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3,495,372

METHOD FOR MAKING SIGHT CEILINGS CONSISTING OF PANELS
AND SIGHT CEILING MADE ACCORDING TO THE METHOD

Filed Aug. 1, 1967

2 Sheets-Sheet 1

FIG. 1

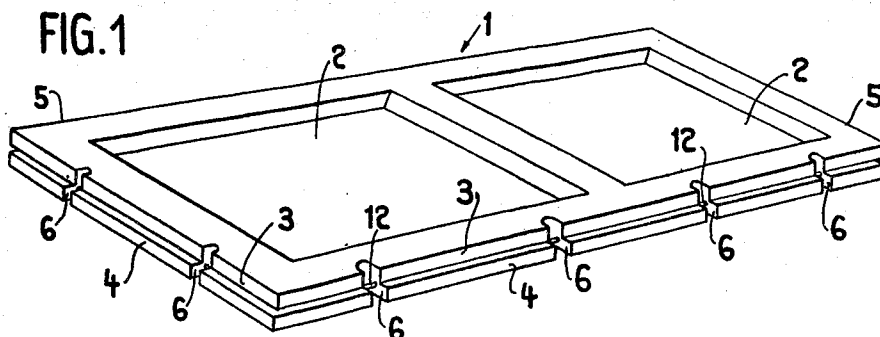


FIG. 2

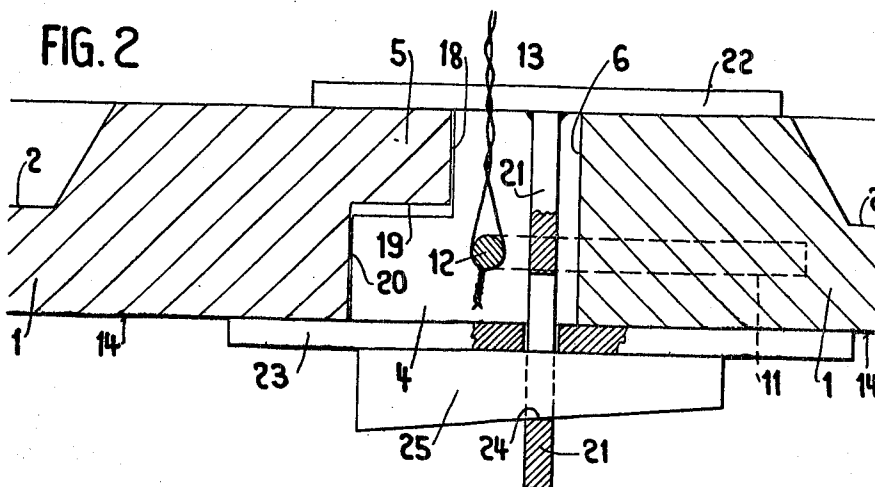


FIG. 3

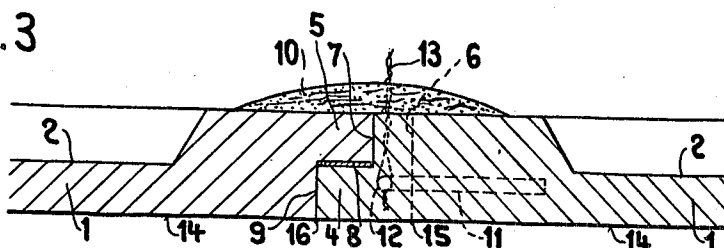


FIG. 4

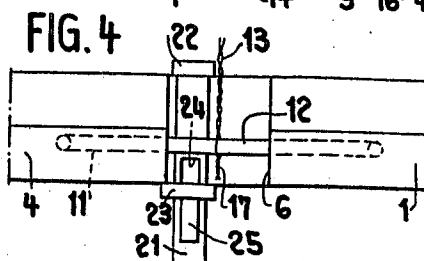
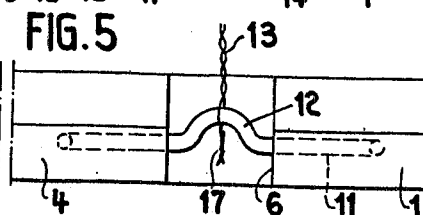


FIG. 5



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FIG. 6

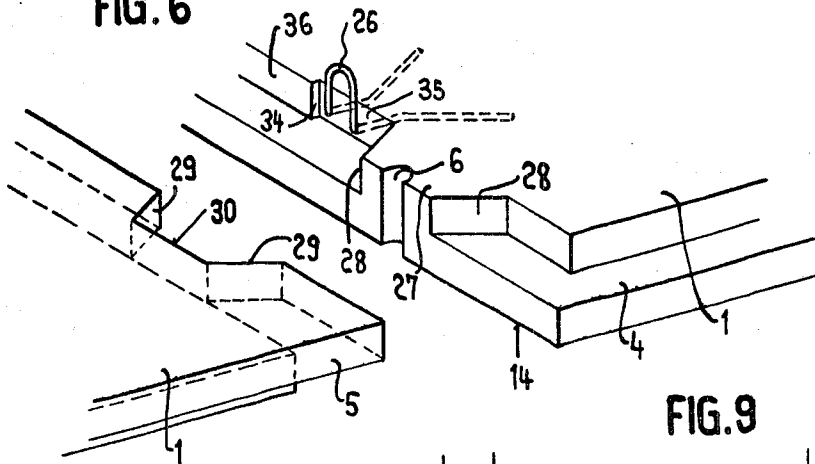


FIG. 9

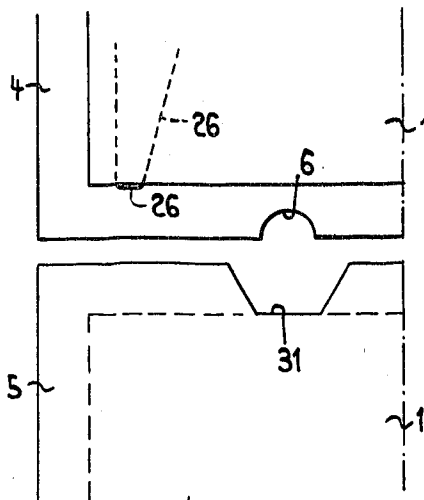


FIG. 7

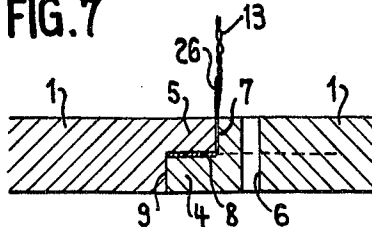


FIG. 8

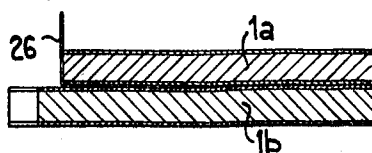


FIG. 10

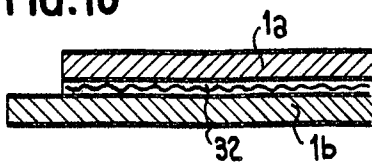
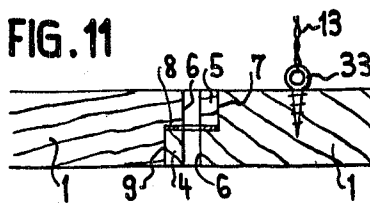


FIG. 11



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METHOD FOR MAKING SIGHT CEILINGS CONSISTING OF PANELS AND SIGHT CEILING MADE ACCORDING TO THE METHOD

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3 Claims

ABSTRACT OF THE DISCLOSURE

A method for making sight or visible ceilings consisting of panels, comprising the provision of steps guaranteeing a satisfactory evenness of the visible ceiling surface. A ceiling with the panels allowing the said method to be executed.

Under the term "sight ceiling" a ceiling, for instance a suspended ceiling is understood which is visible from the room and which covers or masks the real or rough ceiling or other construction to which the sight ceiling is mounted in any convenient manner.

The method according to the invention concerns a method for making sight ceilings consisting of panels, these panels having, on at least one edge, a lower flange or tongue and, on the opposite edge, only an upper flange or tongue.

It was very difficult to mount the panels in a manner that the sight or visible surfaces of adjacent panels are flush with each other, i.e. of obtaining level or unbroken visible ceiling surfaces with the aid of prior methods. The impossibility of making the visible surfaces of adjacent panels exactly flush with each other, i.e., of obtaining level or unbroken visible ceiling surfaces with the aid of prior methods required subsequent additional treatment by highly skilled workers to remove the uneven portions of the visible ceiling surface after having mounted the ceiling. These additional treatments or operations were of special importance in the case of ceilings having jointless sight or visible surfaces. If the degree of unevenness was high, large portions of the visible ceiling surfaces had to be coated or plastered to make the unevenness invisible. However, also with visible ceilings having no jointless visible surface considerable inconveniences occurred.

In a prior method it had been tried to avoid unevenness in sight ceilings with or without jointless visible surfaces by providing the panels with rod-shaped connecting means which freely project into recesses of the panels; the connecting rods of adjacent panels having been interconnected by tubular pieces. However, in order that the rods of each pair lie in alignment with each other, not only the panels had to be manufactured with high precision, but also the connecting rods to be interconnected by the tubular pieces had to be fixed to the panels with high accuracy both in the direction of the plane and in the direction of the thickness of the panels, should unobjectional evenness of the visible ceiling surface have been obtained. Displacement of adjacent panels relating to each other, sometimes desired during mounting, was, of course, impossible with these connecting means.

In another prior method obtaining evenness of the visible ceiling surface had been tried by exactly fitting tongues or flanges providing in the middle region of the thickness of the panels into corresponding grooves of the adjacent panels. However, also with this prior method very high precision in the manufacture of the panels was required to obtain satisfactory evenness. Besides this, in

the case of suspended ceilings, these panels had to be suspended on the real or rough ceiling at two opposite sides. This method, as well as the first-mentioned prior manner of mounting always required at least two workers for mounting a panel.

It is the aim of this invention to do away with all these and other inconveniences in the art of making sight ceilings both with or without jointless visible surfaces.

The method according to the invention is characterized in that, on mounting a panel, its upper flange or tongue is being supported on the lower flange or tongue of the adjacent already mounted panel, whereupon the opposite end of the panel to be mounted is, for the time being, provisionally connected with the real or rough ceiling with the aid of a mounting means, whereupon, in the region of the rim of the panel, at least one spanning and leveling device is passed through a through-opening and then the panel to be mounted spanned together with the already mounted panel by means of the spanning and leveling device and thereby held with its visible surface flush with the visible surface of the already mounted panel.

The sight or visible ceiling made according to this method is characterised in that the panels have in the region of at least one of their sides at least one through-opening for transiently passing through it a spanning and leveling device.

Supporting the upper flange or tongue of a panel to be mounted on the lower flange of the already mounted panel allows the mounting of the visible ceiling by a single worker. The panel thus supported on the lower flange of the already mounted panel is being spanned together with the latter panel by means of the spanning and leveling device to obtain the visible surfaces of the panels flush with each other and the spanning and leveling action is not removed before a binding material connecting the panels rigidly together has set or hardened or before the panels have been rigidly connected together by any other connecting means. In this way, the visible surfaces of the panels of the ceiling are exactly flush with one another and unobjectionable evenness of the visible surface of the ceiling is guaranteed without that high precision in the manufacture of the panels and in the disposition of the fixing means is required. In the case of ceilings with jointless visible surface only small, i.e. narrow joints and recesses are to be coated or plastered which can be done by a semiskilled worker.

Since it is not always necessary to keep a prescribed relative position between interengageable fixing means of adjacent panels, the panels, in certain embodiments, can be shifted relatively to each other in the ceiling plane as need be.

The accompanying drawings illustrate examples of performance of the sight ceiling according to the invention and also serve the purpose of explaining the manner in which the method according to the invention may, for example, be executed.

FIG. 1 is a perspective view of a panel seen from the top in an inclined direction.

FIG. 2 is, on a larger scale, a sectional view through the connection of two adjacent panels with the spanning and leveling device, i.e. during the mounting of a panel.

FIG. 3 is, on a smaller scale, a section parallel to that of FIG. 2 with the left-hand panel completely mounted and after the spanning and leveling device having been removed.

FIG. 4 is, on a smaller scale, an elevation from the left in FIG. 2, the left-hand panel being removed.

FIG. 5 is a view similar to FIG. 4, but of a modified embodiment, the spanning and leveling device being removed.

FIG. 6 is a perspective view of two panels, in which the fixing means lies outside the through-opening.

FIG. 7 is a sectional view through two adjacent panels of another example, in which the fixing means also lies outside the through-opening.

FIG. 8 is a sectional view of a panel consisting of two layers.

FIG. 9 is a top-view of two panels according to FIG. 8, the panel being not yet joined together.

FIG. 10 is a sectional view of a panel formed in the manner of a sandwich.

FIG. 11 is a sectional view of two adjacent panels according to a further embodiment.

The completely mounted ceiling will now at first be described:

The panel 1 as illustrated in FIG. 1 and e.g. made of plaster of Paris has two recesses 2 on its upper surface and on each of two adjacent edges 3 only a lower flange or tongue 4 and on each of the two other edges only an upper flange or tongue 5. Along the longer edges 3 the panel 1 has four narrow openings in the shape of laterally open recesses 6 going through the entire thickness of the panel 1. The shorter edge 3 has only two such through-openings 6. These recesses 6 are lacking along the two other edges only provided with the upper flanges 5. For certain sizes and kinds of the panels it may be sufficient to provide through-openings 6 or only one such opening only along one edge. There may be embodiments with a lower flange 4 on only one edge and with an upper flange 5 only on the opposite edge, the two other edges of the panel being completely even over their whole width.

FIG. 3 now illustrates two panels 1 joined together in the completed formation. The upper flange 5 of the left-hand panel is simply supported on the lower flange 4 of the right-hand panel 1. The joints 7, 8 and 9 between these panels are rigidly connected together by a binding agent, such as, for instance, by adhesive plaster of Paris or mortar or by any other suitable binding material. Only in joint 8 the layer of binding agent is hatched in the drawing. As an additional rigid connection between adjacent panels there is or are provided on the upper surface of the panels along the joint 7 a bead 10 or several beads at a distance from each other, this bead or beads consisting of a mixture of hemp and plaster of Paris or of another binding material. This bead or beads may in certain cases, be omitted, the binding agent in the joints 7, 8, 9 being sufficient, or this bead or beads may be sufficient and the binding agent in the joints 7, 8 and 9 may be omitted. The sectional view of FIG. 3 does not go through a recess 6. However, the U-shaped fixing means 11 projecting into the recess 6 at least partly filled with plaster is shown in dotted lines. The two legs of the fixing means 11 are cast or moulded into the right-hand panel. A twisted suspension wire 13 is connected to the web 12 of the means 11, lying within the recess 6. The twisted suspension wire 13 is connected to the real or rough ceiling (not shown) in a well-known manner. FIG. 3 illustrates that the sight surfaces 14 of the panels, visible from the room, are completely flush with each other and that, in the case of a ceiling with jointless sight surface, only the small joints and the narrow apertures of the recesses 6 between the points 15 and 16 are to be plastered or masked, this operation requiring, of course, no highly-skilled worker.

With reference to FIGS. 2 and 4 it will now be explained how the ceiling described above, which in the present example is a suspended ceiling, can be mounted with the help of the method according to the invention:

Assuming that the right-hand panel 1 in FIG. 2 has already been completely mounted, i.e., that it is already rigidly connected in the manner shown in FIG. 3 with the panel (not shown) on its right side. Therefore, the wire 13 is already completely twisted, i.e., the right-hand panel 1 is already in the position desired in the ceiling formation. Now, a single worker takes another panel 1 (the left-hand panel in FIG. 2) and supports its upper flange 5 on the lower flange 4 of the completely levelled or aligned

right-hand panel 1. Afterwards, the worker provisionally suspends this left-hand panel 1 on the real or rough ceiling by means of a wire 13 (not shown) attached to the web 12 of the fixing means (not shown) of this left-hand panel 1. Since, for the time being, the upper flange 5 of the left-hand panel 1 is freely supported on the lower flange 4 of the right-hand panel 1, the worker, if necessary, can shift the left-hand panel in the plane of the ceiling. Before supporting the upper flange 5 of the left-hand panel 1 on the lower flange 4 of the already mounted panel, the worker has brought a binding agent, such as adhesive plaster of Paris or mortar onto the faces 18, 19 and 20. After having put the flange 5 onto the flange 4, the worker passes from the top the web 21 of an upper spanning plate 22 of a spanning and levelling device through the recess 6 until the upper spanning plate 22 lies on the upper surface of the right-hand panel 1. Then he slips onto the web 21 a lower spanning plate 23 and afterwards drives a key or wedge 25 through a slot 24 of the web 21. The above procedure is executed also for the other recesses. By means of the spanning plates 22 and 23 now firmly pressed against the right-hand panel 1, the left-hand panel 1 to be mounted is being exactly levelled with regard to the right-hand panel 1, i.e., its sight or visible surface 14 is exactly flush with the sight or visible surface 14 of the right-hand panel 1. Now, the bead or beads 10 is or are applied, which harden quickly. Until hardening or binding of the bead or beads 10 is completed, the spanning and levelling device or devices remain in the position shown in FIG. 2. After completion of the hardening of the bead or beads 10 the key or wedge 25 and the lower spanning plate 23 are removed and the web 21 with the upper spanning plate 22 is withdrawn towards the top. At a given time, the wire 13 (not shown) of the left-hand panel is twisted until it has the necessary length. Afterwards and in the case of a jointless sight or visible surface 14 the small joints and the narrow recesses 6 are plastered or masked, whereupon the next panel 1 will be mounted. The joints 7, 8 and 9 may, of course, also be provided with a quickly hardening or binding agent and the bead or beads 10 may then under certain circumstances be omitted. In such a case the spanning and levelling device or devices remain in spanning and levelling condition until the binding agent in the joints 7, 8 and 9 has set or hardened.

If the dimensions of the panels 1 are such that difficulty would arise to the worker to take hold of the spanning plate 22 and to withdraw it towards the top from his position, the upper spanning plate 22 can be articulated to the web 21, for instance, by a hinge-joint, preferably in an unsymmetrical position with regard to the web 21. Then, after having removed the wedge 25, the worker can lift the web 21 from the bottom until the upper spanning plate 22 swings into parallel position to the web 21, whereupon he can withdraw the web 21 and the upper spanning plate 22 through the recess 6 towards the bottom.

Instead of a wedge 25, a wing nut and a bolt provided on the web 21 to cooperate with the wing nut or any other suitable device can be used for spanning the spanning and levelling device.

Some of the through-openings 6 may, after the mounting operation, be left open if desired, e.g. for passing lines or ducts of any kind through them or for any other reasons.

In the modified performance according to FIG. 5 the web 12 of the U-shaped fixing means 11 is a stirrup turned towards the top. This offers the advantage that the wire end 17 may be longer than with a straight web without that it projects beyond the panel towards the bottom or without that it must be bent back into the panel.

In the example according to FIG. 6 the fixing means in the shape of a wire loop 26 is directly cast or moulded into the panel 1. The wire loop 26 may also be replaced by a hook whose stem is cast into the panel 1. In the embodiment of FIG. 6 the through-opening or openings 6 only serve for passing the spanning and levelling device

through them. The fixing means 26 lies beside the opening or openings 6 in a recess 34 and the loop 26 is bent upwards along the back wall 35 of the recess 34 at right angles. This offers the advantage that the through-opening 6 can be made still narrower than in the former example so that plastering or masking the same is still simpler. The wire loop 26 is covered towards the room and thereby invisible. Therefore, no opening is necessary for the loop 26, which must be plastered or masked towards the sight or visible surface 14. The recess 34 may also be omitted and the loop 26 be bent towards the top along the face 36 of the panel 1 above the flange 4. The loop 26 would then still be hidden by the lower flange 4 of the panel 1. In the example of FIG. 6 the recess 6 is provided in a panel portion 27 having two inclined stop faces 28. These stop faces 28 cooperate with corresponding stop faces 29 on the upper flange 5 of the adjacent panel 1 for fixing the relative position in the ceiling plane of adjacent panels.

In the embodiment according to FIG. 7 the through-opening or openings for receiving the spanning and levelling device or devices is or are not laterally open recesses. They are through-holes of round or any other cross-section with closed circumference, these holes lying out of reach of the lower flange 4 and going through the entire thickness of the panels 1. A wire-loop 26 cast into the panel 1 on the level of the upper face of the lower flange 4 is bent at right angles towards the top along the outer face of the flange 5, i.e. it goes through the joint 7.

In the performance according to FIGS. 8 and 9 the panel consists of two layers 1a and 1b which are adhered or glued together or connected together in any other way. These layers hold fast between them the wire loop 26 which, similar to FIG. 7, is bent upwards at right angles and is fixed by the adhering or other connecting the layers 1a and 1b together. The layers 1a and 1b may consist of any suitable material, such as, for instance, solid wood, fiberboard or plates known in the trade under the name "Plasterboard." Under "Plasterboard" plates are understood having an intermediate layer of plaster of Paris and a cardboard coating layer or layers on one or both surfaces of the intermediate layer. As illustrated in FIG. 9 such layer-panels have one or more through-openings 6 in the lower flange 4, similar to FIGS. 1 and 6 and a recess or recesses 31 in the upper flange 5. In order to allow lateral displacement of the panels relatively to each other the recess or recesses 31 are broader than the opening or openings 6. The suspension loop 26 lies outside the opening 6.

The panel according to FIG. 10 forms a sandwich between whose layers 1a and 1b of any suitable material, such as for instance "Plasterboard," an intermediate layer 32 is enclosed which is fixed simultaneously by the interconnection, for instance, glueing together of the layers 1a and 1b. This intermediate layer may for instance be a heating resistance, a heat insulation, a damming layer or a radiation protection layer. The sandwich may also consist of more than two layers 1a and 1b and more than one intermediate layer 32.

In the embodiment according to FIG. 11 the panels consist of screw- and nail-holding material such as, for instance, solid wood, plywood, or of certain fiberboards. The through-openings 6 for the spanning and levelling device lie entirely in the flanges 4 and 5 and have cross-sections with closed circumference. Out of reach of the flanges and of the openings 6 lies the suspension means consisting of an eyebolt 33, for instance of an ordinary wood screw screwed into the panel. However, the screw 33 also lies in the neighbourhood of the rim of the panel. There may also be provided in the panel two small holes lying side by side for drawing a wire-shaped fixing means through them.

In another embodiment the through-openings 6 may also be provided on the side of the panel provided with

the upper flange 5, the fixing means being, of course, provided on the side of panel provided with the lower flange 4.

The panels may also consist of plastic material or have the shape of pans or boxes. Instead of suspending the panels they could be directly screwed or nailed or fixed in another way to suitable means provided on the real or rough ceiling. In this case the ceiling is not a suspended ceiling.

The through-openings 6 of the panels 1 may either be made during the manufacture of the panels 1 in the factory or not before they have been brought to the building site.

In ceilings in which there remain gaps between adjacent panels, i.e., in which the panels are not completely joined together, the spanning and levelling device can be passed through these gaps forming the through-openings.

We claim.

1. In a method for making a visible cover for and in spaced relation to a rough structural part from prefabricated panels by sequentially applying the panels, which comprises supporting one end of a panel to be mounted on one end of an already mounted panel by overlapping the ends of the panels, supporting the opposite end of the panel to be mounted from the rough structural part, aligning the panel to be mounted together with the already mounted panel by applying an upper levelling means of a spanning and levelling device onto the upper surfaces of the already mounted panel and the panel to be mounted, applying a lower levelling plate of the spanning and levelling device onto the lower surfaces of the said two panels, and pressing the lower levelling means of a spanning and levelling device onto panels to hold the visible surface of the panel to be mounted flush with the visible surface of the already mounted panel, applying a binding agent to bind said panel to be mounted to the already mounted panel, and removing the spanning and levelling device only after the setting of the binding agent.

2. In the method according to claim 1 wherein the binding agent is applied prior to supporting the panel to be mounted on the already mounted panel.

3. In the method according to claim 1 wherein the binding agent is applied subsequent to supporting the panel to be mounted on the already mounted panel.

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ALFRED C. PERHAM, Primary Examiner

U.S. Cl. X.R.

52—127, 436, 485; 264—35

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,495,372

February 17, 1970

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It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 33, "means of a spanning and levelling device onto" should read -- plate against the lower surfaces of the said two --.

Signed and sealed this 22nd day of December 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.

Commissioner of Patents