

EUROPEAN PATENT APPLICATION

Application number: 81830167.3

Int. Cl.³: B 28 B 23/02

Date of filing: 17.09.81

Priority: 03.10.80 IT 8344380

Date of publication of application:
14.04.82 Bulletin 82/15

Designated Contracting States:
AT BE CH DE FR GB LI LU NL SE

Applicant: Pittini, Andrea
Via Piovega, 44
I-33013 Gemona del Friuli (UD)(IT)

Inventor: Pittini, Andrea
Via Piovega, 44
I-33013 Gemona del Friuli (UD)(IT)

Representative: Petraz, Gilberto
G.L.P. S.a.s. di Gilberto Petraz P.le Cavedalis 6/2
I-33100 Udine(IT)

Process to obtain double slabs, and a device suitable for realizing said process.

The invention concerns a process to produce and obtain double slabs, and also a device to obtain double slabs, whereby the double slabs are advantageously suitable for building use and consist of at least two substantially plane-parallel layers of cemented conglomerate in which electrically welded wire mesh elements are embedded, and whereby said layers are separated from each other by trellis elements (26) which are advantageously flat trellises, said device being suitable to carry out the process of the preceding claim and comprising in mutual cooperation and coordination:

- table means (14) to form the first slab (30), equipped with vibrating means (15),
- mould means (20) with combs and with means (1125-129) to retain conglomerate and with at least one end bar (18) for positioning and handling purposes having means (34) for its detachment,
- supporting surface means (33) with positioning means (19) and adjustable means (32), whereby said supporting means (33) are independent and able to uphold means with combs (20), and whereby there are vibrating means (15),
- withdrawal table means (12) with substantially horizontal withdrawal means (13) together with means (112-37-137) to sustain and possibly to guide said mould means with combs (20).

./...



fig.3

-1-

1. Description of the invention entitled:

- . "Process to obtain double slabs, and a device suitable for.
- . realizing said process"
- . in the name of ANDREA PITTINI at Gemona del Friuli.

5. Submitted on _____ under No. _____

. This invention concerns a process to obtain double
. slabs and therefore also concerns a device suitable for
. realizing said process.

10. . To be more exact, this invention concerns a process .
. suitable for obtaining double slabs by making use advant- .
. ageously of flat trellises able to support and position .
. reciprocally and temporarily the electrically welded wire .
. mesh which is thereafter contained and embedded in the .
15. castings which constitute the two plane-parallel slabs .
. forming the double slab. .
. Double slabs are known which are typically composed of an .
. element with a continuous or semi-continuous surface coop-
. erating with another substantially similar element, both .
20. elements consisting advantageously of cemented conglomerate,
. whereby metallic elements having stiffening and distancing
. characteristics are interposed between the two slabs. .
. Double slabs are also known in which insulating and/.
. or sound-proofing elements are made to cooperate. .

25. Our invention concerns a new process to obtain said

A 11

1. double slabs and also concerns a new device suitable for
realizing said process.

In the known art there is, for instance, patent applic-
ation IT I974IA/77 in the name of Sartorio, wherein the
5. structure and the processes for making and applying a build-
ing element are described.

Said building elements are made with automatic equip-
ment working with a continuous cycle. Said automatic equip-
ment comprises a movable working surface consisting of an
10. endless mat of plastic material moved by suitable rollers.

Parallel rings of a suitable section are also envisa-
ged as delimiting the side zones of formation of said build-
ing element.

This device involves many drawbacks in that its contin-
15. uous movement makes it impossible to vary, as wished, the
structure of the panels thus made, and moreover it is not
suited to the diverse operations which have to be carried
out to make said building element.

Furthermore, if working is carried out with a discon-
20. tinuous cycle, a plurality of interferences begins to take
place among the various operations or functions performed
on the same working surface.

Moreover, the patent does not say how the working sur-
face is limited in its lengthwise direction, nor does it
25. indicate any other functional elements required.

Patent application IT 23223A/77, also in the name of
Sartorio, describes some presumed improvements to the pre-
ceding patent. This patent application shows in a fanciful
way a new method to obtain double slabs; this method envis-
30. ages the descent from above of both the wire mesh and the
distancing and separating elements into a mass of cemented
conglomerate that is still not solidified.

Besides being substantially fanciful, as we said, this

1. device too requires a very liquefied concrete mass with very
long drying and hardening times and involves many drawbacks
and shortcomings which make it substantially impossible to
apply.

5. There is also patent application IT 25325A/77, again
in the name of Sartorio, wherein a system is substantially
visualised for a bond between neighbouring panels with a
double slab; a special panel is also envisaged which repeats
substantially an old patent of Sartorio, namely IT 713072.

10. Moreover, a further patent in the name of Sartorio has
been set forth wherein the realization of double slabs is
envisaged by means of a system of crosswise supports coop-
erating with sound-proofing elements.

This process is described in IT 27620A/78 and can also
15. be deemed to be essentially fanciful in that the elements
cooperating with the distancing trellises comprise special
conformations which cannot be readily handled on a building
site.

In any event this patent foresees rather imaginary and
20. unreal solutions in view of normal working methods.

An application also exists in the name of Impianti In-
dustriali, which was submitted under No. 83345A/78 and deals
with a system for realizing double slabs by withdrawal from
above of the mould forming the empty spaces.

25. This patent deals with a particularly advantageous de-
vice which, however, has inborn limitations because of the
height of the shed which it assumes to be available.

Our present invention aims at the realization of two-
slab panels with a device which is in itself simple and by
30. the employment of a process which can also be applied to
the normal existing tables for making slabs.

This invention, therefore, enables double slabs to be
made even in cooperation with and on tables already suitable

1. for producing single slabs.

According to the invention arrangements are made to lay on a suitable table an electrically welded wire mesh and advantageously to apply the flat trellises, after which it is arranged to pour the concrete mass and create a homogeneous with vibrations, this phase being substantially the same as that normally employed for flat slabs.

On this layer a mould with combs is applied, of which the upper surface forms the lower inner surface of the upper slab constituting the double slab, whereby the mould is suitable for not interfering lengthwise with the intermediate trellises.

The upper surface of the mould with combs is positioned with suitable distancing shims, which thereby regulate the thickness of the double slab; said distancing shims cooperate with appropriate supports not connected to the vibrating surface on which the first slab has been predisposed and obtained.

On the mould with combs an intermediate layer of insulating and/or sound-proofing material can be spread out or deposited.

This intermediate layer can consist of a plurality of elements made of sound-proofing and/or insulating material, on which an electrically welded wire mesh is advantageously laid and anchored to the flat vertical protruding elements.

When the electrically welded wire mesh has been predisposed, arrangements are made to cast the concrete and vibrate the upper slab; the vibration takes place independently of that of the lower slab since the mould with combs receives its vibration either from independent supports or direct and discharges said vibration onto independent supports.

When vibration has taken place or earlier, the surface

1. of the upper slab is finished with a levelling board, which
may perhaps vibrate, the purpose being to obtain diverse
finishes for the usage phase of the slab.

Next, steps are taken to anchor the mould with combs
5. to a crane and to hoist it in a substantially horizontal
position, thereby also lifting the double slab in which
the mould with combs is lodged.

The double slab, with the mould with combs lodged in-
side it, is rested on an appropriate table. During this
10. phase the mould with combs detaches itself independently,
owing to the force of its own weight, from the upper slab
and rests on the lower slab, thus being ready to be with-
drawn.

When one end of the mould with combs has been removed;
15. It is possible to apply to the other end a suitable towing
means, which may be a winch.

By means of this towing means steps are then taken to
withdraw the mould with combs from the double slab on a sub-
stantially horizontal surface.

20. According to the invention the weight of the mould
during withdrawal is advantageously borne not by the slab
but on appropriate rollers positioned on the table itself
and on a possible plurality of bearings solidly fixed to
the mould with combs and running on appropriate guides.

25. The double slab thus formed can be left on the with-
drawal table for final hardening or can be rested on suit-
able surfaces; the double slab is normally transported with
a bridge crane or lift truck.

According to a variant of the invention the mould with
30. combs is suitable for the circulation of a hot substance
able to speed up the drying and hardening process.

According to another variant said hot substance will
advantageously be hot air and/or steam and perhaps will be

Gilberto Petraz

1. allowed to flow between the mould and the double slab so as
to improve the drying and hardening action.

The device suitable for carrying out this process,
therefore, is envisaged as having a moulding surface with
5. vibration means, whereby said surface and said means can be
the same as those required now to make a single slab.

The use of a lifting means and of auxiliary means to
position the mould with combs is also envisaged. Independ-
ent supporting and/or vibrating means cooperating with the
10. mould with combs are also envisaged.

According to a variant said mould means are suitable
for the circulation and distribution of hot substances and
advantageously of steam.

In cooperation with the forming table a withdrawal ta-
15. ble is envisaged as having substantially horizontal towing
means, the mould means being advantageously guided and sup-
ported thereon.

The invention is therefore embodied in a process for
manufacturing and obtaining double slabs, whereby the dou-
20. ble slabs are advantageously suitable for building purposes
and consist of at least two substantially plane-parallel
layers of cemented conglomerate in which electrically weld-
ed wire mesh elements are embedded; said plane-parallel
layers are kept apart from each other by trellis elements
25. advantageously consisting of a flat trellis; said process
is characterized by the fact that an electrically welded
wire mesh cooperating with advantageously flat trellises
is put in a known manner on a forming surface; thereafter
conglomerate is cast in a known manner and is vibrated, and
30. then, after suitable distancing means have been regulated,
a mould with combs is predisposed, on which a layer of in-
sulating and/or sound-proofing material is perhaps laid and
on which is placed an electrically welded wire mesh anchored

1. to the protruding trellises; next, a mass of cemented con-
glomerate is cast and vibrated independently; the whole is
then lifted and moved onto a substantially horizontal with-
drawal surface, where the mould with combs is withdrawn axi-
5. ally.

Furthermore, the invention is embodied in a device to
obtain double slabs, whereby the slabs are advantageously
suitable for building purposes and consist of at least two
substantially plane-parallel layers of cemented conglom-
10. ate in which electrically welded wire mesh elements are em-
bedded, and whereby said plane-parallel layers are kept
apart from each other by trellis elements advantageously
consisting of a flat trellis, said device being character-
ized by comprising in mutual cooperation and coordination:

- 15. - vibrating surface means to form the first slab,
- mould means with combs having circumferential means to
retain the conglomerate, and at least one removable end
for positioning and handling purposes,
- independent adjustable means to support the mould means
20. with combs, there also being vibrating means,
- substantially horizontal surface means with means to sus-
tain and possibly to guide the mould means with combs,
- and means to withdraw the mould means with combs.

With the help of the attached tables, which have been
25. given as an illustrative but not restrictive example, let
us now look at a preferential solution of the invention.

The tables are as follows:

- Fig. 1 shows from above a plant with two forming tables
and two withdrawal tables;
- 30. Fig. 2 gives a side view of the plant of Fig. 1;
- Fig. 3 gives a three-dimensional view of the forming ta-
ble with the mould with combs in the process of
being positioned;



1. Fig. 4 shows the plant with the mould with combs in position and the electrically welded wire mesh fitted;
Fig. 5 shows the plant of Fig. 4 with the second slab being cast;
5. Fig. 6 shows a successive phase of levelling and vibrating the second layer;
Fig. 7 shows the mould/double slab assembly being removed with a winch;
Fig. 8 shows a double slab positioned on the supporting table, while the mould with combs is already connected to the winch and has been partially withdrawn;
10. Fig. 9 shows the mould with combs fully withdrawn from the double slab;

15 Fig. 10 gives an example of the combs of the mould means.
With reference to the figures, we have as follows:
according to the example shown in the figures the forming table I4 is supported by one or more beams I6 resting on independent legs II7, which in this instance are anchored to
20 the floor. The forming table I4 has in a position beneath itself some vibrators I5 which cooperate with the table I4 itself.

On its upper side the forming table I4 has the ability to anchor some suitable movable and shaped side boards 29,
25 which can be fixed with locking pins 28 or other means.

These movable side boards 29 serve to conform the edge of the lower slab 30 and at the same time to contain the cast concrete.

In cooperation with the forming table I4 and at the
30 sides thereof there are supports 33 which are independent of the forming table I4 and which cooperate with the legs I7 and have vibrating elements II5. The independent supports with bearing surface 33 comprise an alignment pin I9

1. and possible variable shims 32 for the vertical positioning
of the mould with combs 20. Instead of the variable shims
32 other means to adjust height could be employed.

A vibrator I5 which is suitable for transmitting the
5. vibration desired to the mould means with combs 20 and only
to said mould means 20 cooperates with the supporting sur-
face 33.

Between the supporting surface 33 and the legs I7 vi-
bration-damping means 3I may be envisaged which do not let
10. the vibrations of the vibrator I5 pass on.

The forming of the double slab takes place substantial-
ly as follows: the forming table I4 is made ready before-
hand, and on it the movable side boards 29 are positioned
and secured with suitable means 28 so as to limit circum-
15. ferentially in a desired manner the slab to be obtained.

Within the perimeter formed by these side boards 29 is
laid an electrically welded wire mesh, to which are anchored,
in our example, by means of the hooks 27 some trellises 26
for connecting and distancing purposes.

20. Said trellises 26 are advantageously flat and are char-
acterized by suitable hooks 27 which enable a trellis to be
anchored to the electrically welded wire mesh by a simple
sideways displacement of the trellis 26 in respect of the
wire mesh.

25. Other trellises 26, however, can be employed which are
substantially suitable for use but have no hooks 27.

Within the perimeter formed by the movable side boards
29 the conglomerate, which may be a cemented conglomerate,
is then poured until the thickness desired for the lower
30. slab 30 has been reached. Next, the whole is vibrated with
the vibrators I5 cooperating with the forming table I4.

When the first layer or first slab 30 has been obtain-
ed, steps are taken to position the mould means with combs

1. 20 by making use of a crane 24 with slings 23 cooperating .
with appropriate hook holes 22 in the frontal connection .
bars 18.

The frontal bars 18 position between themselves the .
5. combs 120 of the mould means 20 and are anchored to the .
mould by connecting pins 34 able to be inserted wherever .
needed.

The frontal bars 18 comprise at their ends at 21 some .
appropriate holes able to cooperate with the positioning .
10. means or pins 19 present on the supporting surface 33.

Thus, the mould with combs rests on separate and auxil-
iary structures 17-33 which do not cooperate directly with .
the forming table 14.

This makes it possible to use already existing forming
15. tables 14 too and merely to add legs 17 and supporting sur-
faces 33 like those shown.

The frontal bars 18 include at their end some guide .
bearing means 118 which are suitable, during the withdrawal
phase, for cooperating with the lateral guide 137 of the .
20. withdrawal group 13.

The frontal bars 18 secure the combs 120 of the mould .
means 20.

The combs 120 and frontal bars 18 are fixed to each .
other, for instance, with pins 34, so that by removing the .
25. pins 34 it is possible to remove the frontal bars 18.

Arrangements are then made to position the mould means
20 in such a way that the combs 120 are disposed alongside .
the trellises 26 and lengthwise thereto so that the corres-
ponding spaces 25 cooperate with the trellises 26 themselves.

30. The spaces 25 are closed upwardly advantageously by .
elastic means 125 which prevent the conglomerate from pass-
ing through and enable a moulding surface 114 to be obtained.

The combs 120 can be conformed in any desired manner.

1. When positioning the frontal bars 18, care should be
taken to ensure that the holes 21 in said frontal bars 18
coincide with the positioning means or pins 19 so as to per-
mit both a suitable anchorage and a coordinated seat on the
5. surface 33.

With the mould means 20 in position the plant is ready
to make the second layer.

To regulate the interspace which has to be kept between
the upper and lower layers, steps are taken to predispose
10. shims 32 of various sizes until the required height is rea-
ched.

Instead of the shims 32 means of another type to regul-
ate the height can be envisaged.

A layer of insulating and/or sound-proofing material
15. is placed on the mould means 20 on the new forming surface
119, or nothing is placed thereon, depending on the specific
requirements.

Electrical and/or hydraulic circuits can also be pre-
disposed together with possible junction boxes or sockets,
20. thus enabling the various electrical, hydraulic and intercom
circuits, etc. to be obtained or making it possible to ob-
tain spaces which are equipped or can be equipped, such as
windows or doors and the like while the double slab is be-
ing made.

25. The electrically welded wire mesh 42 is put on the
mould with combs 20 and possibly on the possible layer of
insulating material when so predisposed, and is anchored to
the trellises 26.

When the electrically welded wire mesh has been anchor-
30. ed to the trellises 26, the plant is ready to make the sec-
ond slab 43.

As said earlier, the trellises 26 are made to pass
through the mould means 20 by making use of lengthwise slits

1. 25, which are closed lengthwise 25 to the passage of concrete material by means 125 made of an elastic material.

2. Around the mould means 20 and on its upper side, suitable movable side boards 129 are provided and fixed to the mould means itself 20 and to the bars 18 and serve to limit and delimit the second slab 43.

3. When the upper surface 114 too has been made ready, steps are taken to pour and level the conglomerate, as shown in Figs. 4, 5 and 6 as an example.

10. Levelling can be done with a levelling board 41, which may be motorized or not and which can cooperate with vibrator means 215.

4. As soon as the upper surface has been levelled and the product has been hardened enough, arrangements are made to lift with the crane 24 the whole assembly consisting of the double slab 30-43 and the mould means with combs 20, as shown in Fig. 7 as an example.

5. The mould means 20 can be provided with suitable ducts through which steam or hot air or another heating means can pass so as to dry and normalise the double slabs more quickly.

6. According to a variant the combs 120 include a plurality of holes 220 which permit the coordinated outgoing of steam and/or hot air which comes into contact with the conglomerate and speeds up drying. Said holes 220 can be of any desired type and shape and can be located anywhere.

7. The double slab 30-43 and mould means 20 are lifted together and the whole is rested on the withdrawal table 12, care being taken that the rear end bar 18 cooperating with the rear end of the mould means 20 cooperates advantageously with the pins 119 on the withdrawal table 12.

8. When the double slab 30-43 and the mould means 20 are rested on the withdrawal table 12, the mould means 20 de-

1. taches itself from the upper slab 43 owing to the action of
its own weight and rests on the lower slab 30, thus freeing
itself.

On the withdrawal table I2 the double slab can be rest-
5. ed advantageously on the supports II2 covered with wood or
with an elastic material.

Next, the end bar I8 present at the front of the mould
means 20 is anchored to the winch means 35 with a carriage
or carriages with a towing wire 36.

10. The rear end bar I8 cooperating with the pins II9 is
then detached by removing the connections consisting of the
connection pins 34, if existent; the mould means 20 is thus
left with only the front end bar I8.

By using the winch 35, the mould means 20 is caused to
15. leave by being pulled out from the double slab and is advan-
tageously made to slide on the supporting rollers 37 so
that said mould means 20 does not press on the lower slab
30 and thereby create stresses or breakage.

To reduce the pressure still further, the bar I8 com-
20. prises bearing means II8 that slide on the lateral guides
I37 and are sustained thereby.

When the whole mould means 20 has been withdrawn, the
slab is available for transfer to any desired place.

Ledge means 234 can be envisaged which are able to per-
25. mit the mould means to continue to be supported both by the
bearing means II8 (at its front) and by the roller or rol-
lers 37 (at its rear).

As soon as it has been withdrawn, the mould means 20
is cleaned and re-assembled, and the end bar I8 which was
30. temporarily detached is mounted again thereon; the mould
means 20 is used again for the next cycle of moulding double
slabs, said cycle beginning with the time of use of the
mould means 20 itself.

Gilberto Petraz

1. In fact, the forming table I4 has been cleaned in the
meanwhile, the electrically welded wire mesh has been pre-
disposed, the trellises 26 have been predisposed, the first
casting of conglomerate has been carried out and vibrating
5. has been done.

This makes available the instalment of the mould means
20 which has been withdrawn just now from the double slab
30-43.

A plant II according to the invention can include one
10. or more forming tables I4, perhaps aligned, and one or more
withdrawal tables I2-I3 with one or more winch means 35, de-
pending on the production rate.

We have described here a preferential solution of the
invention, but variants are possible. Thus the proportions,
15. times, sizes and lay-outs can be varied; it is possible to
conform the mould means 20 in any desired way; the invent-
ion can be combined with forming tables I4 already existing,
etc. These and other variants are all possible for a technic-
ian in this field.

20 .

25 .

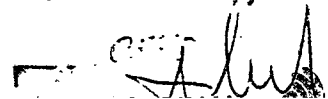
30 .

Gilberto Pérez

C L A I M S

1. I. Process to produce and obtain double slabs, whereby
the slabs are advantageously suitable for building uses and
5. consist of two substantially plane-parallel layers of cement-
ed conglomerate in which electrically welded wire mesh ele-
ments are embedded, and whereby said parallel surfaces are
separated from each other by trellis elements which are ad-
vantageously flat trellises, said process being character-
10. ized by the fact that on one forming surface (14) is placed
in a known manner an electrically welded wire mesh (42) co-
operating with trellises (26) which are advantageously flat,
and that a casting of conglomerate is then carried out in a
known manner and is next vibrated to obtain the first sur-
15. face (30), and that, after regulation with suitable distanc-
ing means (32), a mould means with combs (20) is predisposed
on which a layer of insulating and/or sound-proofing material
is possibly laid and over which an electrically welded wire
mesh (42) is placed and anchored to said protruding trellis-
20. es (26), and that a mass of cemented conglomerate is then
poured which is vibrated independently, the second surface
(43) being thus obtained, whereby the whole (23-24) is then
lifted and moved onto a substantially horizontal withdrawal
surface (12), where said mould means with combs (20) is with-
25. drawn axially (35-37).

2. Device to obtain double slabs, whereby the double
slabs are advantageously suitable for building uses and
consist of at least two substantially plane-parallel layers
of cemented conglomerate in which electrically welded wire
30. mesh elements are embedded, and whereby said parallel sur-
faces are separated from each other by trellis elements (26)
which are advantageously flat trellises and the device is
suitable for embodying the process of the Claim hereinbefore,



1. said device being characterized by comprising in mutual co-
 . operation and coordination:
 . - table means (14) to form the first slab (30), equipped .
 . with vibrating means (15), .
 5. - mould means with combs (20) together with means to retain
 . the conglomerate (125-129) with at least one end bar (18)
 . to obtain positioning and handling, .
 . - supporting surface means (33) with positioning means (19)
 . and adjustable means (32), said supporting means (33) .
 10. being independent and able to sustain mould means with .
 . combs (20), there being vibrating means (15), .
 . - withdrawal table means (12) with substantially horizontal
 . withdrawal means (13) together with means (112-37-137) to
 . support and possibly to guide the mould means with combs .
 15. (20).

3. Device to obtain double slabs, as in Claim 2, char-
 . acterized by the fact that the supporting means (33) bear .
 . positioning means (19) and means to regulate thickness (32)
 . and are upheld by independent legs (17), whereby there are .
 20. advantageously vibration-damping means (31) and whereby .
 . vibrator means (15) are present.

4. Device to obtain double slabs, as in Claims 2 and 3,
 . characterized by the fact that the mould means (20) compris-
 . es a plurality of interspaced (25) combs (120), whereby .
 25. said plurality of combs (120) is positioned by end bar means
 . (18) and at least one of said end bar means is removable, .
 . and whereby said spaces (25) between said combs (120) in- .
 . clude elastic means (125) to retain conglomerate at least .
 . at their upper side.

30. 5. Device to obtain double slabs, as in Claim 2 and in
 . one or another of the Claims thereafter, characterized by .
 . the fact that the end bar means (18) include holes (21) to .
 . cooperate with positioning means (19) and bearing means

1. (II8) to cooperate with guide means (I37), whereby there
are advantageously means to anchor side boards (I29) and
hook means (22).

6. Device to obtain double slabs, as in Claim 2 and in
one or another of the Claims thereafter, characterized by
the fact that the combs (I20) include means to receive and
convey hot substances (air and/or steam), whereby distri-
bution means (220) are advantageously present.

7. Device to obtain double slabs, as in Claim 2 and in
one or another of the Claims thereafter, characterized by
the fact the the withdrawal table means (I2) with withdraw-
al means comprise a supporting surface (I2) for the double
slab (30-43)/mould means (20) assemblage and, at their front,
towing means (35-36) and guiding (I37) and supporting (37).
means and possibly a stop (234).

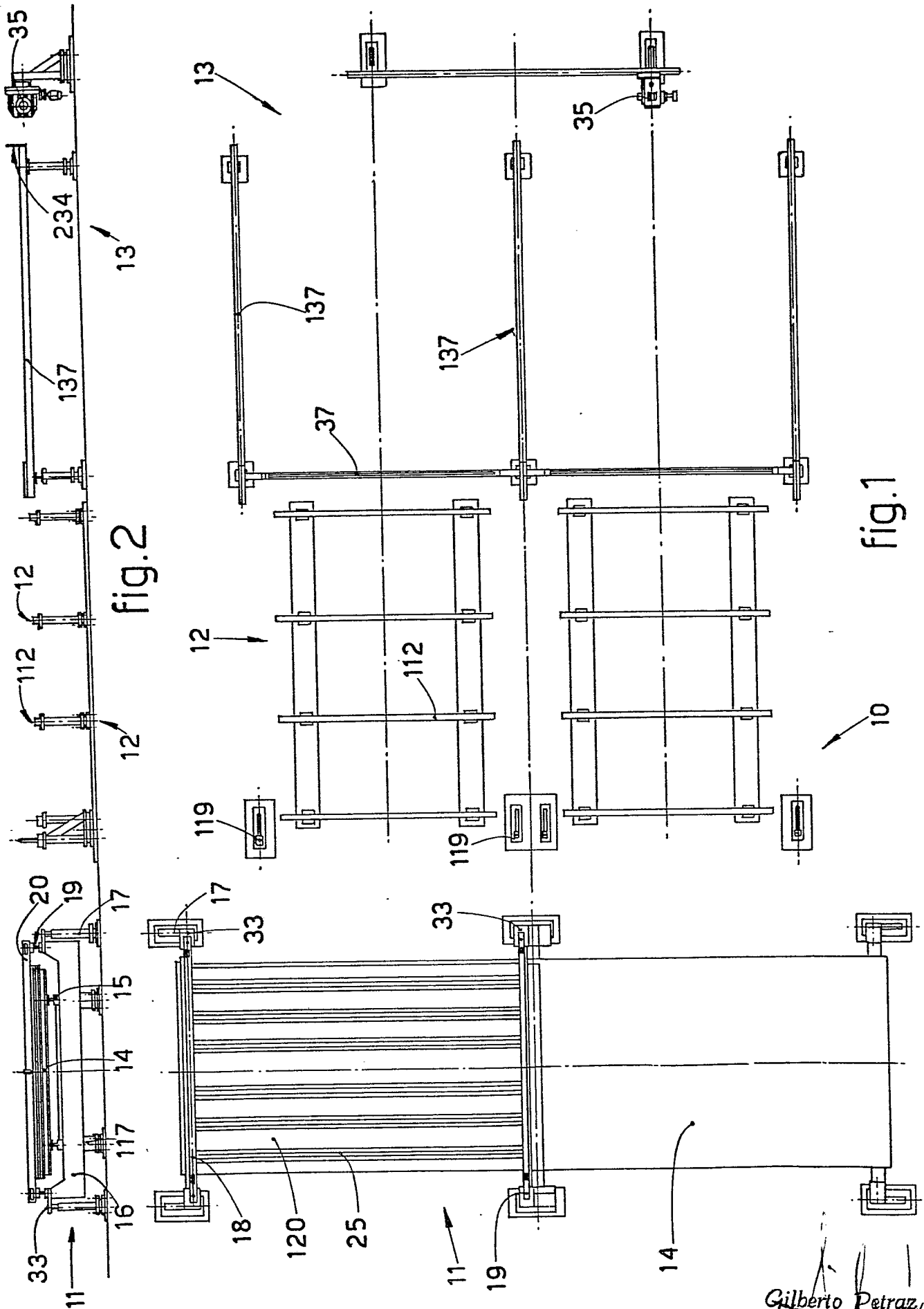
8. Device to obtain double slabs, as in Claim 2 and in
one or another of the Claims thereafter, characterized by
the fact that the supporting surface means (I2) has support-
ing surfaces (II2) covered with soft materials (wood, rubber,
etc.).

9. Device to obtain double slabs, as in Claim 2 and in
one or another of the Claims thereafter, characterized by
the fact that the towing means (35-36) consist of winch
means (35) cooperating with a cable (36) anchored to the
end bar (I8) solidly fixed to the plurality of combs (I20).

10. Process to produce and obtain double slabs advantag-
eously suitable for building uses, and device to realize
said process, as described and shown and for the purposes
allowed.

30.

1/4



Gilberto Petraz

2/4

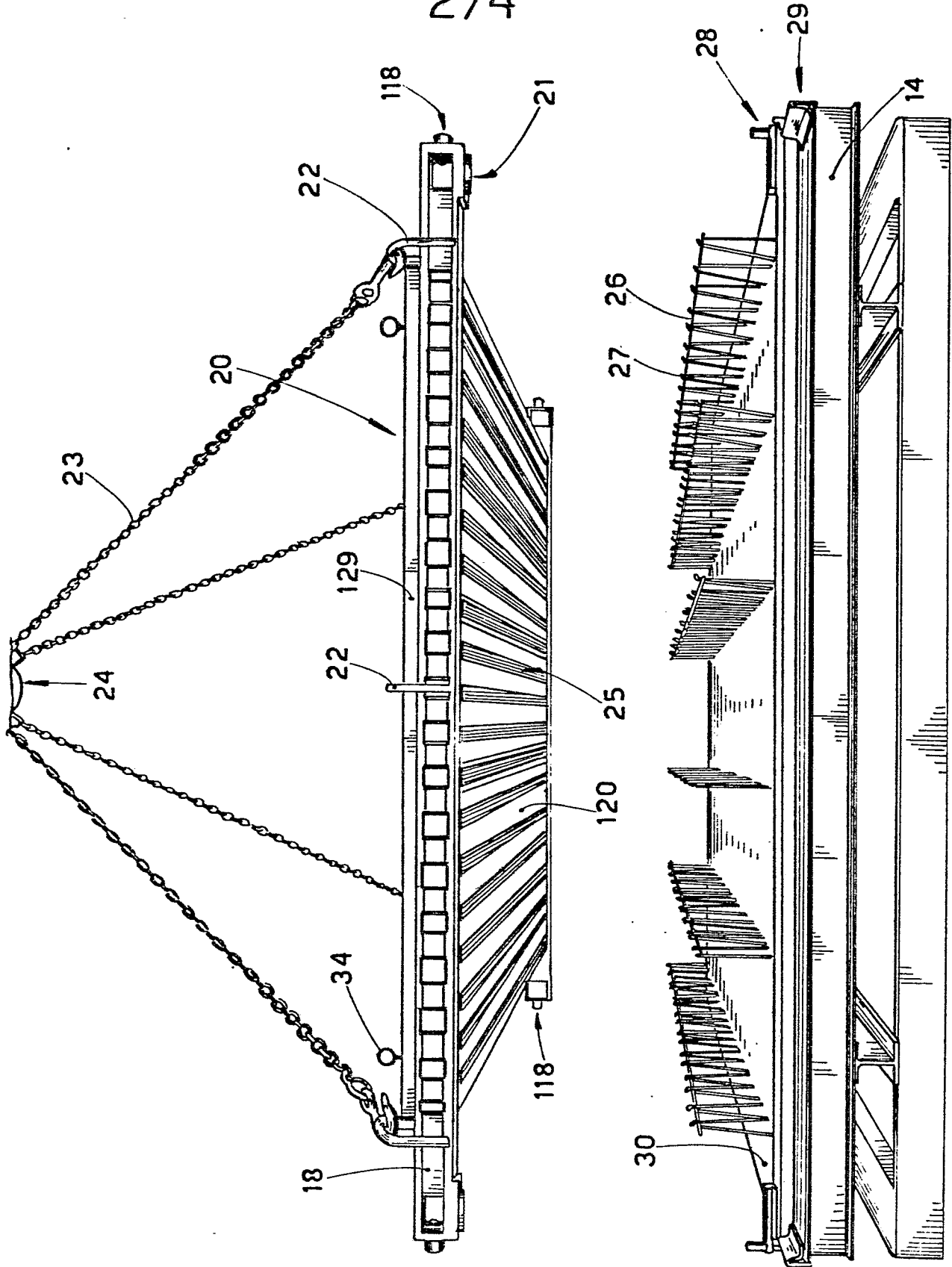


Fig. 3

3/4

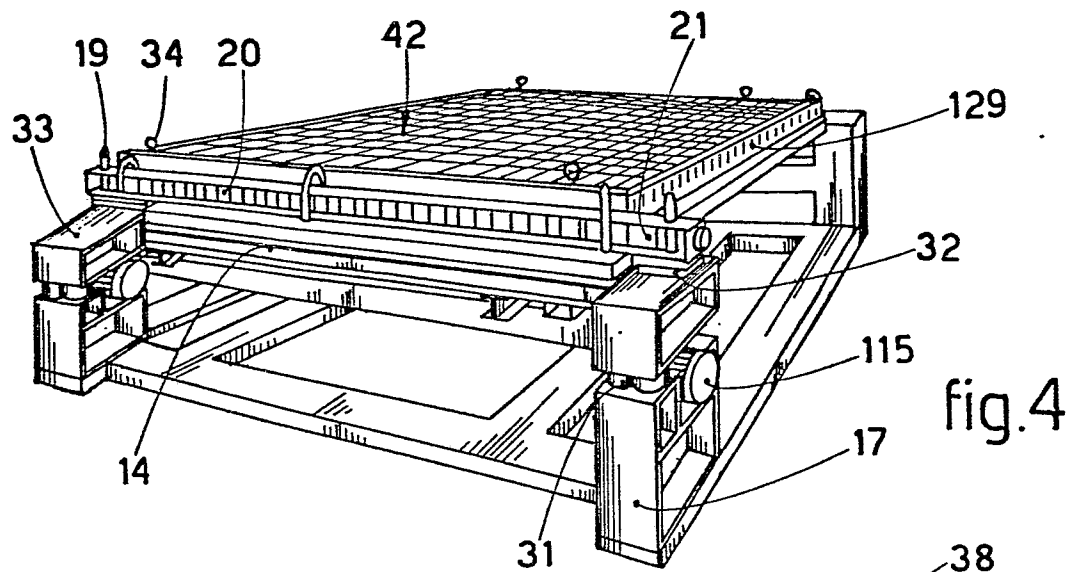


fig.4

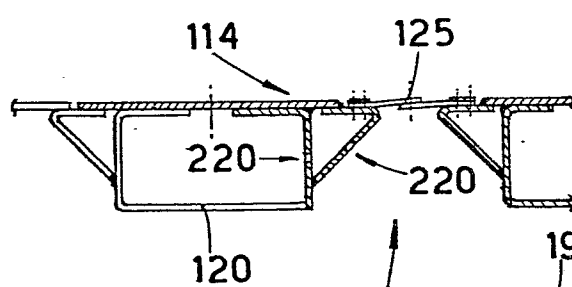


fig.10

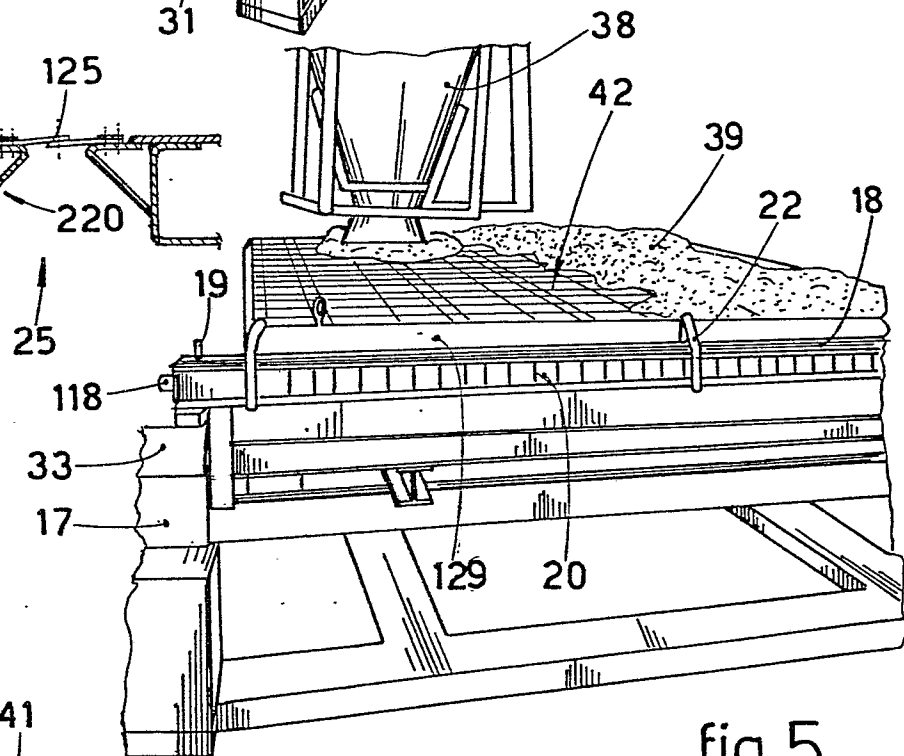


fig.5

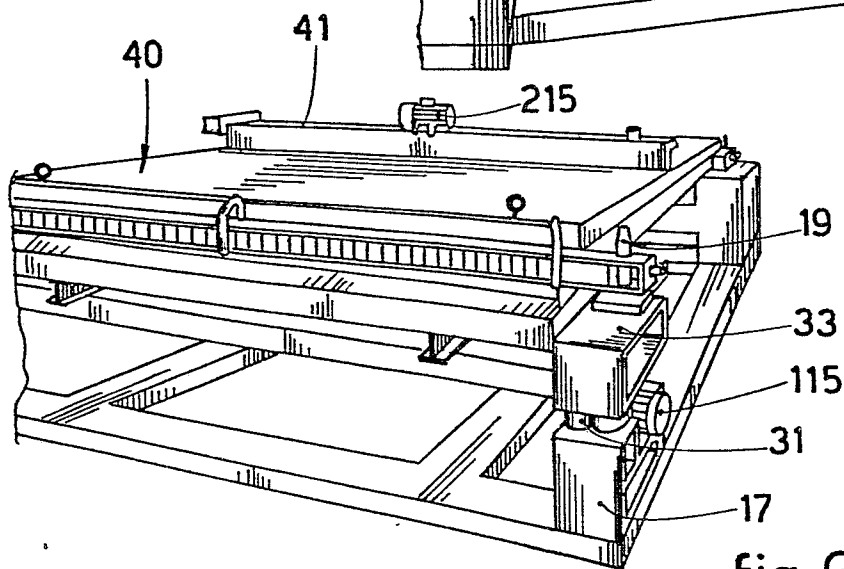
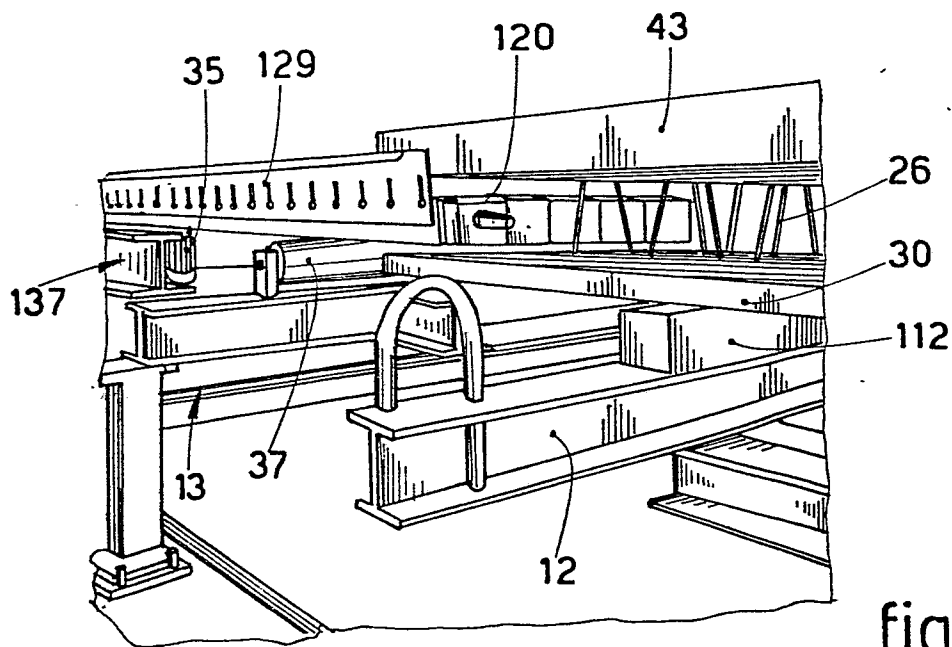
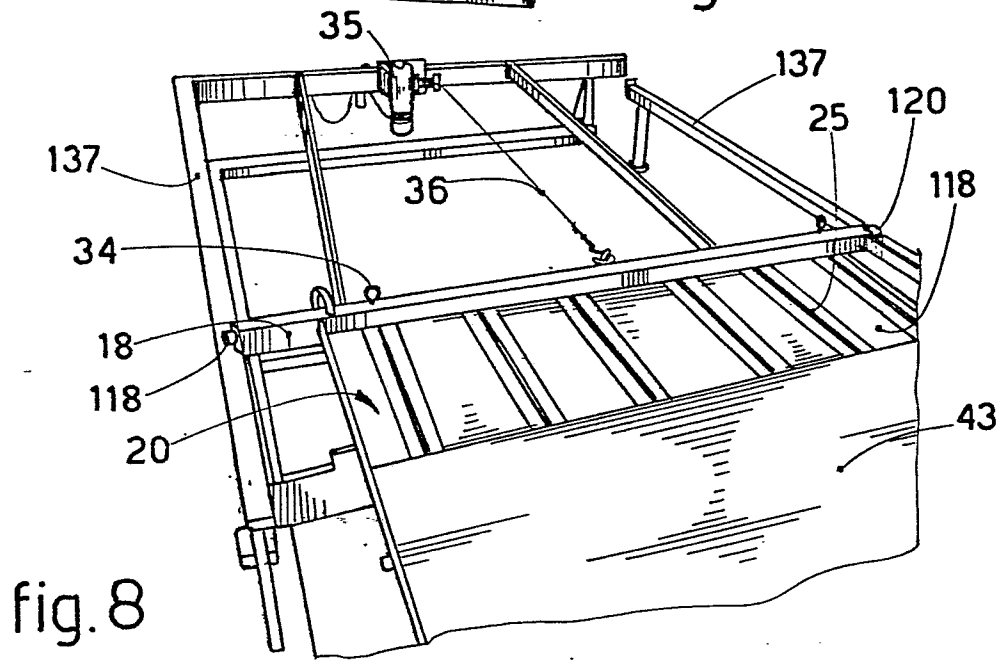
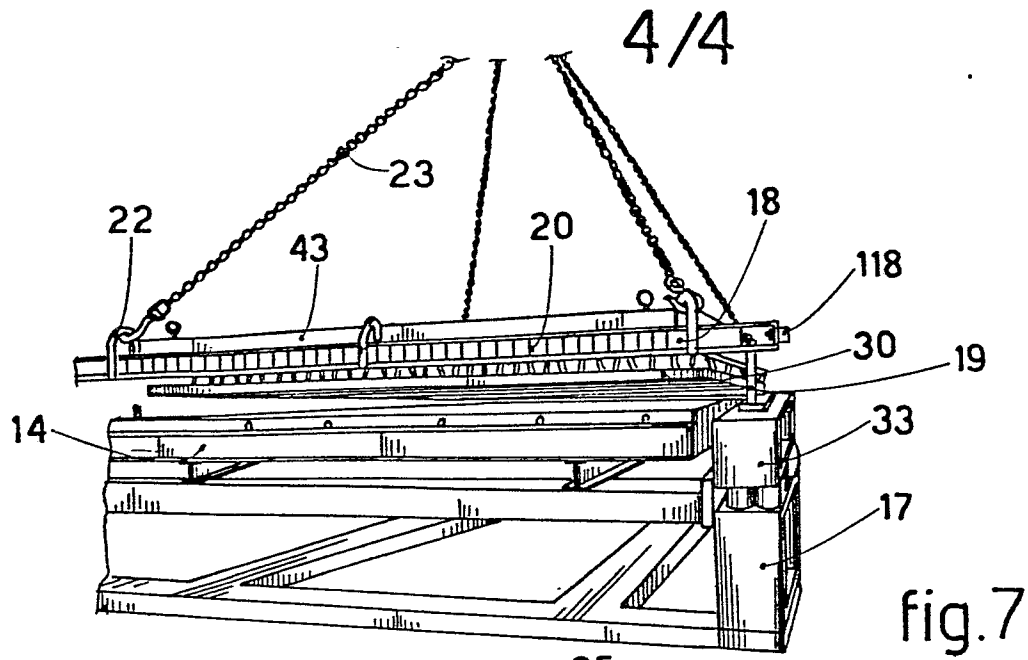


fig.6

Gilberto Petraz



Gilberto Petraz



European Patent
Office

EUROPEAN SEARCH REPORT

Application number
EP 81 83 0167

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>DE - A - 2 449 800 (RHEINBAU)</u> * Whole document * --	1,2	B 28 B 23/02
A	<u>DE - A - 2 611 843 (E. WAGNER)</u> * Whole document * --	1,2	
A	<u>DE - A - 2 064 434 (G. HUBMANN)</u> * Whole document * --	1,2	
A	<u>FR - A - 2 131 615 (G. HUBMANN)</u> * Whole document * -----	1,2	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) B 28 B
			CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
☒ The present search report has been drawn up for all claims			&: member of the same patent family. corresponding document
Place of search The Hague		Date of completion of search 05-04-1982	Examiner BOLLEN