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54 **Modular prefabricated portal for the erection of building.**

57 The invention is concerned with a modular prefabricated portal for the erection of buildings. The portal comprises a pillar or abutment portion (20) and a stringer portion (30) which extends cantilever fashion in a substantially normal direction to the abutment portion to provide a manufactured article having, for example an L-, U-, T-, or TT-like or other comparable shapes. The pillar portion (20) has, at one end, two lugs (50) forming an extension of the abutment portion, whereas at the other end thereof, two lug accommodating sockets (66) are provided. Such sockets advantageously comprise either grooves or offsets (66). Bounded between the lugs (50), at one end, and the sockets (66), at the other end of the abutment, is a respective abutting surface (40) for dry resting the portal onto an underlying portal wherewith it is engageable by insertion of the lugs (50) on the one into the the receiving sockets on the other.

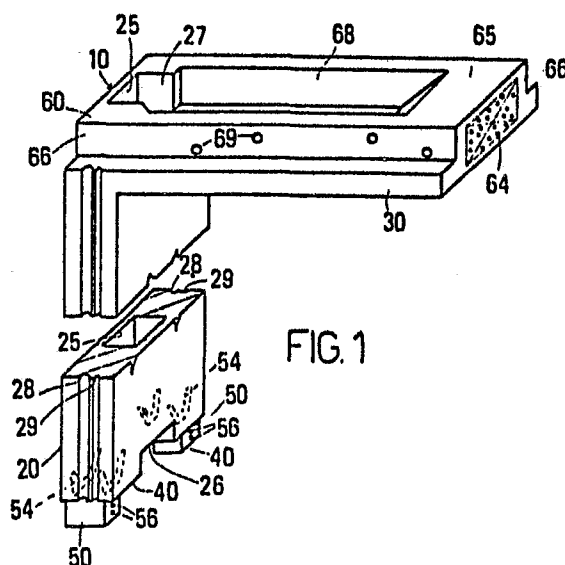


FIG. 1

"MODULAR PREFABRICATED PORTAL FOR THE ERECTION OF BUILDINGS"

This invention relates to a modular prefabricated portal for the erection of buildings.

The erection of buildings, whether for civil or industrial use, by means of modular prefabricated elements of relatively large size and weight involves a number of problems, such as that of providing prefabricated articles of manufacture to relatively close tolerances, that of properly positioning the modules prior to seal casting between modules, and that of ensuring structural continuity between modules.

It is an object of this invention to provide a modular prefabricated portal of reinforced concrete, which can ideally obviate the problems set forth above, and in particular afford a true dry lay of one module onto another, as well as allow for minor, albeit almost always necessary, trimming displacements during the installation of any one module to offset or compensate for possible faults resulting from elastic deformation of the module itself or prefabricating errors.

It is another object of this invention to arrange for said modular prefabricated portal to be easily handled on the job site and conveniently transportable by truck by virtue of its inherently stable features.

A further object of this invention is to arrange for said modular prefabricated portal to be readily manufactured and installed with a minimum of labor requirements.

Still another object of this invention is to

arrange for said modular prefabricated portal to afford direct accomplishment of rough-finished building structures which can be provided, ahead of seal casting between a number of modules laid side-by-side on a common plane, with nearly continuous slab surfaces contributing to the safety of the workers involved.

These and other objects, such as will be apparent hereinafter, are achieved by a modular prefabricated portal for the erection of buildings, which has an angled structure comprising at least one pillar portion and at least one stringer portion extending in substantially normal directions to each other, an end surface for dry lying provided at the ends of the or each pillar portion, at least two spaced lugs extending upwards with respect to said end surface from one end of the or each pillar portion, at least two lug-receiving sockets provided at the other end of the or each pillar portion, thereby the bottom end of the or each pillar portion of one portal can be precision abutted onto an underlying portal and engaged therewith by inserting the lugs on the one into the sockets on the other.

Advantageously, said sockets would comprise grooves or offsets.

Further features and advantages of the invention will be more readily understood from the following detailed description of some embodiments thereof, given herein by way of example and not of limitation with

reference to the accompanying drawings, where:

Figure 1 is an isometric view, with parts shown in section, of one panel point and of the pillar ends;

Figure 2 is an isometric view of another panel point design (having a side overhang for seating a completion panel therein) and of the pillar ends;

Figure 3 is a perspective diagrammatic view of an inverted "U" portal, according to the invention, having two side overhangs; and

Figure 4 is a perspective diagrammatic view of a building structure to be obtained by assembling inverted "U" portals according to the invention together.

Making reference first to the exemplary embodiment illustrated by Figure 1, it may be seen that the panel point 10 of the portal shown therein has an abutment or pillar 20 of rectangular cross-section and with a width, for example, equal to 4-5 times its thickness dimension, and a stringer 30 which extends from the top end of the pillar and has the same width and thickness as the pillar itself. Both the abutment and stringer are formed from reinforced concrete as a single casting in a suitable mold.

The abutment 20 is formed on its bottom end with a flat rest surface 40 and two lugs 50 each lying adjacent a respective short side of the surface 40, so as to be spaced apart from and oppositely located to the surface 40. The lugs 50 extend from the abutment and may be an integral construction with it

or otherwise attached thereto. The lugs may be formed from reinforced concrete, steel, or any other suitable construction materials. In Figure 1, the lugs 50 are shown to be in the form of steel bodies anchored to the web of the pillar 20 by means of stress bars or anchors 54. Advantageously, the lugs 50 have one or more through holes 56 with their axes lying in the same direction as the stringer 30 to let ties there-through, as explained hereinafter.

10 The abutment 50 has an axial longitudinal cavity 25 formed therein which runs from one end thereof to the other. On its face confronting the stringer, the abutment has a lower side notch 26 and an upper one 27. Along the narrow faces of the abutment there extend
15 two grooves 28 and 29, for example adapted to accommodate vertical ties provided at the joint between two side-by-side portals 1. The abutment 20 has, at its top end, a supporting surface 60 adapted to abut on a respective rest surface 40 of the pillar of a superimposed portal.
20 The surface 60, in the example shown, is coplanar with the top face of the stringer 30 and has a break in the form of two side offsets 66 which also extend over the entire length of the stringer edges. The offsets 66 have a depth dimension and are at a distance between
25 centers such as to accommodate the lugs 50 from an overlying portal. The stringer 30 has a top recess 68 which is, through the notch 27, in direct communication with the abutment cavity 25. On the rise of the offsets 66 there are provided a plurality of bonds or
30 depressions 69 placed at intervals (e.g. on half-meter

spacings) over the entire length of the stringer.
At the solid portions, such as that indicated at 65,
the stringer 30 may enclose a cellular concrete core,
such as indicated at 64, for lightening and insulation
5 purposes.

Figure 2 shows a panel point 70 similar to that
of Figure 1 but having a side overhang.

Figure 3 illustrates a module 80 with two panel
points and two overhangs. In Figures 2 and 3, like or
10 similar parts to those of the portal of Figure 1 are
designated with the same reference numerals. The
overhang of the stringer 30 of the panel point 70 is
terminated with a step 77 at a free end thereof for
dry resting finishing slabs 71 of reinforced concrete
15 thereon, e.g. to finish such horizontal surface members
as floors.

Figure 4 depicts an example of the assembling or
mounting of inverted-U portals 80 with floor level
abutments and stringers up to about 9 meters, for
20 the accomplishment of architectural building structures.
During the initial stage of the assembling procedure,
a first set of foundation portals 84 are installed.
If service spaces are to be provided, such as
staircases, or to fill other architectural requirements,
25 the portals 80 may be kept at mutual spacings exceeding
the modular distance between centers and panels 86,
such as commonly available panels of the "predalles"
type, may be used to fill the void between modular
portals. To form the upper floors, the portals 80 are
30 first brought to enter with their lugs 50 the offsets

66 of an underlying portal previously installed until their surface 40 is caused to rest dry on the mating supporting surface 60. The lugs 50, in fact, have a slightly smaller height than the rise of the offsets 66, thereby they will not contact the offset shelf on the occurrence of the rest contact between surfaces 40 and 60, which contact is to be as close as possible.

Through the use of ties or chain links (not shown) passed through the holes 56 in two juxtaposed lugs 50, located on two different abutments of a portal, as well as of bolts or clamping sleeves, small relative displacements can be provided between abutments to induce corresponding deformations in the portal in order to cancel out or at least accommodate any trimming faults due to elastic yielding by the stringer portion of the portal, twisting or manufacturing errors in the modular article. The ties or chains may be incorporated to the installation and cast with successive supplemental sealing castings to increase the structural continuity between modular portals.

Thus, the lugs 50 serve several functions. First and foremost, they serve to protect the flat rest surface 40 against any damage caused during handling at the job site and erection; secondly, they allow, through the ties, true dry positioning of one portal onto another; and after completion of the supplemental sealing castings, serve to provide a perfect structural continuity between modules by increasing the rest base, creating continuity to shearing (horizontal actions), and a certain continuity to bending.

Thanks to the provision of cavities or protuberances 69 along the stringers flanks, with the sealing castings being carried out after the portals have been installed, a reliable connection is

5 established between a prefabricated module and adjoining sealing casting to achieve structural continuity for the building, which should be still boosted, even with cross connecting bars between portals, as is well known in the art.

10 The cavity 25, which extends continuously from one floor to another of a building erected with portals according to the invention, may be adapted to function as a housing for such utilities as the heating system, air conditioning system, electric system, plumbing,

15 draining, etc., as well as a housing for structural components (such as ties, partition works, connection works, etc.). The cavity 25 may also serve as a housing for a concrete cast iron work to form a continuous pillar inwards of plural superimposed

20 portals. The floor depressions 68 may also be utilized to accommodate a variety of systems, and may possibly act as a dumping space for inorganic trash during the erection stage, thus bringing about a considerable saving in the time required to clean the floors.

25 On the other hand, the depressions 68 are all provided with a closed bottom, thereby even ahead of the supplemental sealing castings between portals they define horizontal members (floors) which are substantially continuous and whereon workers can walk

30 without any risk of falling. The vertical grooves 28

and 29 provided along the short flanks of the abutments, once the portals have been brought together, define cavities wherein a tie may be accommodated to oppose any tremor thrusts, which cavities would

5 always be, however, filled with concrete or any other suitable material to create a joint interconnecting the portals or one portal with other prefabricated components, such as infillings.

As may be seen, a portal according to the
10 invention lends itself for assembling to other portals to provide a reliable and internal joint, concealed from view, between the various modular components, thus improving both the building safety and finish.

As may be appreciated, in some situations, windows,
15 openings, air inlets may be formed in the pillar portion 20 either by providing a suitable removable block in the mold during the casting step or as installed by demolition of the thin walls of the cavity 25.

CLAIMS

1 1. A modular prefabricated portal for the erection
2 of buildings, having an angled structure comprising at
3 least one pillar portion (20) and at least one stringer
4 portion (30) extending in substantially normal directions
5 to each other, an end surface (40) for dry laying pro-
6 vided at the ends of the or each pillar portion, at least
7 two spaced lugs (50) extending upwards with respect to
8 said end surface from one end of the or each pillar
9 portion (20), at least two lug-receiving sockets (66)
10 provided at the other end of the or each pillar portion,
11 thereby the bottom end of the or each pillar portion of
12 one portal can be precision abutted onto an underlying
13 portal and engaged therewith by inserting the lugs (50)
14 on the one into the sockets (66) on the other.

1 2. A portal according to Claim 1, characterized in
2 that said lugs (50) are integral with their respective
3 pillar portion (20).

1 3. A portal according to Claim 1, characterized in
2 that said lugs (50) are attachable or securable to their
3 respective pillar portion (20).

1 4. A portal according to any of the preceding claims,
2 characterized in that said sockets (66) comprise grooves
3 or offsets.

1 5. A portal according to Claim 4, characterized in
2 that the grooves or offsets (66) extend over at least
3 part of the length of the or each stringer portion (30).

1 6. A portal according to any of the preceding
2 claims, characterized in that it comprises at least one
3 inner duct (25) extending from end to end of the or each

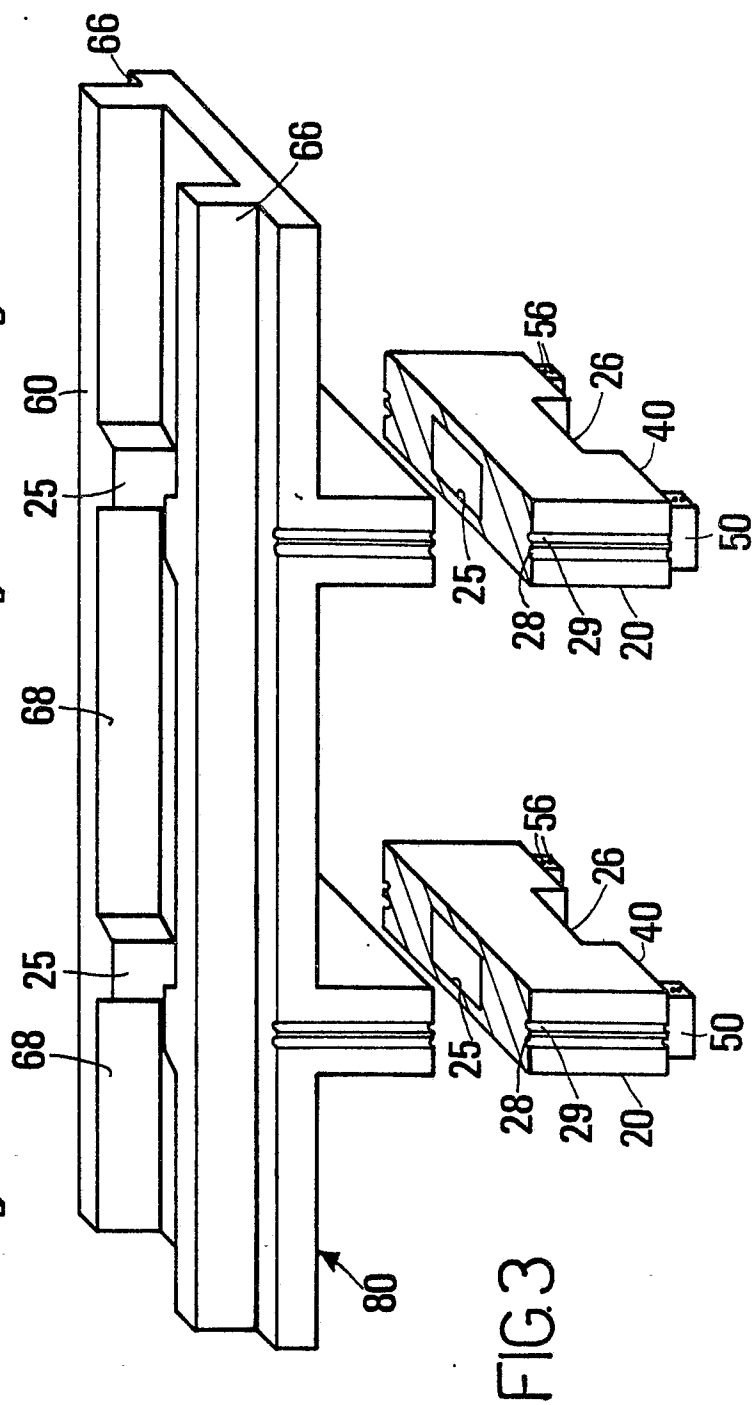
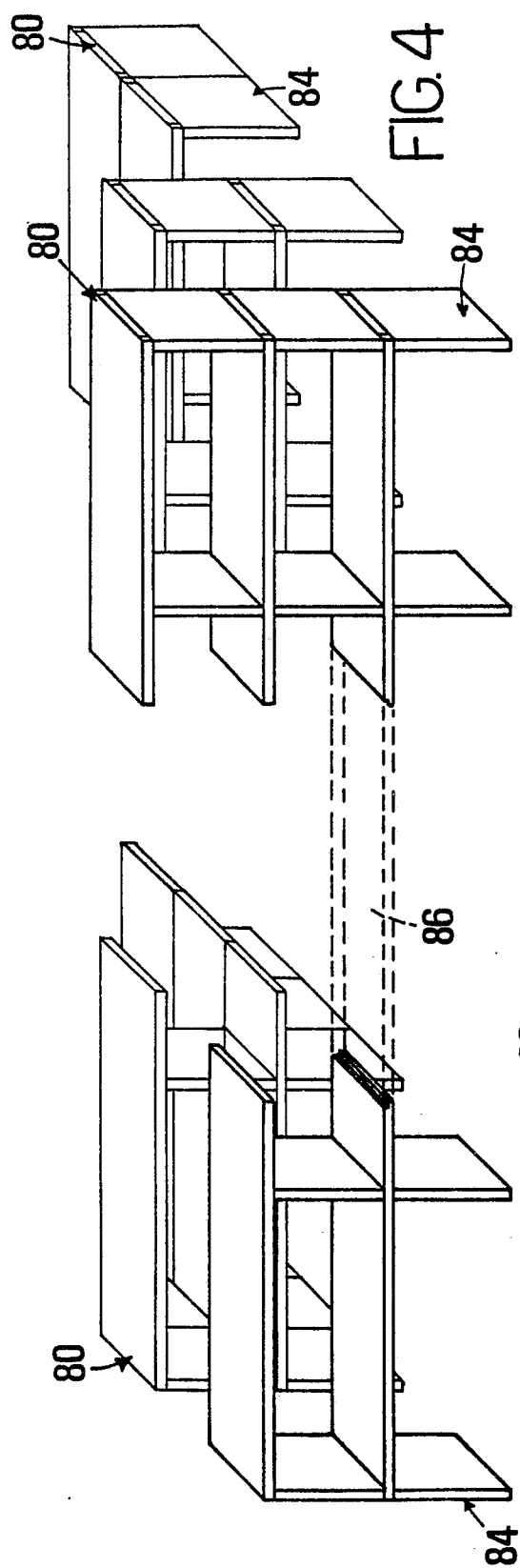
-4 pillar portion.

1 7. A portal according to Claim 6, characterized in
2 that it comprises a housing or collecting depression
3 (68) in the or each stringer portion (30).

1 8. A portal according to any of the preceding claims,
2 characterized in that it comprises at least one groove
3 (28,29) on each mating flank of the or each pillar portion
4 (20) and extending over the entire length of said portion.

1 9. A portal according to any of the preceding claims,
2 characterized in that it comprises a plurality of cavi-
3 ties or protuberances (69) along the flanks of the or
4 each stringer portion (30).







European Patent
Office

EUROPEAN SEARCH REPORT

0196342
Application number

EP 85 10 3881

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	FR-A-2 495 207 (GOLD) * Page 10, lines 3-24; page 11, lines 3-11; figure 1 *	1	E 04 B 1/348
A	--- US-A-3 724 141 (KELLEHER) * Column 3, line 41 - column 4, line 16; figures 1-6 *	1	
A	--- FR-A-2 408 696 (E.H. INTERNATIONAL EVOLUTION HOUSING J.R.L.) * Page 3, line 29 - page 4, line 34; page 8, lines 29-36; figures 1,2 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			E 04 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 03-12-1985	Examiner CLASING M.F.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			