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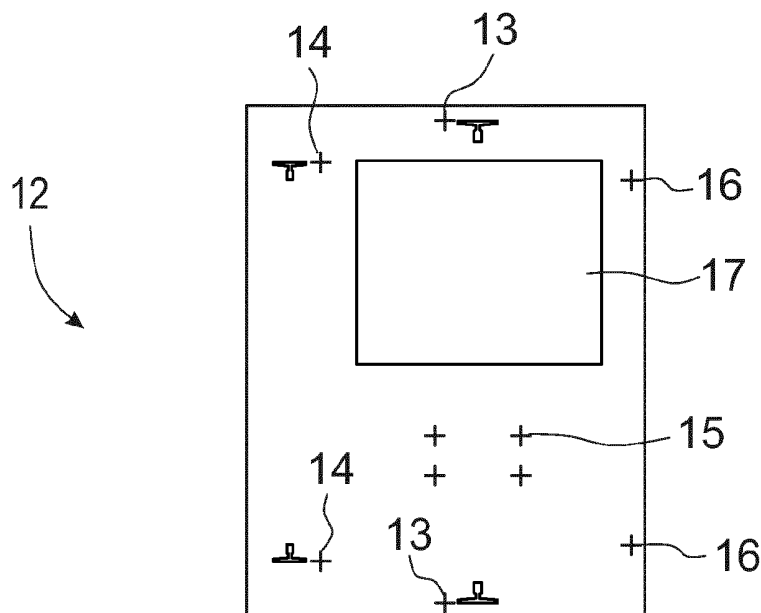
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(54) **Arrangement in an elevator hoistway**

(57) The object of the invention is an arrangement in an elevator hoistway (2), in which elevator hoistway (2) is at least an elevator car (1) disposed movably on guide rails (4), and which arrangement comprises a template (12) that is to be disposed on the base of the elevator hoistway (2) in connection with installation of the elevator

and that is provided with markings (13-17) of the placement locations of components of the elevator. The template (12) with its markings (13-17) is arranged to form at its point a wear surface of the floor of the elevator hoistway (2) of the installed elevator.



**Fig. 3**

## Description

**[0001]** The object of the invention is an arrangement, as defined in the preamble of claim 1, in an elevator hoistway.

**[0002]** Before the installation of an elevator into a building, it must be measured whether the elevator hoistway made for the elevator is such in terms of its dimensions that the elevator with all its parts will fit in the correct attitude into the hoistway. At the same time the placement of the various components of the elevator in relation to the base of the hoistway must be determined, so that the components are disposed in their correct locations with respect to the cross-sectional layout of the hoistway. These types of procedures can also be performed in connection with the modernization of an elevator, when a new elevator is installed into an existing hoistway.

**[0003]** According to prior art the placement of components in an elevator hoistway is performed on site by measuring and plumbing the placement location of each construction element and area separately and by fixing a construction element, such as guide rails, a possible machine below, diverting pulleys, *et cetera*, into its thus measured and determined placement location. In addition, the marking of the required safety space is done by painting on the floor of the elevator hoistway a place that is the size and shape of the safety space. One drawback in solutions according to prior art is that when made manually they are slow and susceptible to human error. For example, the safety space can unwittingly be painted in wholly or partially the wrong location, or to be too large, in which case the marking does not guarantee a correct and reliable safe space at the bottom of the elevator hoistway. Likewise, errors of differing magnitude can arise in the measuring and determining of the placement location of other components.

**[0004]** The object of this invention is to eliminate the aforementioned drawbacks and to achieve a simple and inexpensive arrangement in an elevator hoistway, which arrangement for its part enables rapid, dimensionally accurate and safe installation of the elevator. The arrangement according to the invention is characterized by what is disclosed in the characterization part of claim 1. Other embodiments of the invention are characterized by what is disclosed in the other claims.

**[0005]** Some inventive embodiments are also discussed in the descriptive section of the present application. The inventive content of the application can also be defined differently than in the claims presented below. The inventive content may also consist of several separate inventions, especially if the invention is considered in the light of expressions or implicit sub-tasks or from the point of view of advantages or categories of advantages achieved. In this case, some of the attributes contained in the claims below may be superfluous from the point of view of separate inventive concepts. Likewise the different details presented in connection with each embodiment can also be applied in other embodiments.

In addition it can be stated that at least some of the subordinate claims can in at least some situations be deemed to be inventive in their own right.

**[0006]** One advantage of the solution according to the invention is that by means of it determining the precise positions of the components of an elevator without measuring errors in relation to the layout of the base of the elevator hoistway and in relation to the cross-section of the whole elevator is easy and quick. Thus the solution according to the invention speeds up and increases the efficiency of the installation of an elevator, and the positions of components do not need to be measured afterwards or the position of the safety space does not need to be separately painted on the base of the hoistway. The arrangement according to the invention functions extremely well, particularly in elevators having a standard hoistway and standard elevator car, because in these it is known certainly how the components of the elevator are situated in the elevator car, on the walls of the hoistway and on the floor of the hoistway.

**[0007]** The basic concept of the invention is to dispose on the base of the elevator hoistway a template, on the basis of the markings of which the placement of certain components of the elevator, preferably the positioning of the whole elevator in the elevator hoistway, is performed and to use the template also for forming the wear surface of the floor of the elevator hoistway. A template has markings for guiding the relative placement of components. In addition, disposing the template itself in the elevator hoistway sets an instruction for the placement of the elevator in relation to the elevator hoistway. Preferably a template covers the whole floor of the elevator hoistway or covers at least almost the whole floor. A template to be disposed on the base of the hoistway can be formed as a single piece or can be composed of two or more pieces to be joined to each other. A template to be disposed on the base of the hoistway can also be made to some extent larger in its area than the floor of the hoistway and when placing the template on the base of the hoistway the edges of the template are folded upwards. The template, and at the same time the wear surface, can also be formed in another way. A preferred other way for forming is a paper or corresponding stencil, in which the location markings and other markings are apertures of the stencil and by the aid of which the alignment markings and other markings to be made can be painted on an otherwise completed floor surface.

**[0008]** The invention can also be understood as a finished wear surface that is installable on the floor of the elevator hoistway, which wear surface is simultaneously a template for indicating the placement locations of components of the elevator. This type of finished wear surface can be a plate of the mat type, which is delivered into the elevator hoistway rolled into a roll and is then unrolled onto the floor of the elevator hoistway and fixed to the elevator hoistway.

**[0009]** When applying the invention a preferred method is to mark on the template the position of the safety

space, i.e. the so-called safety cube. Instead of, or in addition to, this an area can be marked which is safe when the elevator car arrives at its lowest position or in which otherwise extreme caution must be exercised. Instructions and warnings can also be marked on a template.

**[0010]** In the following, the invention will be described in greater detail by the aid of some examples of its embodiment with reference to the attached drawings, wherein

- Fig. 1 presents a diagrammatic and simplified side view of the top part and bottom part of an elevator hoistway of one type of elevator,
- Fig. 2 presents a top view of an elevator hoistway e.g. according to Fig. 1 and some of the elevator components disposed in the hoistway,
- Fig. 3 presents a top view of one template according to the invention, said template being disposed on the base of the hoistway and indicating the placement locations of components,
- Fig. 4 presents a top view of a second template according to the invention, said template being disposed on the base of the hoistway and indicating the placement locations of components,
- Fig. 5 presents a side view of the template according to Fig. 4 when folded,
- Fig. 6 presents a top view of a third template according to the invention, said template being disposed on the base of the hoistway and indicating the placement locations of components, and
- Fig. 7 presents a top view of yet another template according to the invention, said template being disposed on the base of the hoistway and indicating the placement locations of components.

**[0011]** Figs. 1 and 2 present a diagrammatic and simplified view of one type of elevator. In Fig. 1 the elevator is presented as viewed from the side and in Fig. 2 from above. In addition, Fig. 1 presents only the top part and bottom part of the elevator hoistway 2 and the elevator hoistway 2 is truncated at its center part.

**[0012]** An elevator car 1 moving in an essentially vertical direction on guide rails 4 is disposed in the elevator hoistway 2, which elevator car is supported on suspension ropes 3a, and which is moved with an elevator machine 7, which is disposed on the base of the elevator hoistway 2 and is provided with a traction sheave 8, by the aid of a traction member 3b, such as a belt, a toothed belt or traction ropes. The first end of the suspension ropes 3a is fixed to the top part of the elevator car 1, from where the suspension ropes 3a are led over one or more diverting pulleys 9, 10 that are in the top part of the elevator hoistway 2 and to turn downwards to a counterweight 5 moving along guide rails 6, to the top end of which counterweight the second ends of the suspension ropes 3a are fixed. Further, the second end of the traction member 3b moving the elevator car 1 is fixed to the bot-

tom end of the counterweight 5 and the traction member 3b is led to travel from the counterweight 5 downwards to pass below one or more diverting pulleys 11 that are in the bottom part of the elevator hoistway 2 to a traction sheave 8, from where the traction member 3b is led onwards to the bottom part of the elevator car 1, to which the first end of the traction member 3b is fixed.

**[0013]** Fig. 1 also presents the bottommost and topmost floor level of the elevator, at the point of which floor levels the doors 1a of the floor levels are situated in the elevator hoistway 2. In addition, disposed on the base of the elevator hoistway 2 on top of the floor of the elevator hoistway 2 is a template belonging to the solution according to the invention, which template is a base plate or underlay plate, for which the designation base template can also be used. Here the floor refers to the structural floor of the elevator hoistway 2, e.g. a floor cast from concrete. After installation of the elevator the template 12 is left on the floor of the elevator hoistway 2 to form at its point a wear surface that is on top of the floor of the elevator hoistway 2 in the finished elevator, which wear surface functions as a protective layer protecting the floor, and as a display surface, on which is marked *inter alia* the safe space, preferably a working space, which is also called a safety space, under the elevator car 1 in the elevator hoistway 2. The aforementioned wear surface is the visible surface, upon which a person stands and works at the bottom of the elevator hoistway 2. When the marking of the safety space is very visible on this surface, it helps e.g. a servicing employee to seek safety quickly in an emergency situation.

**[0014]** The suspension solution of the elevator can also be different to what is described above. The suspension and moving of the elevator car 1 can also be performed with one and the same suspension ropes, instead of separate suspension ropes 3a and a traction member 3b, and the suspension ratio can be e.g. 1:1, 1:2, or some other ratio. Likewise, the elevator machine 7 can be disposed elsewhere than on the base of the elevator hoistway 2, e.g. in the top part of the elevator hoistway 2, on the side of the elevator hoistway, or in a separate machine room.

**[0015]** Fig. 3 presents a top view of one template 12 according to the invention, said template being disposed on the base of the elevator hoistway 2 on the floor of the elevator hoistway 2 and indicating the placement locations of components of the elevator. The template 12 is essentially the shape and size of the cross-section of the elevator hoistway 1 in such a way that the template 12 can easily be disposed on the floor of the elevator hoistway 1. At least some of the positions of the most important elevator components are pre-marked onto the top surface of the template 12, and also if so desired various elements such as the base plates to be disposed under the guide rails 4, 5 are integrated into said top surface, e.g. according to the elevator drawing. In the template 12 according to the embodiment, the plumbing points 13 of the guide rails 4 of the elevator car 1, and correspond-

ingly the plumbing points 14 of the guide rails 6 of the counterweight 5, are marked on the top surface. In addition, the location of the plumbing points or fixing points 15 of the elevator machine 7 to be disposed on the base of the elevator hoistway 2, and the plumbing points 16 of the landing doors 1a, are pre-marked on the top surface of the template 12.

**[0016]** In addition to the preceding markings, on the top surface of the template 12 are further marked at least the safe space of the area below the elevator car 1, said area being determined according to elevator regulations and according to the specific elevator to be installed in the elevator hoistway 2 in question, i.e. a place 17 that is the natural size of the safety space in terms of its cross-section. The place 17 of the safety space is aligned more particularly according to the mechanics of the elevator, which is determined from the placement of the components and from the known basic construction of the elevator. The markings can also be profile drawings of the cross-section of the guide rails 4 and 5 in their actual placement locations, such as is marked e.g. in Fig. 3.

**[0017]** The template 12 according to Fig. 3 is a thin plate-shaped piece, e.g. a wooden, plastic or metal plate, which when disposed in its position on the floor of the elevator hoistway 2 forms a wear surface and facing surface protecting the floor of the elevator hoistway 2, as has been stated above. On the top surface of a template 12 there can also be some pattern preventing slipping for enabling safe working.

**[0018]** Figures 4 and 5 present a second template 12 according to the invention, said template being disposed on the floor of the elevator hoistway 2 and indicating the placement locations of components of the elevator. The template 12 in Fig. 4 is presented as viewed from above and when spread open, and in Fig. 5 the template 12 is presented as viewed from the side and when folded closed. A folded template 12 is easier to handle and transport and likewise it is easier to dispose on the floor of the elevator hoistway 2. On the top surface of the template 12 according to Figs. 4 and 5 are essentially the same markings as in the template 12 according to Fig. 3, though the markings can also be of a different type. One difference to the template 12 according to Fig. 3 is, *inter alia*, that the template 12 is now composed of two parts, a first part 12a and a second part 12b, which are e.g. essentially as large and of the same shape as each other and are connected at one of their edges to each other with one or more hinges 18, around which the template 12 can be folded closed and spread open. Instead of hinges 18, there can be one or more folds in the template 12, by the aid of which fold(s) the template 12 can be folded closed and unfolded open. The template 12 can be composed of two parts 12a, 12b that are detachable from each other, which are disposed on the floor of the elevator hoistway 2 with their edges against each other.

**[0019]** Fig. 6 presents a template 12, which is composed of three parts hinged to each other with hinges 18, and which is corresponding to the aforementioned tem-

plates 12. This type of template solution is convenient in elevator hoistways 2 that are large in their cross-section. Instead of hinges 18, in this solution also there can be folds enabling folding up. In the template according to Fig. 6 the markings of the top surface are essentially the same as in the templates mentioned earlier, but now in addition e.g. metal base plates 19 are integrated into the top surface of the template 12 at the points of the placement locations of the guide rails 5 of the elevator car 1. The purpose of the base plates 19 is to level out the point load exerted by the guide rails 5 against the floor of the elevator hoistway 2.

In addition, there are roundings or bevels 20 on the corners of the template 12 for making the placing of the template into position easier.

**[0020]** Fig. 7 presents a mat-type template 12 that can be rolled into a roll, which is easy to handle and transport and which is also suited to large elevator hoistways 2. On the top surface of the template 12 are essentially corresponding markings and components as in the templates 12 mentioned earlier.

**[0021]** The template 12 can also be a trough type, in which case possible oil leaks or liquid leaks can be managed more easily and trash that has dropped onto the base of the hoistway 2 can be easily removed in one go. In addition, the template 12 can also be smaller in size than the cross-section of the elevator hoistway 2. In this case the template 12 is plumbed into its correct position in relation to the components of the elevator car 1 and fixed rigidly into place on the floor of the elevator hoistway 2, after which the components of the elevator can be installed according to the markings of the template. The template 12 can also be provided with a drainage aperture, which can be connected to a sewer for removing possible floodwater from the elevator hoistway 2.

**[0022]** It is obvious to the person skilled in the art that different embodiments of the invention are not only limited to the examples described above, but that they may be varied within the scope of the claims presented below. Thus, for example, the markings of a template may differ from those presented above. There can be more or fewer of them than what is presented above and they can be aligned for different components.

**[0023]** It is further obvious to the person skilled in the art that depending on the size of the template, the template can have more separate parts, or parts connected to each other e.g. with a hinge or with folds, than what is presented above. There can be e.g. 4, 5, 6 or even more of these types of parts, and they can be different models and different sizes to each other.

## Claims

1. Arrangement in an elevator hoistway (2), in which elevator hoistway (2) is at least an elevator car (1) disposed movably on guide rails (4), and which arrangement comprises a template (12) that is to be

- disposed on the floor of the elevator hoistway (2) in connection with installation of the elevator and that is provided with markings (13-17) of the placement locations of components of the elevator, **characterized in that** the template (12) with its markings (13-17) is arranged to form at its point a wear surface of the floor of the elevator hoistway (2) of the installed elevator.
2. Arrangement according to claim 1, **characterized in that** the template (12) with its markings (13-17) is the shape and size of essentially the whole base of the elevator hoistway and it comprises an essentially continuous protective layer on top of the floor of the elevator hoistway (2).
  3. Arrangement according to claim 1, **characterized in that** the template (12) with its markings (13-17) is arranged to cover a part of the floor of the elevator hoistway (2) and it comprises at its point an essentially continuous protective layer on top of the floor of the elevator hoistway (2).
  4. Arrangement according to claim 1, 2 or 3, **characterized in that** on the top surface of the template (12) is the marking (17) of the safety space below the elevator car (1), said marking being pre-marked for the specific elevator, and according to the configuration of the elevator and according to elevator regulations, and of a cross-sectionally natural size.
  5. Arrangement according to any of the preceding claims, **characterized in that** the template (12) is a single-piece, thin, plate-shaped piece, which is arranged to be fixed into its position on the floor of the elevator hoistway (2).
  6. Arrangement according to any of the preceding claims 1-4, **characterized in that** the template (12) is a piece composed of more than one plate-shaped part, the parts of which piece are configured to be disposed beside each other on the base of the elevator hoistway and are arranged to be fixed into their position on the floor of the elevator hoistway (2).
  7. Arrangement according to claim 6, **characterized in that** the different parts of the template (12) are connected to each other by means of one or more hinges (18), or by means of one or more folds, in such a way that the template (12) can be folded closed and can be spread open onto the floor of the elevator hoistway (2).
  8. Arrangement according to any of the preceding claims 1-4, **characterized in that** the template (12) is of a flexible material and is arranged to be rollable into a roll and unrollable from the roll onto the floor of the elevator hoistway (2).
  9. Arrangement according to any of the preceding claims, **characterized in that** metal base plates (19) are integrated into the top surface of the template (12) at least at the point of the placement locations of the guide rails (4) of the elevator car (1).
  10. Arrangement according to any of the preceding claims, **characterized in that** there are roundings or bevels (20) on the corners of the template (12) for making the placing of the template (12) into position easier.
  11. Wear surface (12) to be installed on the floor of the elevator hoistway (2), which is simultaneously a template (12), on which are markings (13-17) indicating the placement locations of components of the elevator.
  12. Wear surface (12) according to claim 11, **characterized in that** the wear surface (12) is the shape and size of essentially the whole base of the elevator hoistway and it forms a continuous protective layer on top of the floor of the elevator hoistway (2).
  13. Wear surface (12) according to claim 11 or 12, **characterized in that** on the top surface of the template (12) is the marking (17) of the safety space below the elevator car (1), said marking being pre-marked for the specific elevator, and according to the configuration of the elevator and according to elevator regulations, and of a cross-sectionally natural size.
  14. Wear surface (12) according to claim 11, 12 or 13, **characterized in that** the template (12) is a thin plate-shaped piece, which is arranged to be fixed into its position on the floor of the elevator hoistway (2).
  15. Wear surface (12) according to claim 11, 12, 13 or 14, **characterized in that** the template (12) is of a bendable material, and can preferably be rolled into a roll and can be unrolled from the roll onto the floor of the elevator hoistway (2), and even more preferably the template is of a flexible material.

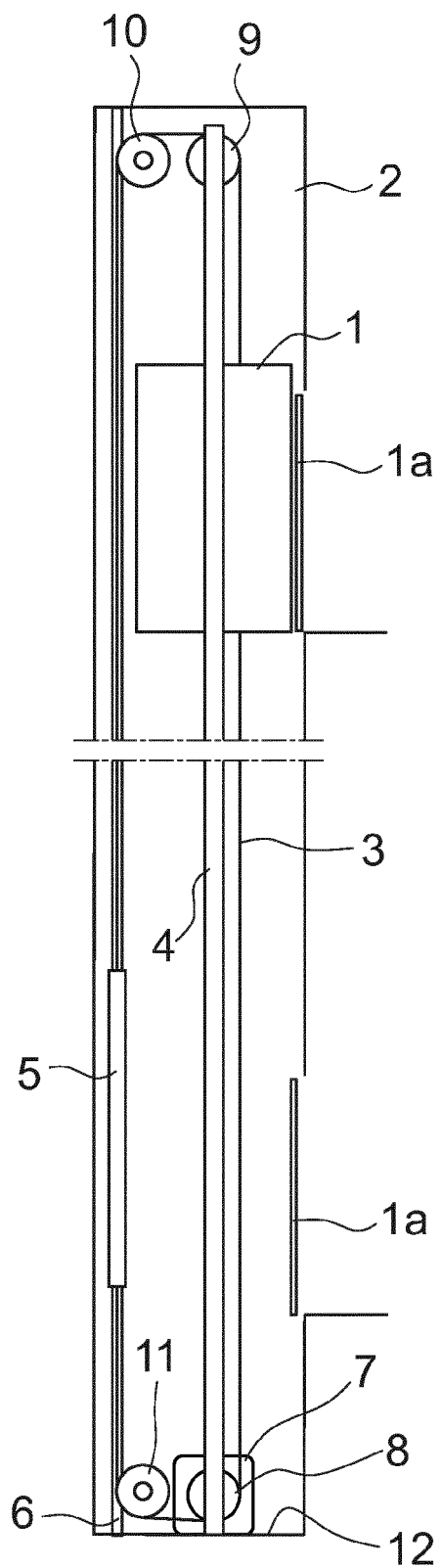


Fig. 1

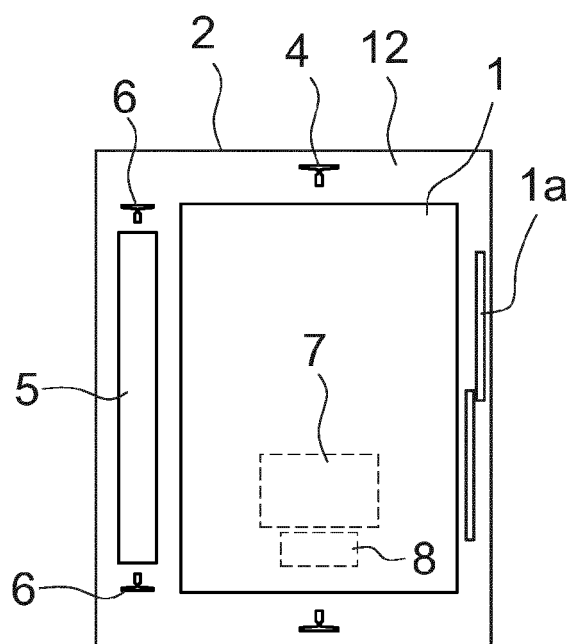


Fig. 2

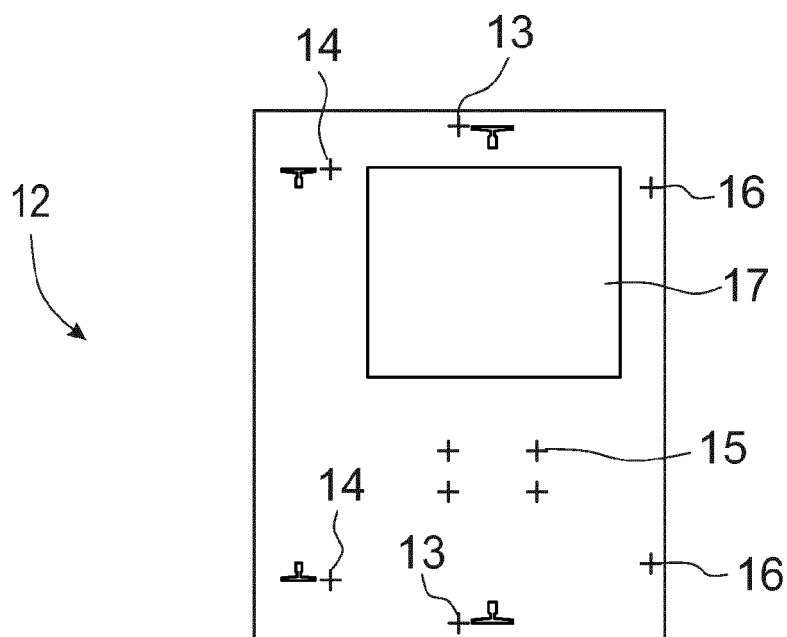


Fig. 3

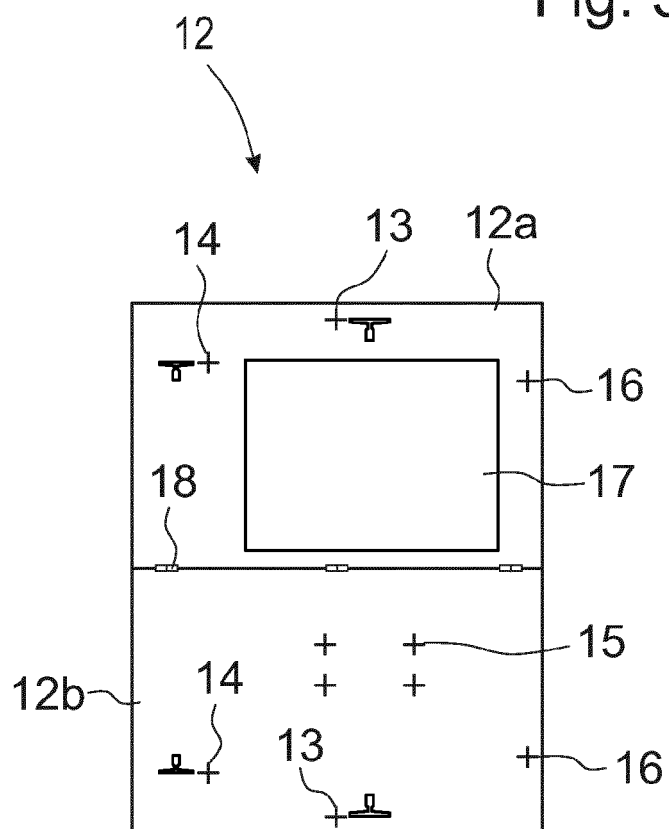


Fig. 4

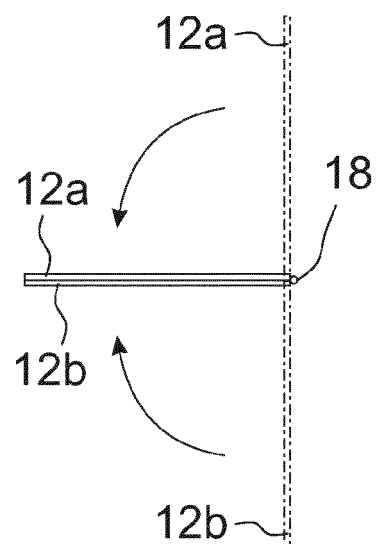


Fig. 5

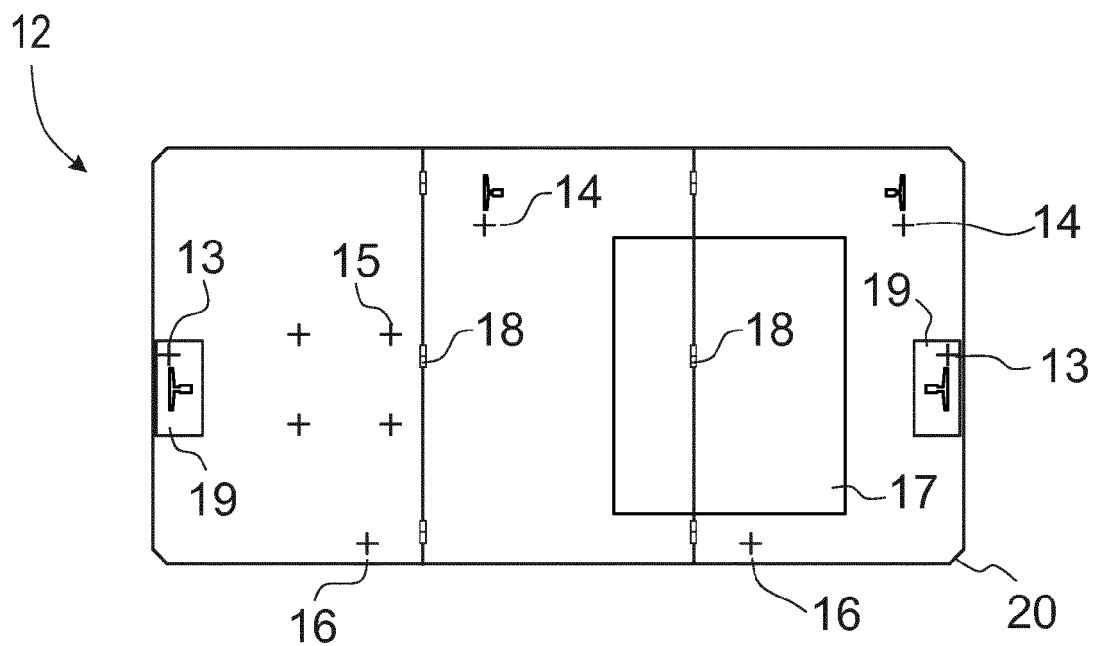


Fig. 6

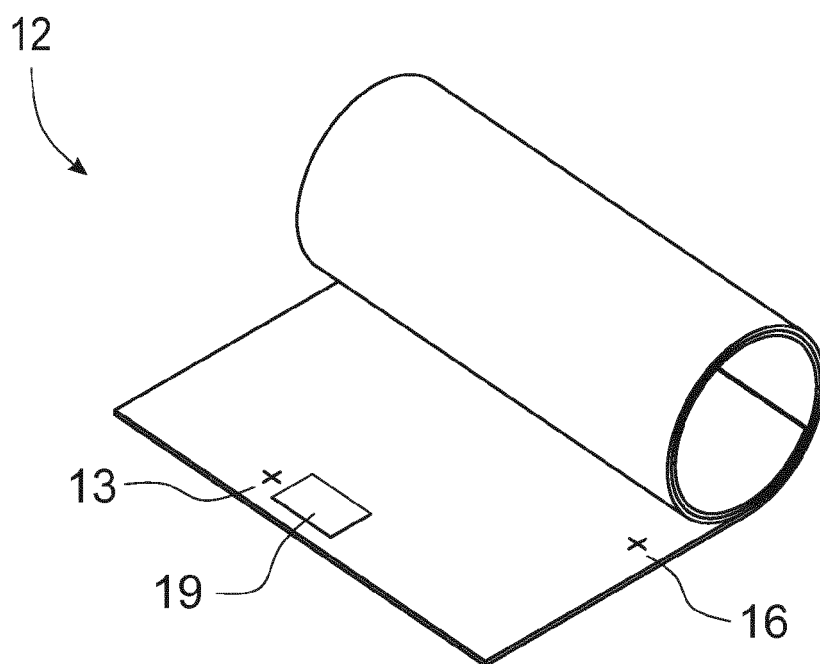


Fig. 7