as a unit with at least one snap-in element,, which is elastically deflected during a fastening procedure to subsequently snap behind a corresponding snap-in element due to an internal tension force. A “snap-in element” is to be understood in this context in particular as a resilient element

for producing a snap-in connection, which is configured to be elastically deflected during an installation. An advantageously simple and rapid installation of the lighting means can thus be achieved in particular. Furthermore, an advantageously secure and accurate positioning of the lighting means can be achieved.

Furthermore, it is proposed that for a display of a defined information, the lighting unit is configured to illuminate the door leaf in a defined color. The lighting unit is preferably configured to illuminate the door leaf in various colors, wherein each color is associated with a defined information, in particular a defined status and/or a defined state. The door leaf is used in particular for visualizing the information. For this purpose, the door leaf is configured in particular to light up in a planar manner in various colors. In particular various items of information are conceivable for a display in this case. For example, a status of the door device and/or the room located behind it can be displayed. Alternatively or additionally, a specific room information, for example, a clean room zone and/or a clean room class, can be displayed. The door device can thus be used in particular for a display of items of information. Additional displays can thus be omitted in particular, whereby in particular additional devices which are possibly difficult to clean can be omitted. Moreover, an already provided surface can thus be used as a large display surface, whereby in particular a high level of visibility of an item of information can also be ensured from a distance.

It is furthermore proposed that the lighting means of the lighting unit is implemented of an RGB-LED stripe. The lighting means can preferably emit various light colors. The lighting means is particularly preferably activatable to emit an arbitrary light color.

Clean room system with at least one room and with at least one door device according to one of the preceding claims delimiting the room. It is proposed that the lighting unit is configured for outputting a status of the room delimited by the door device.

The door device can thus be used in particular for a display of a status. In particular additional displays can thus be omitted, whereby in particular additional devices which are possibly difficult to clean can be omitted. Moreover, an already provided surface can thus be used as a large display surface, whereby in particular a high level of visibility of an information can also be ensured from a distance. A registration of the status can also be ensured at a greater distance. Thus, for example, a malfunction status could also be perceived rapidly and reliably.

Drawings

Further advantages result from the following description of the drawings. An exemplary embodiment of the invention is illustrated in the drawings. The drawings, the description, and the claims contain numerous features in combination. A person skilled in the art will advantageously also consider the features individually and combine them to form reasonable further combinations.

In the figures:

Figure 1 shows a clean room system with three rooms, a first door device according to the invention, a second door device according to the invention, a third door device according to the invention, and a clean room control unit in a schematic illustration,

Figure 2 shows the first door device according to the invention and the clean room control unit in a schematic illustration,

Figure 3 shows a detail of the door device according to the invention with a frame unit, with a translucent door leaf, and with a lighting unit integrated into the frame unit in a schematic sectional illustration along section line III-III, and

Figure 4 shows a light distribution characteristic of a linear optics unit of the lighting unit of the door device.

Description of the Exemplary Embodiment

Figure 1 shows a clean room system 36 in a schematic illustration. The clean room system 36 comprises at least one room 38, 40, 42 and at least one door device 10, 10‘, 10” delimiting the room 38, 40, 42. The clean room system 36 comprises three rooms 38, 40, 42 , which are closed off in an operating state. Furthermore, the clean room system 36 comprises a first door device 10, a second door device 10‘, and a third door device 10”. The first door device 10 connects a first room 38 of the three rooms 38, 40, 42 to an environment. The second door device 10’ and the third door device 10” connect the first room 38 respectively to a second room 40 or a third room 42. The second door device 10’ connects the first room 38 to the second room 40 and the third door device 10” connects the first room 38 to the third room 42.

The first room 38 is formed by an airlock room. The first room 38 connects an environment to the further rooms 40, 42. The second room 40 and the third room 42 are each formed by clean rooms. The first room 38 is delimited by walls. Furthermore, the first room 38 comprises a clean air unit 44. The clean air unit 44 is configured for clean air flushing of an interior of the first room 38. The clean air unit 44 is partially integrated into one of the walls. Another construction of the rooms 38, 40, 42 which appears reasonable to a person skilled in the art would also be fundamentally conceivable, however.

The door devices 10, 10', 10” are each formed by a solid glass door. The door devices 10, 10', 10” are each formed by a frameless solid glass door. The door devices 10, 10', 10” are realized identically. A description of the first door device 10 can accordingly also be applied in particular to the further door devices 10‘, 10”.

The door device 10 is formed by a clean room door device. The door device 10 comprises a frame unit 12. The frame unit 12 forms a frame of the door device 10. The frame unit 12 comprises

at least one frame leg 24, 46, 48. The frame unit 12 comprises three frame legs 24, 46, 48. The frame unit 12 comprises two vertical frame lengths 24, 46 and one horizontal frame leg 48 connecting the vertical frame legs 24, 46. The frame legs 24, 46, 48 are each formed by extruded profiles. However, another design of the frame legs 24, 46, 48 which appears reasonable to a person skilled in the art would also be fundamentally conceivable. Furthermore, the door device 10 comprises an at least partially translucent door leaf 14. The door leaf 14 is realized to be completely translucent. The door leaf 14 comprises a glass pane 32, which takes up at least a substantial portion of the main extension plane 20 of the door leaf 14. The door leaf 14 is completely formed by the glass pane 32. However, it would also be conceivable that the door leaf 14 moreover comprises a frame, in which the glass pane 32 is at least partially framed. The glass pane 32 is embodied as satin-finished. The glass pane 32 is nontransparent (Figure 2).

Furthermore, the first door device 10 comprises at least two hinges 50, 52. The first door device 10 comprises two hinges 50, 52. The first door device 10 comprises an upper hinge 50 and a lower hinge 52. The hinges 50, 52 are arranged with the first end on an edge region of the door leaf 14 and are fixedly adhesively bonded and/or screwed thereon. However, another connection method appearing reasonable to a person skilled in the art between the hinges 50, 52 and the door leaf 14 would also be fundamentally conceivable. At a second end, which is pivotable in relation to the first end, the hinges 50, 52 are connected to the frame unit 12. The upper hinge 50 is connected to the door leaf 14 in an upper region of the door leaf 14 and the lower hinge 52 is connected to the door leaf 14 in a lower region of the door leaf 14. The hinges 50, 52 are connected to the door leaf 14 on the same side of the door leaf 14. Furthermore, the first door device 10 comprises a door opener 54. The door opener 54 is integrated into the upper hinge 50. The door opener 54 comprises a motor (not shown further), which is arranged in an axis of rotation of the upper hinge 50 (Figure 2).

Furthermore, the first door device 10 comprises a handle unit 56. The handle unit 56 comprises an outer main body 58, an inner main body (not shown), an outer door handle 60, and an inner door handle (not shown). The main bodies 58 are connected fixedly and rigidly positioned to the door leaf 14 of the door device 10. The outer main body 58 has a screw connection through the door leaf 14 to the inner main body in a manner which is not further visible. However, another fixed connection which appears reasonable to a person skilled in the art between the main bodies 58 and the door leaf 14 would also be fundamentally conceivable. The outer main body 58 presses directly against the frame unit 12 in a closed state of the door device 10. The door handles 60 of the handle unit 56 are fixedly connected to the respective main bodies 58. The door handles 60 are each formed by a handle. The door handles 60 are each formed by a bow handle (Figure 2).

The door device 10 furthermore comprises a seal unit 78 for sealing off the door leaf 14 in a closed state in the frame unit 12. The seal unit 78 is formed by a sealing lip arranged on the frame unit 12. The seal unit 78 comprises a fastening region, which is configured to engage in a groove of the frame unit 12 for fastening of the seal unit 78. Furthermore, the seal unit 78 comprises a seal region, which is configured to press against the door leaf 14 in a closed state of the door device 10. The seal region is configured to be pressed against the door leaf 14 in a closed state of the door device 10 for sealing off perpendicularly to the main extension plane of the door leaf 14. The seal region of the seal unit 78 protrudes out of the frame unit 12 perpendicularly to the main extension plane of the door leaf 14. The seal unit 78 is arranged on a frame extension of the frame unit 12, which is used as a stop for the door leaf 14.

Furthermore, the door device 10 comprises a lighting unit 16 at least partially integrated into the frame unit 12. The lighting unit 16 is completely integrated into the frame unit 12. The lighting unit 16 is configured for an at least partial lighting and illumination of the door leaf 14. The lighting unit 16 is

configured for a complete lighting of the door leaf 14 in dependence on an operating state. The lighting unit 16 is configured for a planar lighting of the glass pane 32. Furthermore, the lighting unit 16 comprises a lighting means 18. The lighting means 18 of the lighting unit 16 is formed of an RGB-LED stripe. However, another realization of the lighting means 18 which appears reasonable to a person skilled in the art would also be fundamentally conceivable. A frame leg 24 of the frame unit 12 comprises a groove 26, in which the lighting means 18 of the lighting unit 16 is arranged. The first vertical frame leg 24 of the frame unit 12 comprises a groove 26, in which the lighting means 18 of the lighting unit 16 is arranged. A main extension direction of the lighting means 18 extends parallel to a main extension direction 62 of the frame leg 24. The lighting means 18 extends along the main extension direction 62 substantially over an entire extension of the frame leg 24. The lighting unit 16 is configured for introducing light of the lighting means 18 into the door leaf 14 parallel to the main extension plane 20 of the door leaf 14. The lighting unit 16 comprises for this purpose a linear optics unit 22, which is configured for introducing light of the lighting means 18 into the door leaf 14 parallel to the main extension plane 20 of the door leaf 14. The linear optics unit 22 is arranged in a beam path of the lighting means 18. The linear optics unit 22 is formed oblong. A main extension direction of the linear optics unit 22 extends parallel to a main extension direction of the lighting means 18. The linear optics unit 22 extends along the main extension direction of the lighting means 18 over an entire extension of the lighting means 18. The linear optics unit 22 is consistently spaced apart from the lighting means 18 over the entire extension (Figure 3).

The linear optics unit 22 has a substantially trapezoidal cross section, wherein the legs 30, 30’ of the trapezoid are shaped convexly. The linear optics unit 22 has a cross section in a plane perpendicular to the main extension direction of the linear optics unit 22, which substantially has the shape of an equilateral trapezoid. A base side of the trapezoid terminates

flush in this case on a front side. Furthermore, the legs of the trapezoid are shaped convexly. The legs of the trapezoid are moreover shaped mirror-symmetrically in relation to one another. The linear optics unit 22 has a consistent cross section along the main extension direction.

Figure 4 shows a light distribution of the linear optics unit 22. The linear optics unit 22 generates a light distribution 82 in a cross-sectional plane perpendicular to the main extension plane 20 of the door leaf 14 in the case of an exit having a very narrow characteristic. The very narrow light distribution permits a deep penetration into the glass pane 32 of the door leaf 14 and thus prevents a rapid light drop. Furthermore, the linear optics unit 22 generates a broad light distribution 84 in a plane parallel to the main extension plane 20 of the door leaf 14. Due to the broad light distribution 84, the light of the individual LEDs of the lighting means 18 is overlaid and mixed, whereby a cone effect can be kept low.

Furthermore, the lighting unit 16 comprises a lighting means carrier 34, on which the lighting means 18 is fixedly arranged. The lighting means 18 is adhesively bonded on the lighting means carrier 34. However, another connection method appearing reasonable to a person skilled in the art would also be fundamentally conceivable. The lighting means carrier 34 extends along the main extension direction of the lighting means 18 over an entire extension of the lighting means 18. The lighting means carrier 34 is held in the groove 26 of the frame leg 24 by a snap-in connection. The lighting means carrier 34 comprises a snap-in unit with two snap-in elements 74, 76 for producing the snap-in connection. The snap-in elements 74, 76 are configured for locking with corresponding snap-in elements of the groove 26. The snap-in elements 74, 76 are arranged on two opposing outer sides of the lighting means carrier 34 extending parallel to the main extension direction 62 of the frame leg 24. A first snap-in element 74 is formed by a snap-in lug arranged directly on an outer edge of the lighting means carrier 34. The second snap-in element 76 is formed by a cylindrical sealing lip. The

second snap-in element 76 consists of an elastomer and is embodied separately from a main body of the lighting means carrier 34. The second snap-in element 76 is accommodated in a recess of the main body of the lighting means carrier 34. During an installation of the lighting means carrier 34, the second snap-in element 76 is inserted into the groove 26 in a first step. Subsequently, the lighting means carrier 34 is pivoted into the groove 26 via the second snap-in element 76 as an axis of rotation, until the first snap-in element 74 locks in the groove 26. The lighting means carrier 34 is furthermore used for a heat dissipation of heat occurring on the lighting means 18. The lighting means carrier 34 has a high thermal conductivity for this purpose. The lighting means carrier 34 substantially consists of aluminum. The lighting means carrier 34 consists of aluminum, except for the second snap-in element 76. The frame unit 12 preferably also consists of aluminum.

The lighting unit 16 furthermore comprises a cover 28 for covering the groove 26 of the frame leg 24. The cover 28 of the lighting unit 16 seals off the lighting means 18 from an environment in an installed state. Furthermore, the cover 28 is directly locked with the frame leg 24 in an installed state. The cover 28 comprises for this purpose a snap-in web 64, 66 on each of two opposing outer sides extending parallel to the main extension direction 62 of the frame leg 24. The cover 28 comprises a main body 68. The snap-in webs 64, 66 are arranged on opposing outer sides of the main body 68. The snap-in webs 64, 66 extend parallel to the main extension direction 62 of the frame leg 24 over an entire extension of the groove 26. The snap-in webs 64, 66 extend, viewed in a plane of section perpendicular to the main extension direction 62 of the frame leg 24, substantially perpendicular to a main extension plane of the main body 68. The snap-in webs 64, 66 protrude out of the main body 68 substantially perpendicular to a main extension direction of the main body 68. Furthermore, the snap-in webs 64, 66 comprise a snap-in lug on the free ends thereof respectively on sides facing away from one another, which are configured to lock with the frame leg 24. The snap-in lugs lock in snap-in

recesses of the groove 26 of the frame leg 24 in an installed state of the cover 28. The cover 28 is arranged in the groove 26 of the frame leg 24 in an installed state. The cover 28 extends parallel to a main extension direction 62 of the frame leg 24 over an entire extension of the frame leg 24. The main body 68 and the snap-in webs 64, 66 of the cover 28 are produced jointly in an extrusion process. However, another production process which appears reasonable to a person skilled in the art would also be fundamentally conceivable.

Furthermore, the cover 28 comprises at least one seal 70, 72. The cover 28 comprises two seals 70, 72 extruded onto the main body 68. The seals 70, 72 are each formed by a TPE seal. However, another design of the seals 70, 72 which appears reasonable to a person skilled in the art would also be fundamentally conceivable. The seals 70, 72 are arranged on opposing outer edges of the main body 68. The seals 70, 72 are each arranged on opposing outer edges of the main body 68 in a groove of the main body 68. The seals 70, 72 extend parallel to the main extension direction 62 of the frame leg 24 over an entire extension of the cover 28. Furthermore, the seals 70, 72 each extend out of the main body 68 parallel to the main extension direction of the main body 68. The seals 70, 72 have a cross section which substantially consists of two squares each overlapping at one corner in a plane of section perpendicular to the main extension direction 62 of the frame leg 24. One of the squares is arranged here in the groove of the main body 68, while the other protrudes out of the main body 68. The seals 70, 72 have a consistent cross section along the main extension direction of the main body 68. The seals 70, 72 are deformed, in particular bent, during an installation of the cover 28. The seals 70, 72 are pressed away downward during an installation and press against the lower edges of the groove 26 of the frame leg 24 in this case. The square of the respective seal 70, 72 protruding out of the main body 68 is pivoted here by approximately 45° in each case, so that a base side of the square terminates level with the lower side of the main body 68 of the cover 28. A substantially planar, surface-flush, and well-sealed

connection can be achieved in this way between the cover 28 and the frame leg 24.

The linear optics unit 22 of the lighting unit 16 is realized partially integrally with the cover 28 of the lighting unit 16. The linear optics unit 22 of the lighting unit 16 is realized integrally with the main body 68 of the cover 28 of the lighting unit 16. The linear optics unit 22 and the cover 28 are produced in a multi-component extrusion process. The linear optics unit 22 and the cover 28 are jointly produced in a multi-component extrusion process. On a side of the linear optics unit 22 facing away from the lighting means 18, a wedge-shaped groove extends along each of the two transition edges between the linear optics unit 22 and the cover 28. The wedge-shaped grooves extend parallel to a main extension direction of the cover 28. Furthermore, the linear optics unit 22 extends on a side facing toward the lighting means 18 up to shortly before the lighting means 18. The lighting means 18 and the linear optics unit 22 are contactless. However, it would also be conceivable that the linear optics unit 22 presses directly against the lighting means 18.

The linear optics unit 22 has a much higher translucency than the cover 28. The linear optics unit 22 is translucent while the cover 28 is opaque. The cover 28 is configured to avoid radiation of the lighting means 18 past the door leaf 14. The linear optics unit 22 is arranged for this purpose completely in a beam path between the lighting means 18 and the door leaf 14 in a closed state, while the cover 28 adjoins the linear optics unit 22 on both sides.

For a display of a defined information, the lighting unit 16 is configured to illuminate the door leaf 14 in a defined color. The lighting unit 16 is configured to output a status of the room 38, 40, 42 delimited by one of the door devices 10, 10', 10”. The lighting means 18 is activatable for this purpose to emit an arbitrary light color. Furthermore, the clean room system 36 comprises a clean room electronics unit 80 for this

purpose. The clean room electronics unit 80 is configured for monitoring the clean room system 36, in particular the rooms 38, 40, 42 of the clean room system 36. Furthermore, the clean room electronics unit 80 is configured for activating the lighting unit 16. The clean room electronics unit 80 is configured for activating the lighting unit 16 to display a defined information. For example, the door leaf 14 can thus be activated in white, green, or red by means of the clean room electronics unit 80. If the door leaf 14 lights up green, this means, for example, that an entry to the corresponding door devices 10, 10', 10” is possible. If the door leaf 14 lights up red, this means, for example, that an adjoining room 38, 40, 42 of the corresponding door devices 10, 10', 10” is occupied. If the door leaf 14 flashes green, i.e., alternates between green and white, this means, for example, that an entry to the corresponding devices 10, 10', 10” is fundamentally possible, but is occupied due to a recovery time. The clean room electronics unit 80 monitors for this purpose a status of the rooms 38, 40, 42 of the clean room system 36 and outputs it via the door devices 10, 10', 10”. The clean room electronics unit 80 is furthermore coupled to the clean air unit 44.

Patentkrav

1. Døranordning, især renrumsdøranordning, med i det mindste en karmenhed (12), med i det mindste en i det mindste delvist translucent dørfløj (14) og med i det mindste en i det mindste delvist i karmenheden (12) integreret belysningsenhed (16), der har i det mindste en lyskilde (18) og er indrettet til en i det mindste delvis belysning, især fuldstændig oplysning, af dørfløjen (14), hvor belysningsenheden (16) er indrettet til at lede lys fra lyskilden (18) i det mindste i det væsentlige parallelt med et hovedudstrækningsplan (20) for dørfløjen (14) ind i dørfløjen (14), hvor
belysningsenheden (16) har i det mindste en lineær optik (22) der er indrettet til at lede lys fra lyskilden (18) i det mindste i det væsentlige parallelt med dørfløjens (14) hovedudstrækningsplan (20) ind i dørfløjen (14), kendetegnet ved, at
den lineære optik (22) har et i det væsentlige trapezformet tværsnit, hvor trapezens ben (30, 30') er formet konvekst.

2. Døranordning ifølge krav 1, kendetegnet ved, at
karmenheden (12) har i det mindste et rammeben (24), der omfatter en not (26), i hvilken der er anbragt i det mindste en lyskilde (18) for belysningsenheden (16).

3. Døranordning ifølge krav 2, kendetegnet ved, at
belysningsenheden (16) har i det mindste en afdækning (28) til en afdækning af rammebenets (24) not (26).

4. Døranordning ifølge krav 3, kendetegnet ved, at
belysningsenhedens (16) lineære optik (22) er udformet i det mindste delvist i ét stykke med belysningsenhedens (16) afdækning (28).

5. Døranordning ifølge krav 4, kendetegnet ved, at
den lineære optik (22) og afdækningen (28) er fremstillet i en flerkomponent-ekstrusionsfremgangsmåde.

6. Døranordning ifølge krav 5, kendetegnet ved, at den lineære optik (22) i forhold til afdækningen (28) har en væsentlig højere translucens.

7. Døranordning ifølge et af de foregående krav, kendetegnet ved, at dørfløjen (14) omfatter i det mindste en glasskive (32), som indtager i det mindste en væsentlig del af dørfløjens (14) hovedudstrækningsplan (20).

8. Døranordning ifølge krav 7, kendetegnet ved, at belysningsenheden (16) er indrettet til en fladeformet belysning af glasskiven (32).

9. Døranordning i det mindste ifølge krav 2, kendetegnet ved, at belysningsenheden (16) har i det mindste en lyskildebærer (34), på hvilken lyskilden (18) er fast anbragt, og som via en indgrebsanordning er holdt i rammebenets (24) not (26).

10. Døranordning ifølge et af de foregående krav, kendetegnet ved, at belysningsenheden (16) med henblik på en visning af en defineret information er indrettet til at belyse dørfløjen (14) i en defineret farve.

11. Døranordning ifølge et af de foregående krav, kendetegnet ved, at belysningsenhedens (16) lyskilde (18) er dannet af en RGB-LED-stribe.

12. Renrumssystem med i det mindste et rum (38, 40, 42) og med i det mindste en døranordning (10, 10', 10") ifølge et af de foregående krav, der begrænser rummet (38, 40, 42).

13. Renrumssystem ifølge krav 12, kendetegnet ved, at belysningsenheden (16) er indrettet til en udlæsning af en status for det rum (38, 40, 42), der er begrænset af

døranordningen (10, 10', 10").

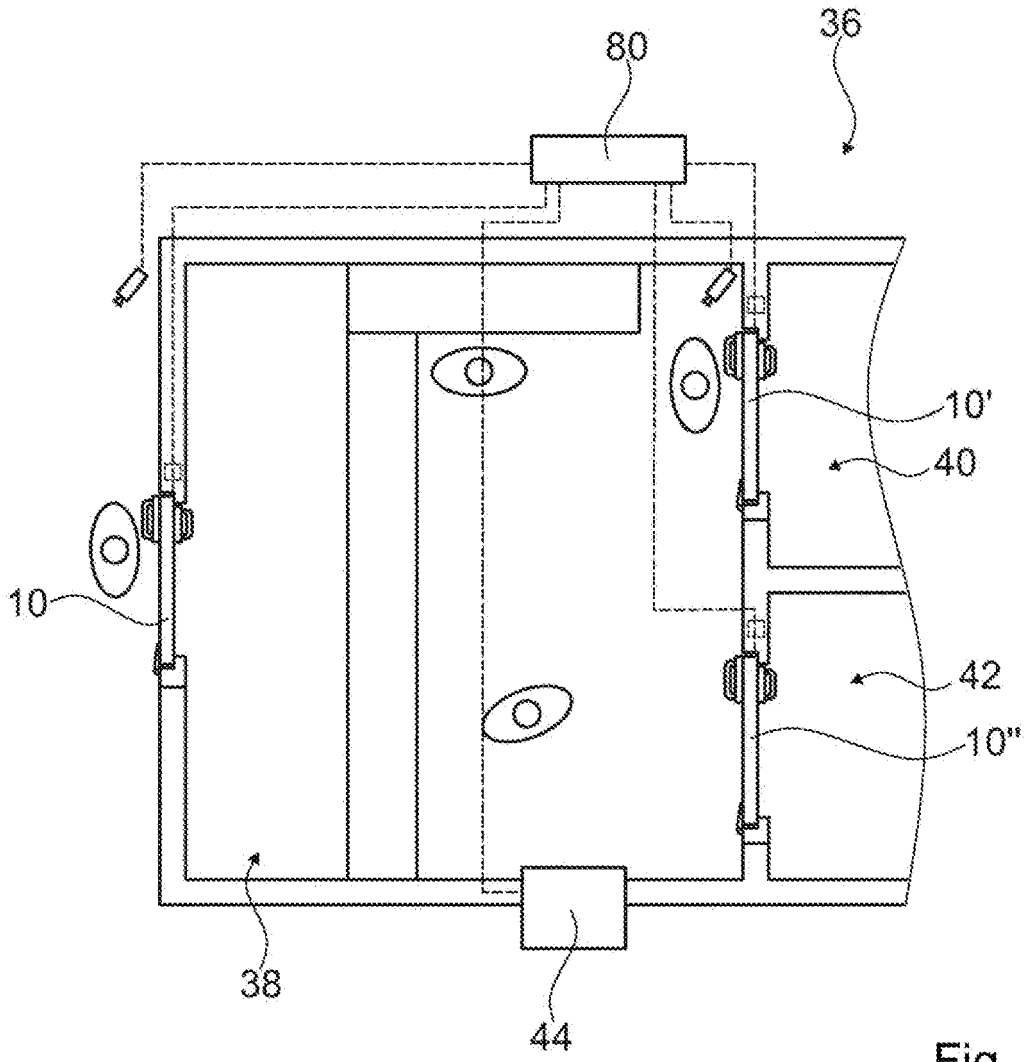


Fig. 1

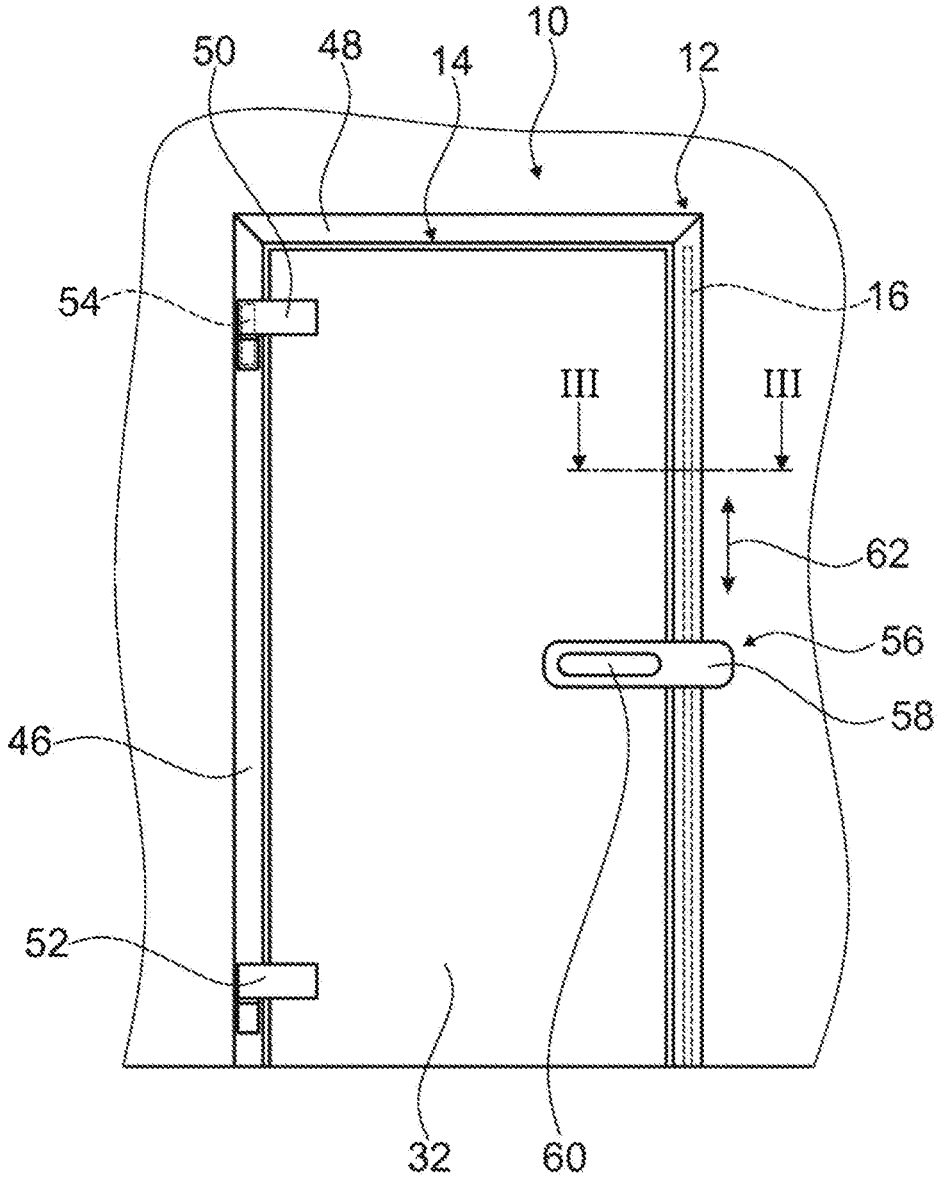


Fig. 2

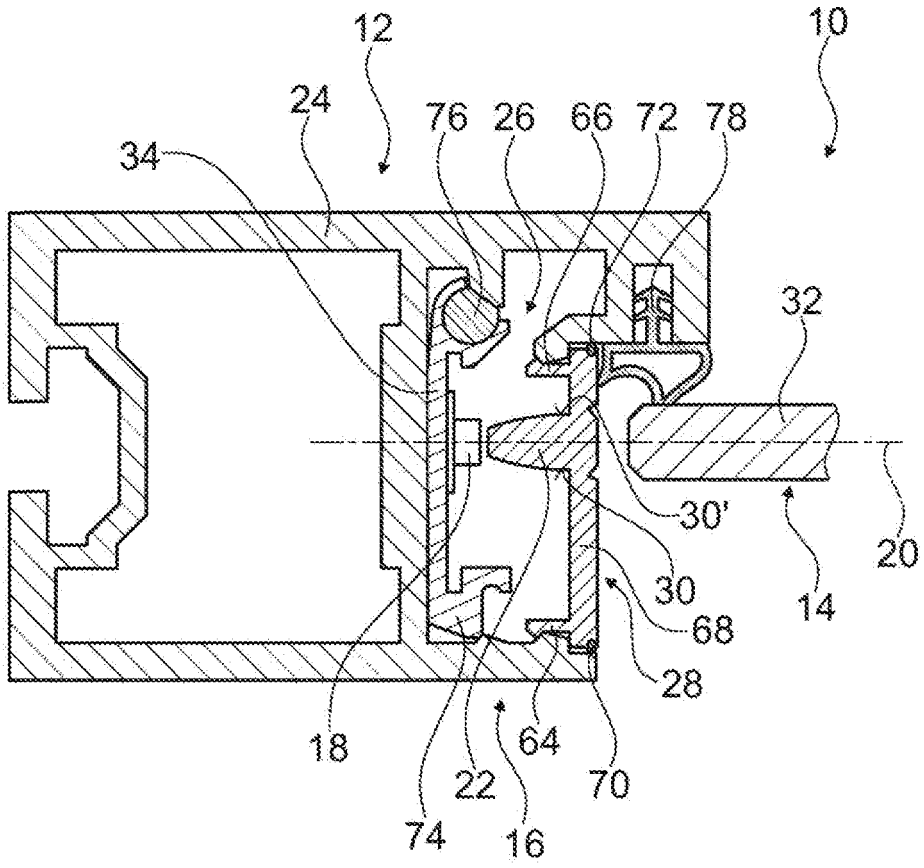

12
10
24
76
26
66
72
78
34
32
30'
20
30
14
68
28
18
64
22
70
74
16

Fig. 3

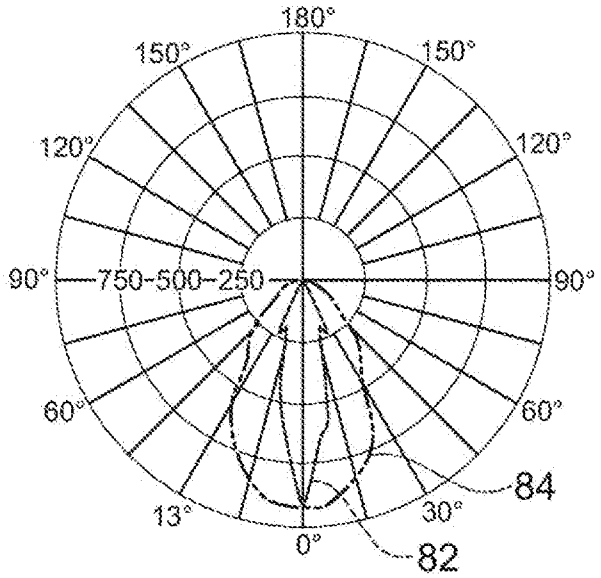

180°
150°
150°
120°
120°
90°
750-500-250
90°
60°
60°
84
13°
30°
0°
82

Fig. 4