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(54) Provisional railing

(57) Provisional railing for installation in any formwork during the construction of buildings, especially during the construction of the staircases, which constitutes a safety element which prevents persons moving about in the vicinity from falling into empty space or onto floors below. The provisional railing consists of some supports (2) which permit the fastening of some vertical tubular stanchions (3), these vertical stanchions (3) being the bearers of the horizontal protection elements (4). The supports are fastened to the external vertical plane of the formwork, facilitating the construction work and even the finishing of the surfaces delimited by said railing.

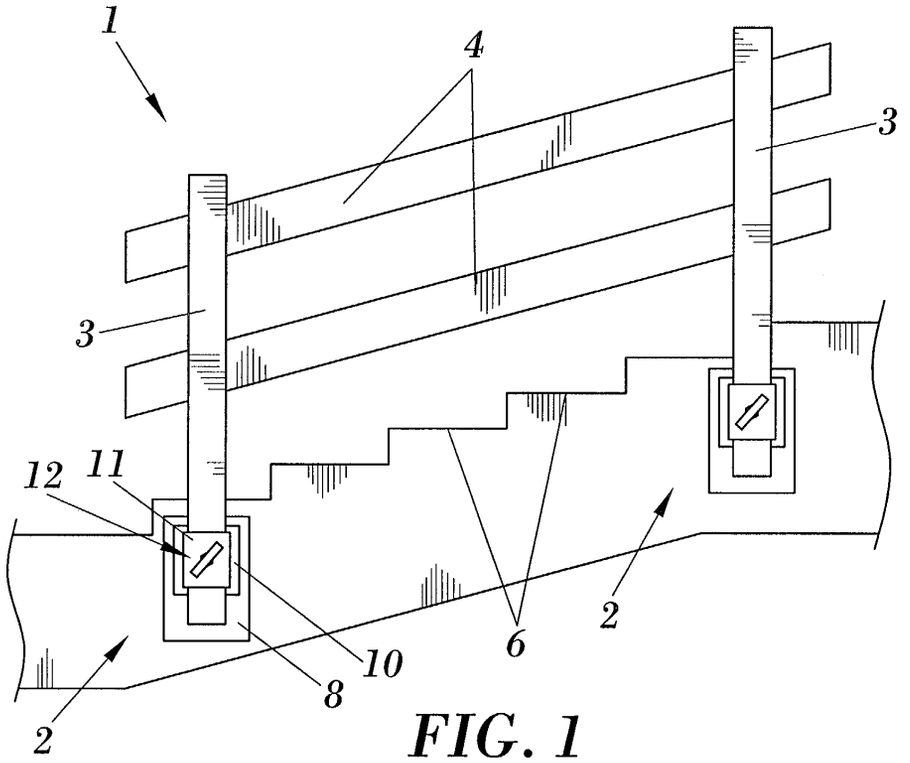

FIG. 1

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Description

OBJECT OF THE INVENTION

[0001] The present invention refers to a provisional railing conceived to be installed during the construction of buildings, especially during the construction of the staircases, constituting a fundamental safety element to prevent persons in the vicinity from falling into empty space or onto floors below.

[0002] The incorporation of a baseboard accessory adapts this provisional railing, specially developed for its use in stair wells, for its application as an element of protection capable of being installed in lift shafts, on balconies and roofs.

BACKGROUND OF THE INVENTION

[0003] Risks and accidents in the workplace constitute an extremely serious problem for society and for the economy, requiring for their effective prevention the application of complex measures of a legal, technical and administrative nature, set out by the Law 31/1995 on the Prevention of Risks in the Workplace.

[0004] In the productive sectors, that of construction presents above average levels of risk and statistics of frequency and seriousness, for which reason multiple devices have been developed to increase safety during the construction of buildings.

[0005] The aforesaid Law on the Prevention of Risks in the Workplace requires barriers and protective nets to be installed in civil works, which explains the great variety of these barriers available at the present time. However, it has been observed that most of these barriers are designed to be installed on horizontal surfaces, neglecting safety in specially dangerous areas, such as staircases during the construction thereof.

[0006] Through the document ES 1045228 a safety railing is known constituted in a way such that it admits adaptation to any inclination of the framework of a staircase. For this it has a railing of the type of those which are constituted by two pincer-like telescopic bodies, adjustable by means of an internal screw worked by a lever, so the elements that act as pinching arm in the assembly with respect to the framework have corresponding revolving clamps that facilitate the adaptation thereof to any inclination of the framework. This type of railing has the fundamental inconvenience that, once installed, the upper clamp is located on the horizontal plane or tread of the step, hindering the work of finishing the same. In like manner, the lower clamp is positioned on the inclined plane which is delimited by the planking of the staircase on the underside thereof, hindering possible work to be carried out on this surface. Another inconvenience detected in this type of railing is that the union between the railings and the battens which configure the safety railing is implemented by placing said battens in the L-shaped supports which the railings incorporate, without having any reliable means of fastening. In the event that this safety railing is installed on a staircase, the battens will not be horizontal, since their ends will be resting in supports belonging to railings located at different heights, whereby the surface supporting said battens on each of the supports will not even be that corresponding to the width of said supports. For this reason it is considered that this fastening system is not the most appropriate in a safety railing, and even less so if it is going to be installed in a staircase under construction, since it does not guarantee the minimum level of safety required in this type of device.

[0007] This problem is resolved in the protective railing defined in the Spanish document ES 1048148, which incorporates the elements necessary to fix the battens to the railings by means of shackles. This railing is conformed by some railings fitted with platforms for support and fastening by screwing to the steps of the staircase, these supporting platforms being therefore screwed to the tread of the step, hindering, as in the previous invention, the finishing work to be carried out on the staircase. This invention is better than the previous one in that each tubular stanchion has a single support platform, that is, it is not, as in the previous case, a clamp which "bites" the step both above and below, therefore the inclined plane is free of elements that hinder it being finished, which usually consists in painting.

[0008] According to the foregoing, the greatest inconvenience that these two railings present in the specific application thereof to staircases under construction is the need for their removal in order to proceed to the finishing thereof, thereby leaving the workers without protection from possibly falling onto floors below.

DESCRIPTION OF THE INVENTION

[0009] The object of the present invention is to achieve an adequate railing for its provisional installation on any formwork during the construction of buildings, especially during the construction of the staircases, so that it constitutes a safety element to prevent persons moving in the vicinity from falling into empty space or onto floors below, even in the phase of finishing the surfaces delimited by said railing.

[0010] The railing disclosed has the advantage over the safety railings known up to now in that the system of anchoring the vertical posts bearing the horizontal protection is not fastened to the horizontal surface of the formwork, hindering in this way the work on this surface, but is instead fastened to the external vertical plane of said formwork. As has been stated previously, the railing which is disclosed below is specially suitable for its installation during the construction of staircases, although the incorporation of an optional baseboard accessory adapts it for use as a protective element in lift shafts, on balconies and roofs during the construction of the building.

[0011] The provisional railing object of this invention consists basically of some supports which allow the fastening to the external vertical plane of the formwork of the vertical tubular stanchions, these vertical stanchions being the bearers of the horizontal protection, this assembly constituting a protector for the staircases which is easy to mount and to store.

[0012] The supports of this provisional railing are installed on the external ends of the framework of the staircase under construction, specifically in the plane perpendicular to that constituted by the tread of each step. Three different models exist for these supports, all of them with the same purpose of serving as fastening and support for the vertical tubular stanchions. The fastening of two of the models of these supports is done with some screws, fixing them to the side of the staircase, while the fastening of the third support model is carried out by anchoring a piece in the concrete. By means of this arrangement of the supports it is possible to mitigate the drawbacks of the railings existing in the current state of the art, since they do not hinder the work to be carried out in the horizontal plane of the steps. Since finishing the vertical plane on which the supports are installed usually consists of painting only, the provisional railing can remain installed until the final stage of construction, which is precisely the painting.

The first of the supports is formed by a fishplate basically rectangular and flat in shape, having a thickness such that it allows the easy anchoring thereof to the formwork of the staircase by means of screws, for which reason it has several drilled holes, usually two, for the correct screwing thereof. The support is completed with a length of tube, termed the bearing tube, in which the vertical, tubular stanchions are inserted, as will be seen later.

[0013] To assure a minimum gap between the external end of the formwork of the staircase and the railing, so that the latter does not hinder the work which has to be carried out on the steps thereof, the fishplate that constitutes the base of the supports has joined thereto a spacing tube the only function of which is to overcome all the projections produced by the actual construction. In the event that the support incorporates it, the spacing tube is located between the fishplate and the bearing tube. The union between this fishplate and said spacing tube is carried out by welding, the spacing tube being positioned parallel to the fishplate so that the surface affected by the welding is as large as possible, guaranteeing thereby a correct join between the two elements. The measurements and form of this tube can be chosen according to the needs of each occasion, keeping in mind that the length thereof must never be greater than that of the fishplate and must not impede the screwing of the latter to the formwork, for which reason the holes drilled in the fishplate must always be accessible. In terms of the scale of the job or of the actual requirements thereof, spacing tubes can be chosen of more or less diameter or thickness, so that the railing is installed more or less removed from the end of the formwork of the staircase. If it is considered unnecessary to separate the staircase, supports similar to those described will be installed, but without incorporating the spacing tube.

[0014] The union between the spacing tube and the bearer tube is also carried out by welding and, as in the previous case, they are located parallel to each other. In the supports of this type which do not incorporate a spacing tube, the bearer tube will be welded directly to the fishplate. These bearer tubes have the purpose of holding the vertical tubular stanchions which are introduced in said bearer tubes. The dimensions and form of the bearer tube have to be such that they allow the subsequent introduction of the vertical tubular stanchions, so that if the vertical tubular stanchion which is going to be installed has a rectangular section, the bearer tube will have this same section, the same if this section is round or any other section. As for the length thereof, it will usually be slightly less than that of the spacing tube to which it is welded, so that the greatest possible welding surface is achieved without impeding the fastening of the fishplate to the formwork.

[0015] When the vertical tubular stanchion is inserted in the bearer tube it is necessary to immobilize the stanchion inside this tube to secure the railing assembly and have the vertical tubular stanchion remain at the desired height. For this purpose the bearer tube has a system of anchoring by means of shackles, generally operated by means of a crank.

[0016] The support according to a second manner of embodiment of the invention consists basically of a tubular piece mounted horizontally with a second tubular piece joined to the first forming an L. The join of this support to the formwork of the staircase is carried out by screwing a plate which is joined to the end free of the tubular piece. Once the support is secured, the assembly proceeds of the vertical tubular stanchion, which is located on the second tubular piece of the support, said piece being inserted in the internal cavity of the stanchion. To secure said stanchion to the support, a rod is passed through some lateral holes of the vertical tubular stanchion, which holes coincide with the through-holes made in the side faces of the second tubular piece of the support.

[0017] The third possible embodiment of the support differs substantially from the previous two, since in this case the union of the same one to the lateral formwork of the staircase is not carried out by screwing. The support in this third embodiment has an anchor piece which, as its name indicates, is anchored in the concrete of the formwork of the staircase presenting its open face toward the exterior of said formwork. After welding an anchoring tube to the lower part of the front face of the vertical tubular stanchion, said anchoring tube is introduced on the anchor piece, being fastened thereto by shackles due to two gudgeon stops which said tube incorporates. To secure the assembly in this case a rod is made to pass through the front holes of the vertical tubular stanchion, the end of said rod being introduced in

an upper housing of the anchor piece. This third manner of embodiment of the support also allows the spacing of the railing to be regulated with respect to the external end of the formwork of the staircase, having for this a spacing fishplate which is inserted between the front face of the vertical tubular stanchion and the open face of the anchor piece, limiting the penetration of the anchoring tube in said piece.

[0018] The vertical tubular stanchion can have diverse embodiments and dimensions, provided that these are appropriate for its correct fastening to the supports fixed to the external formwork of the staircase. Each vertical tubular stanchion has at least one positioning and fastening element to allow the subsequent assembly of the horizontal protection which configures the actual protective railing. These positioning and fastening elements will usually consist of a stepped fishplate fitted with an anchor system by means of shackles, it being possible to vary the number thereof as a function of the height of the vertical tubular stanchion or as a function of the number of horizontal protection elements to be installed on the provisional railing, configuring in this way more or less closed railings. The incorporation of a portion of tube welded to the stanchion, between said stanchion and the stepped fishplate, has the purpose of bringing the horizontal protection nearer the end of the formwork of the staircase. If the angle of the staircase is not excessive and with the purpose of assembling the provisional railing more quickly, the system of anchoring the positioning and fastening elements can be suppressed, which in this case would consist of a simple stepped fishplate in which the horizontal protection elements are introduced.

[0019] One of the additional advantages of the invention, besides the fundamental one of not impeding the work to be carried out in the staircase under construction, is its great versatility and simplicity of assembly. Thus, by simply choosing the appropriate supports, it is possible to have the provisional railing more or less removed from the side of the staircase, which will allow more working space to be left therein to facilitate the work inherent in construction or movement of materials, without this endangering the life of persons moving about in the vicinity. When the support considered necessary has been chosen and installed, the tube welded to the vertical tubular stanchion brings the horizontal protection near to the staircase, in this way an adequate spacing is achieved in the lower area of the same, which is the working area, without the railing being thereby excessively removed from the staircase, which would impair its function as a safety element. Moreover, the fact that a same vertical tubular stanchion can be mounted in any one of the three possible supports implies an advantage as to provisioning and storage.

[0020] The election of vertical tubular stanchions incorporating more or less positioning and fastening elements or the height at which the same are located allows railings to be configured with one, two or more horizontal protection elements, positioned at the desired height, provided the legislation in force in each country is satisfied. Moreover, the possibility of incorporating an optional baseboard accessory on the lower part of the vertical tubular stanchions increases safety against possible falls into lift shafts, from balconies and roofs, substantially expanding the field of application of the provisional railing which although its most specific application is as a safety element to be installed in stair wells during construction, it can also be installed in other hazardous areas of the work site.

[0021] As for the assembly of the provisional railing, it is obvious that the only tool necessary is a drill to screw the fishplate of two of the possible embodiments of the supports to the formwork of the staircase, the remaining operations, such as fastening the vertical tubular stanchion to the bearer tube or that of the horizontal protection to the positioning and fastening element, can be carried out in a simple manner by hand.

DESCRIPTION OF THE DRAWINGS

[0022] To complete the description that is being made and with the object of assisting in a better understanding of the characteristics of the invention, in accordance with a preferred example of practical embodiment thereof, said description is accompanied with a set of drawings, as an integral part thereof, wherein by way of illustration and not restrictively, the following has been represented:

Figure 1. - It shows a view of the provisional railing installed in a staircase.

Figure 2. - It shows a view in perspective of a vertical tubular stanchion incorporating the baseboard accessory and two positioning and fastening elements separated from the stanchion by means of two tube lengths.

Figure 3. - It shows a view in perspective of a first embodiment of the support fixed to the formwork of the staircase.

Figure 4. - It shows a view in perspective of the assembly of the vertical tubular stanchion in a support according to the second manner of embodiment.

Figure 5. - It shows a view in perspective of the assembly of the vertical tubular stanchion in a support according to the third manner of embodiment.

PREFERRED EMBODIMENT OF THE INVENTION

[0023] In the light of the figures an example of embodiment of the invention can be seen therein which consists of a provisional railing (1) constituted basically by a number of supports (2) on which are installed the ver-

tical tubular stanchions (3) which carry the horizontal protection elements (4), the number of these being variable according to that considered necessary in each application.

[0024] As can be observed in figures 1 and 3, the supports (2) of said provisional railing (1) are installed on the external ends (5) of the framework of the staircase under construction, specifically on the plane perpendicular to that which constitutes the tread (6) of each step.

[0025] According to a first embodiment of the supports (2), each of them is formed by a fishplate (8), a bearer tube (11) and an anchoring system (12) to hold the vertical tubular stanchion (3) associated with each support (2). Usually the support (2) includes a spacing tube (10) to overcome the projections produced by the actual construction, said tube being placed between the fishplate (8) and the bearer tube (11).

[0026] The fishplate (8) of the support (2) is basically rectangular and flat in shape, of a thickness such that its easy anchoring to the formwork of the staircase by means of screws (7) is allowed, for which reason it has several drilled holes (9), usually two, for the correct screwing thereof.

[0027] To secure a minimum spacing between the external end (5) of the formwork of the staircase and the provisional railing (1), the fishplate (8) which constitutes the base of the supports (2) usually has a spacing tube (10) joined thereto the only function of which is that of overcoming all the projections produced by the actual construction. The union between said fishplate (8) and said spacing tube (10) is implemented by welding, the spacing tube (10) being mounted parallel to the fishplate (8) so that the surface affected by the welding is as large as possible, assuring in this way a correct union between the two elements.

[0028] The union between the spacing tube (10) and the bearer tube (11) is also implemented by welding and, as in the previous case, they are mounted parallel to each other. These bearer tubes (11) have the purpose of supporting the vertical tubular stanchions (3) which are introduced in said bearer tubes (11).

[0029] When the vertical tubular stanchion (3) has been introduced in the bearer tube (11), it is necessary to immobilize the stanchion inside said tube to secure the assembly of the railing and have the vertical tubular stanchion (3) remain in position at the desired height. For this, the bearer tube (11) has a system (12) of anchoring by means of shackles, generally operated by means of crank (13).

[0030] Figure 4 shows a second possible embodiment of the support (2) which forms part of the provisional railing (1) object of this invention. This support (2) is formed by the union of a horizontal tubular piece (16) with a second tubular piece (17) perpendicular to the previous one, this union forming an L-shaped support. On the end of the tubular piece (16) which is facing the external end of the framework (5), a plate (18) is mounted which has several drill holes (9), so that it is fastened to the framework by screwing.

[0031] When this support (2) has been installed, the vertical tubular stanchion (3) is mounted therein. In this case the assembly is carried out by introducing the second tubular piece (17) of the support (2) in the interior cavity of the stanchion. To secure the assembly, a rod (21) is passed through the side holes (19) which the vertical tubular stanchion (3) has for this purpose, which holes coincide with the through-holes (20) of the second tubular piece (17) which constitutes this second support model (2).

[0032] The embodiment of supports (2) with tubular pieces (16) of different lengths allows the provisional railing (1) to be installed more or less removed from the external end of the framework (5).

[0033] The third possible embodiment of the support (2) differs substantially from the previous two, since in this case the union of the same to the external end of the framework (5) is not carried out by screwing. The support (2) in this third embodiment has an anchor piece (22) which, as its name indicates, is anchored in the concrete of the formwork of the staircase, presenting its open face toward the exterior of said formwork. After welding an anchoring tube (23) to the front face of the vertical tubular stanchion (3), said anchoring tube (23) is inserted in the anchor piece (22), being fixed thereto by shackles due to two gudgeon stops (24) which said tube incorporates. So that said gudgeon stops (24) do not impede the penetration of the anchoring tube (23) in the anchor piece (22), the latter is implemented with said tube rotated through 45°, reversing this rotation once the anchoring tube (23) has penetrated sufficiently into the anchor piece (22). To secure the assembly in this case a rod (21) is made to pass through the front holes (28) of the vertical tubular stanchion (3), the end of said rod (21) being introduced in the upper housing (25) of the anchor piece (22). This third manner of embodiment of the support (2) also allows the spacing of the provisional railing (1) to be regulated with respect to the external end of the framework (5) of the staircase, having for this a spacing fishplate (26) which is inserted between the front face of the vertical tubular stanchion (3) and the open face of the anchor piece (22), limiting the penetration of the anchoring tube (23) in said piece.

[0034] The vertical tubular stanchion (3) can have diverse embodiments and dimensions, provided they are compatible with the support (2) installed in the formwork. As is appreciated in figure 2, each vertical tubular stanchion (3) has at least one positioning and fastening element (14) to allow the subsequent assembly of the horizontal protection elements (4) which configure the actual protective railing. Usually these positioning and fastening elements (14) will consist of a stepped fishplate (27) fitted with an anchoring system (12) by means of shackles which can be the same as that employed to fix the vertical tubular stanchion (3) to the bearer tube (11) and the number thereof will be variable as a function of the height of the vertical tubular stanchion (3) or as a

function of the number of horizontal protective elements (4) to be installed in the provisional railing (1), configuring in this way more or less closed railings. For the purpose of bringing the horizontal protection (4) nearer the staircase it is possible to incorporate a portion of tube (15) welded in parallel to the vertical tubular stanchion (3), being inserted between the latter and the stepped fishplate (27). In the event that the angle of the staircase is not excessive and with the purpose of making assembly of the provisional railing (1) quicker, the anchoring system of the positioning and fastening elements (14) can be suppressed, which in this case would consist of a single stepped fishplate (27) in which the horizontal protection elements are introduced, said fishplate being joined to the tube (15) welded to the vertical tubular stanchion (3) or joined directly to said stanchion in the event that it is not necessary to incorporate the tube (15) through considering that the horizontal protection elements (4) are sufficiently near to the actual staircase.

[0035] In the event that the provisional railing (1) will be used as a protective element to prevent falling into lift shafts, from balconies or roofs, a baseboard accessory (29) is introduced by the lower end of the vertical tubular stanchions (3), before the latter are mounted in the supports (2), which baseboard accessory (29) is fixed to the stanchion by tightening a crank (13) as is appreciated in figure 2. When the baseboard accessory (29) has been installed, one proceeds to install therein a horizontal protection (4) which is adapted by means of an anchoring system (12) similar to that which each of the positioning elements (14) has.

Claims

1. Provisional railing of the type used during the construction of buildings, specially conceived to be installed in stair wells, **characterised in that** it is constituted by some horizontal protection elements (4) which rest on some vertical tubular stanchions (3) mounted in some supports (2) which are fixed on the external ends (5) of the framework of the staircase, preferably in the plane perpendicular to that which constitutes the tread (6) of each step.

2. Provisional railing according to the previous claim, **characterised in that** the supports (2) which fix the railing to the formwork have a fishplate (8) with drilled holes (7) which is secured by screwing to the formwork, a bearer tube (11) into which the vertical tubular stanchion (3) is introduced and an anchoring system (12) to hold the vertical tubular stanchion (3) associated with each support (2).

3. Provisional railing according to the previous claim, **characterised in that** the supports (2) which fix the railing to the formwork include a spacing tube (10) located between the fishplate (8) and the bearer tube (11) to overcome the projections produced by the actual construction, so that the provisional railing (1) does not impede the work to be carried out on the staircase.

4. Provisional railing according to claim 1, **characterised in that** the supports (2) which fix the railing to the formwork have an L-shaped piece formed by the union of a tubular piece (16) fitted on one of its ends with a plate (18) with drilled holes (9) which is fixed by screwing to the formwork, and a second tubular piece (17) which is introduced in the interior cavity of the vertical tubular stanchion (3).

5. Provisional railing according to the previous claim, **characterised in that** the second tubular piece (17) has two through-holes (20) which coincide with individual side orifices (19) of the vertical tubular stanchion (3), so that the introduction of a rod (21) through these holes and orifices secures the union between the support (2) and the vertical tubular stanchion (3).

6. Provisional railing according to claim 1, **characterised in that** the supports (2) which fix the railing to the formwork have an anchor piece (22) which is anchored in the concrete of the formwork of the staircase, presenting its open face toward the exterior of said formwork, into which an anchoring tube (23) is introduced which previously has been welded to the vertical tubular stanchion (3), being fixed to the anchorage piece (22) by shackles due to two gudgeon stops (24) which said tube incorporates.

7. Provisional railing according to the previous claim, **characterised in that** the anchor piece (22) has an upper housing (25) in which the end of a rod (21) is introduced which is made to pass through some front orifices (28) made in the vertical tubular stanchion (3), securing thereby the union between the support (2) and the vertical tubular stanchion (3).

8. Provisional railing according to claims 6 and 7, **characterised in that** the support (2) has a spacing fishplate (26) which is inserted between the front face of the vertical tubular stanchion (3) and the open face of the anchor piece (22), limiting the penetration of the anchoring tube in said piece and overcoming the projections produced by the actual construction, so that the provisional railing (1) does not impede the work to be carried out on the staircase.

9. Provisional railing according to previous claims, **characterised in that** the vertical tubular stanchions (3) have at least one positioning and fastening element (14) which contains a stepped fishplate (27) to fix the horizontal protection elements (4).

10. Provisional railing according to the previous claim, **characterised in that** the positioning and fastening elements (14) have an anchoring system (12) to secure the fastening of the horizontal protection (4).

11. Provisional railing according to the previous claim, **characterised in that** the positioning and fastening elements (14) have a portion of tube (15) welded between the interior front face of the vertical tubular stanchion (3) and the stepped fishplate (27) in order to bring the horizontal protection (4) nearer to the staircase.

12. Provisional railing according to the previous claims, **characterised in that** the vertical tubular stanchions (3) incorporate in their lower part a baseboard accessory (29) which is fastened thereto by tightening a crank (13) and wherein is installed a horizontal protection (4).

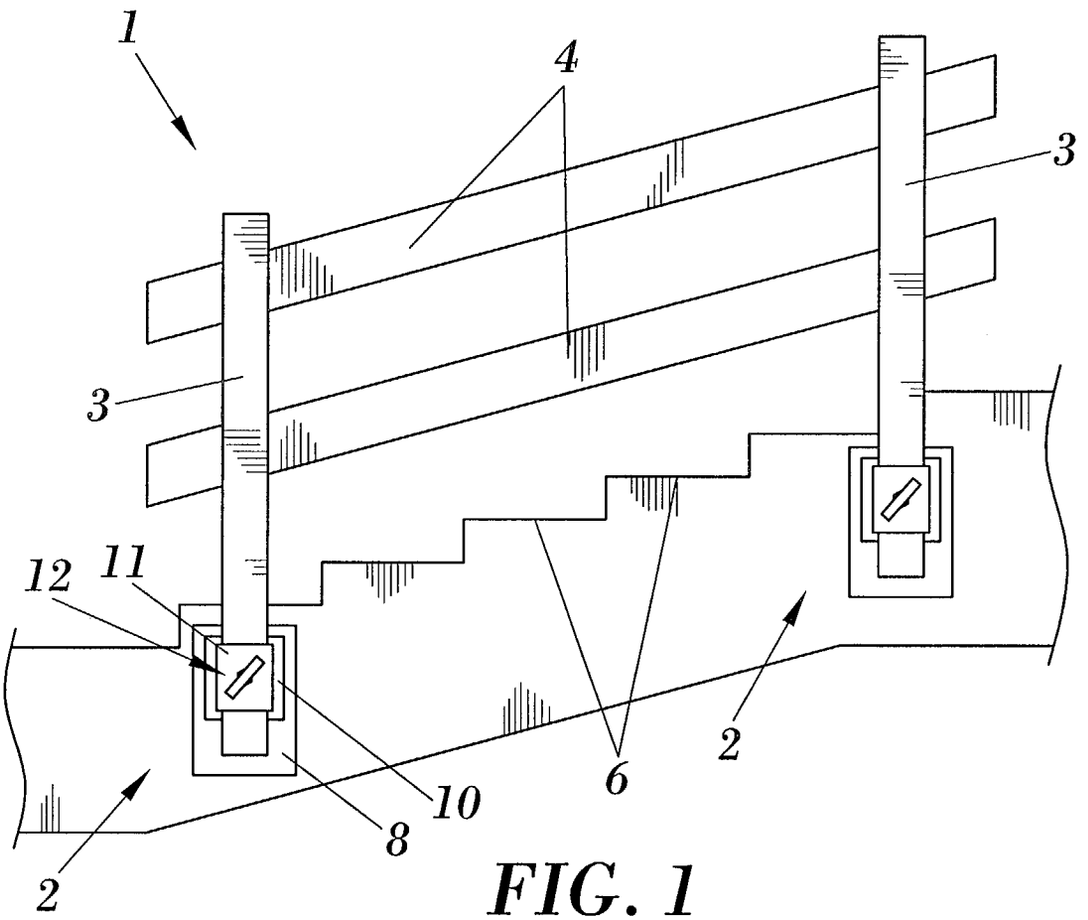

FIG. 1

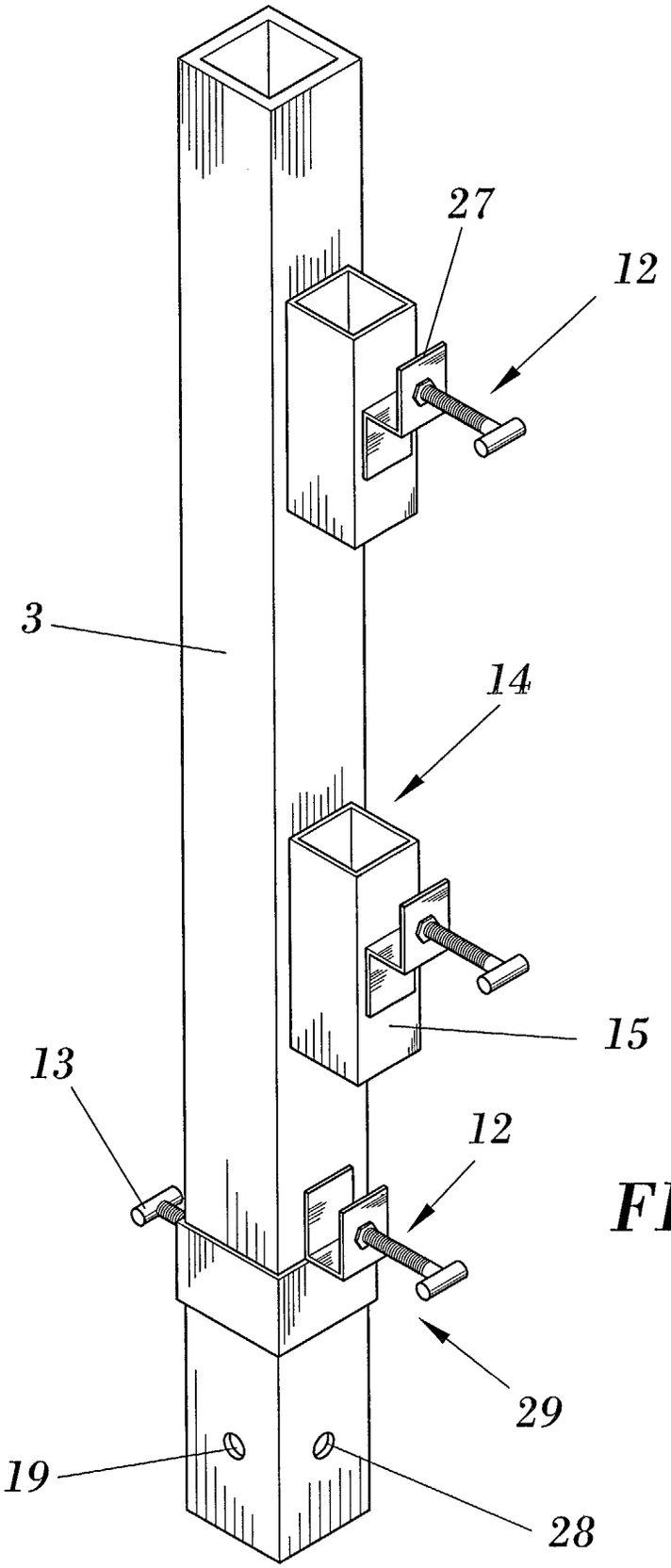

FIG. 2

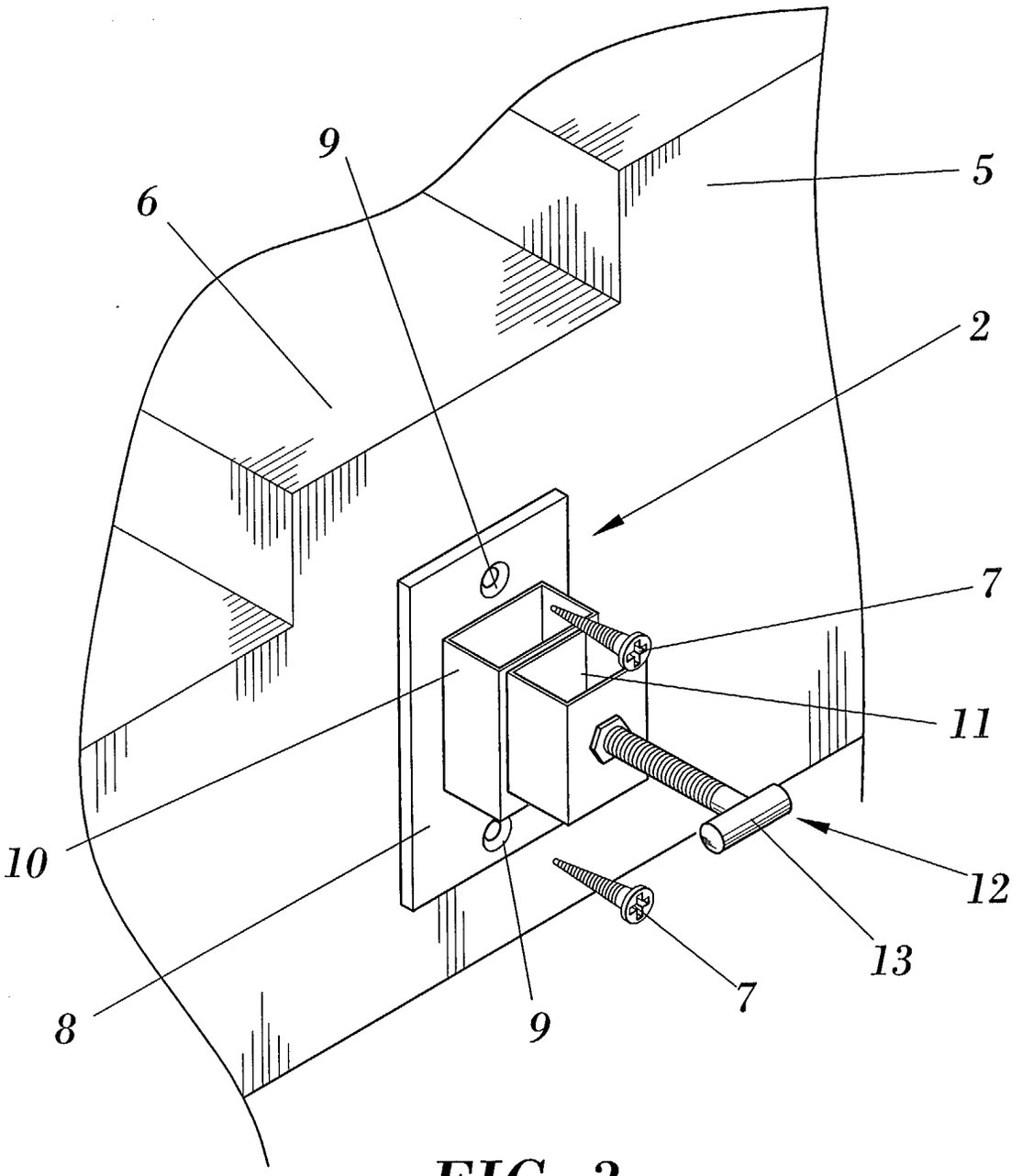

FIG. 3

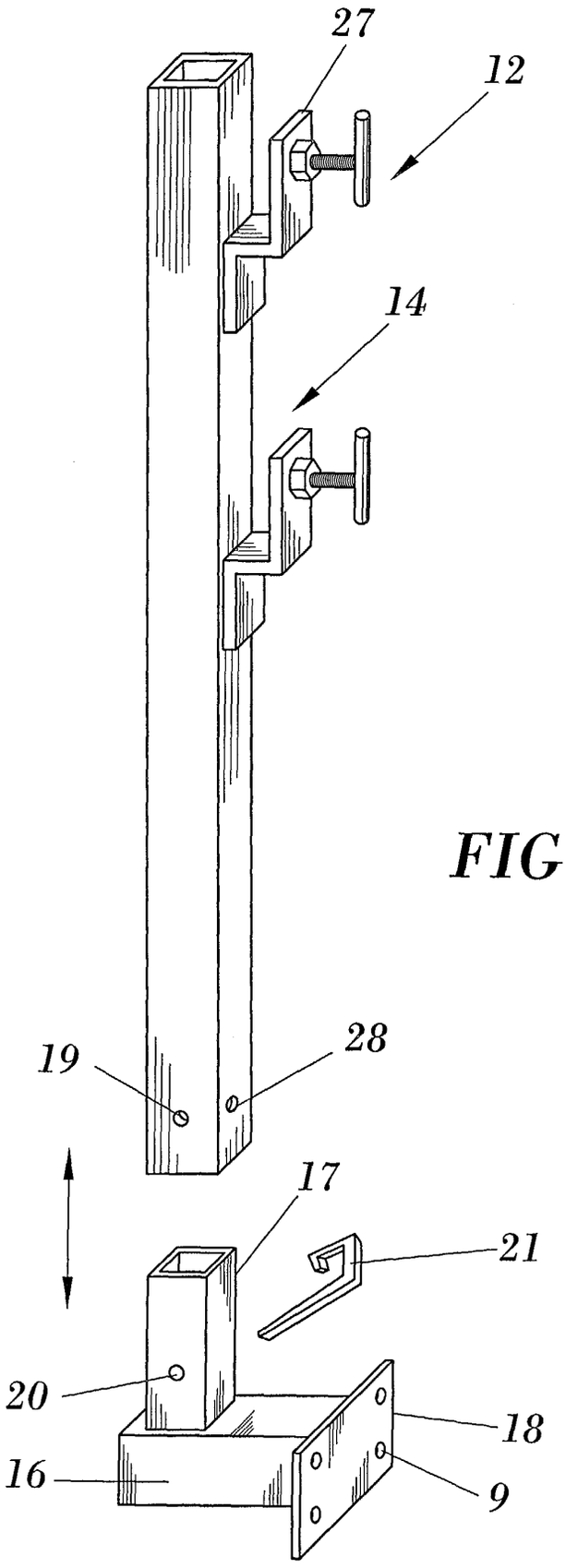

FIG. 4

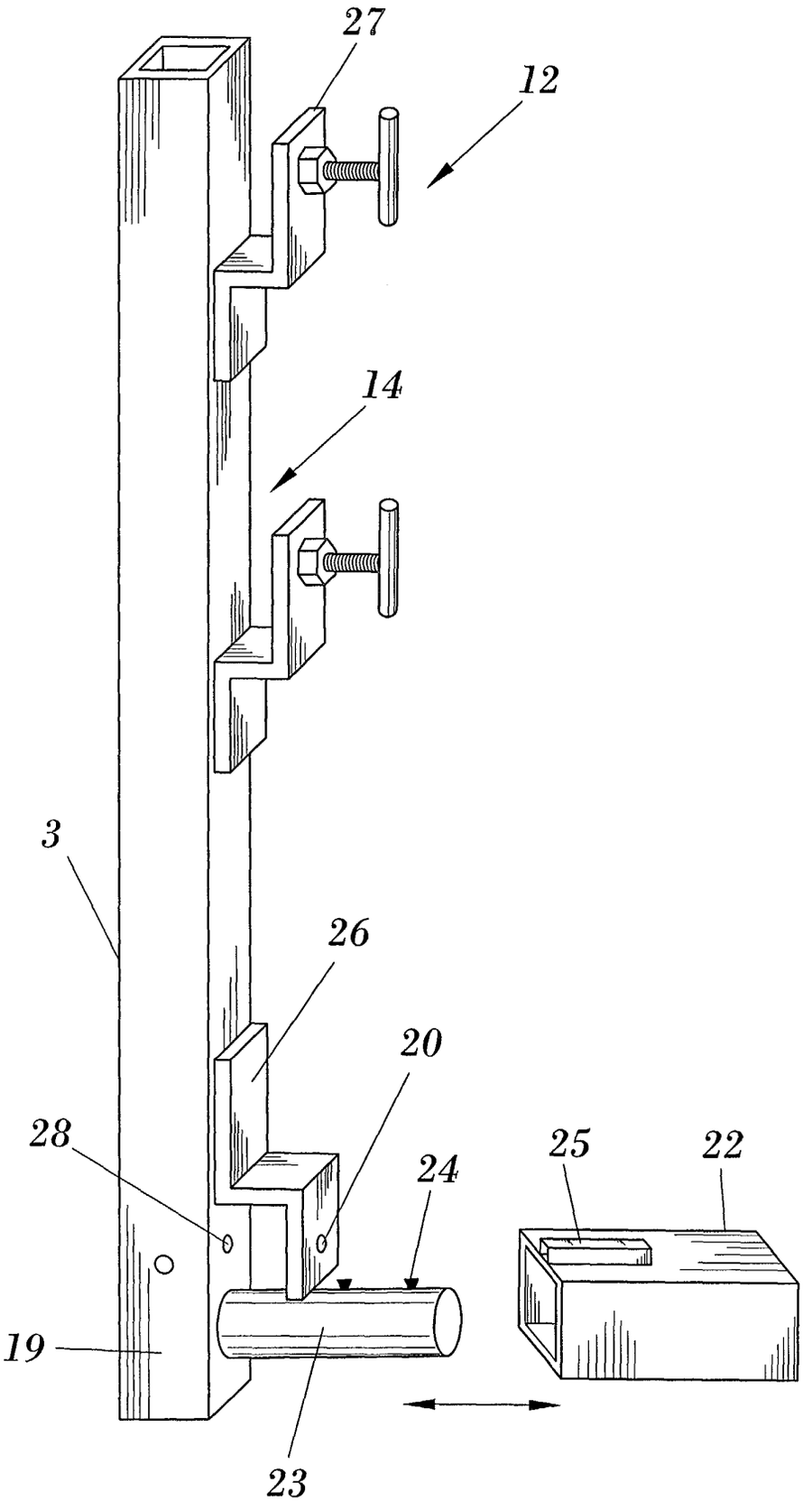

FIG. 5