

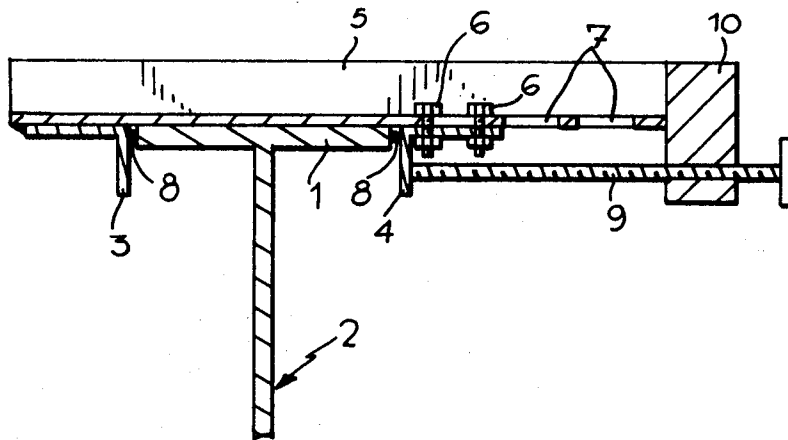
[72] Inventor **Abraham Lipski**
Uccle, Belgium
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 [73] Assignee **Procedes Nouveaux De Construction,**
"Preflex" Societe Anonyme
Saint-Gilles, Belgium
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 [31] **62,396**

[56] **References Cited**
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Primary Examiner—Robert F. White
Assistant Examiner—Thomas P. Pavelko
Attorney—Young and Thompson

[54] **METHOD FOR MANUFACTURING A PREBENT GIRDER EMBEDDED IN CONCRETE**
3 Claims, 2 Drawing Figs.

[52] **U.S. Cl.**..... **264/228,**
25/118 T
 [51] **Int. Cl.**..... **B28b 23/06**
 [50] **Field of Search**..... **264/228**

ABSTRACT: Method for manufacturing a prebent girder embedded in concrete wherein the rigid metal joist of said girder is prebent, the joist is maintained prebent and the tension flange of said joist is embedded in a mass of concrete. Before the prebending, a rigid metal structure, constituted essentially, on the one hand, by longitudinal elements arranged against the edges of said compressed flange and, on the other hand, by transverse connection elements, is temporarily applied to the compressed flange of the joist, said structure acting to avoid lateral buckling of the compressed flange.



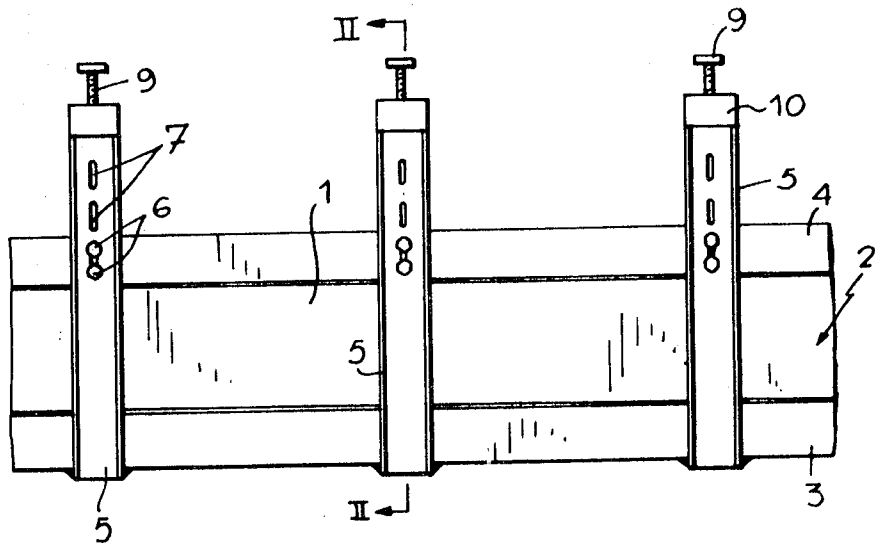


FIG. 1

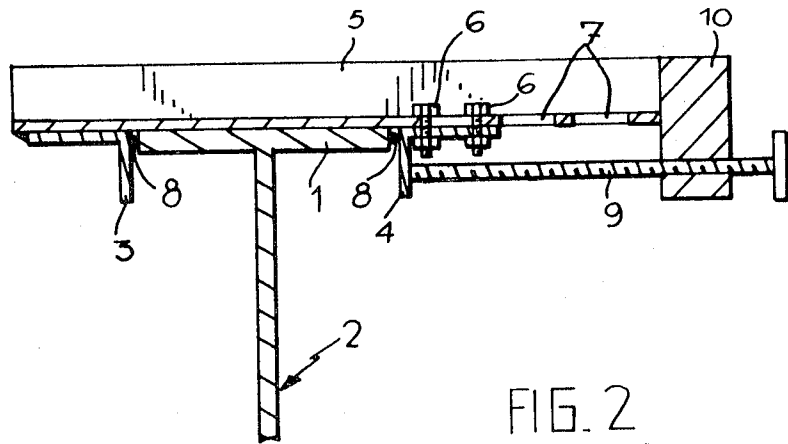


FIG. 2

INVENTOR

ABRAHAM LIPSKI

By *Young & Thompson*
ATTYS.

METHOD FOR MANUFACTURING A PREBENT GIRDER EMBEDDED IN CONCRETE

This invention relates to a method for manufacturing a prebent girder embedded in concrete by first prebending the rigid metal joist of said girder, maintaining the joist prebent and then embedding the tension flange of said joist in a mass of concrete.

In the known methods of the art, the compressed flange of the joist tends to undergo a lateral buckling under the effect of the compressive stresses, due to the prebending.

In the case where the joist presents, crosswise to the prebending direction, a low stiffness, it is necessary to maintain said joist laterally, during the prebending, so as to avoid such a lateral buckling of the compressed flange.

In order to help the joist to undergo high prebending couples, without a danger of lateral buckling of its compressed flange, said joist has to be designed with a stiffness transversely to the prebending direction which is distinctly higher than the stiffness normally required in use. This results in an unnecessary and expensive waste of steel, and leads to a girder of an excessive weight.

The problem concerning the lateral buckling under the effect of prebending has a particular importance in the case of simultaneous manufacturing of two prebent girders by prebending of the metal joists of said two girders in opposite directions and in the same vertical plane.

In the known methods of simultaneous prebending of two joists, vertical metal supports with a sufficient stiffness in the transverse direction to the prebending direction are arranged on both sides of the joists to be prebent, and these supports are tightened against the flanges of said joists.

The use of such supports presents the disadvantage of being a hindrance to a normal regular bending of the two joists under the effect of the prebending, this hindrance being due to the friction of these supports against all the flanges.

On the other hand, it is not possible to embed in a mass of concrete, the parts of the flanges, against which are arranged said supports, as the latter prevent the placing of appropriate casings.

Attempts have been made to meet these disadvantages by reducing the length of the supports, in order to apply them only on the compressed flanges and on the webs of the joists so as to clear the tensioned flanges of the joists to be embedded in concrete.

It is evident that in this known method the effectiveness of the supports decreases with their length. On the other hand, the area of the tensioned joist parts to be embedded in concrete increases generally with the prebending of the joists. Thus the length of the supports, and consequently their effectiveness, has to be reduced the more the joists are prebent, so that the prebending couples have finally to be limited to relatively low values.

The present invention meets these disadvantages. For this purpose, in the method according to the invention, the stiffness of the compressed flanges of the joists is temporarily increased in the direction transverse to the prebending.

For this purpose, according to the invention, a rigid metal structure is applied temporarily on the compressed flange of the joist, said structure being constituted essentially, on the one hand, by longitudinal elements, arranged against the edges of said compressed flange, and, on the other hand, by transversal connection elements and designed to prevent the lateral buckling of said compressed flange.

According to a particular characteristic of the novel method, a lubricant is placed between the longitudinal elements of the above mentioned structure and the edges of the compressed flange of the metal joist.

According to another more favorable characteristic of said novel method, the longitudinal elements of the above mentioned structure are tightened against the edges of the compressed flange, so as to prevent their sliding on the latter during the prebending and to form a temporary frame for the compressed flange.

By the application of the method according to the invention, it will be possible to realize prebent girders with a relatively thin web and compressed flange.

Other particular features and details of the invention will appear in the following description of two embodiments, with reference to the accompanying drawings, in which:

FIG. 1 is a plan view of the compressed flange of the prebent joist of a girder, and

FIG. 2 is a cross section along the line II—II of FIG. 1.

In these two FIGS., the same reference numerals refer to similar elements.

A rigid metal structure, constituted essentially on the one hand, by longitudinal elements, such as angle irons 3 and 4 and on the other hand, by transverse connection elements, such as U-shaped irons 5, is applied temporarily on the compressed flange 1 of a metal joist 2.

Said metal structure presents a high stiffness in the direction transverse to the prebending direction. For this purpose, the angle irons 3 are welded with one of their ends to the U-shaped irons 5. On the other hand, the angle irons 4 are temporarily interlocked at their opposite ends to this U-shaped irons 5 by means of through bolts 6. The position of each angle iron 4, relative to the U-shaped irons 5, is adjustable, as the latter bear several holes 7 for the bolts 6.

Furthermore, the angle irons 3 and 4 are applied against the edges of the compressed flange 1, eventually with an intermediary lubricant 8, by means of setscrews 9, screwed in the threaded blocks 10, integral with the U-shaped irons 5. The angle irons 3 and 4 and U-shaped irons 5 constitute a so-called "Virendeel"-type structure, having a high rigidity in the plane of the angle irons 3 and 4, i.e. in the direction transverse to the direction of the prebending. This structure consequently helps to maintain the flange 1 and avoids its lateral buckling under the effect of prebending.

When a lubricant is used, the structure forms a guide for the deformation of the compressed flange 1, whose edges are slidable along the angle irons 3 and 4.

When the angle irons 3 and 4 are tightened steadily against the compressed flange 1, in order to avoid their sliding on the edges of the flange under the effect of the prebending, these angle irons 3 and 4 absorb a part of the tensile stresses transmitted to said compressed flange 1. Thus, the angle irons 3 and 4 diminish the danger of a side tilt of the flange 1 and constitute a complementary frame for the same.

It is evident that in the case of a joist 2 of particularly great length, the metal-stiffening structure will preferably be constituted of a series of longitudinal elements 3 and 4, aligned coaxially and assembled end to end, for example by means of bolts, welds, etc.

The present invention is not limited to the shown embodiments. Many modifications can be made in the form, the arrangement and the structure of some of the elements, which take part in the realization thereof, in accordance with the present invention, provided that these modifications are not in contradiction with the content of the following claims.

What is claimed is:

1. In a method for manufacturing a prebent girder embedded in concrete wherein:

—a rigid metal joist of said girder is first prebent and maintained in its prebent condition

—and the tensioned flange of said prebent metal joist is thereafter embedded in concrete, the improvement characterized by:

—applying a rigid metal structure comprising longitudinal and transverse elements to a flange of the metal joist, prior to prebending said metal joist, which after prebending will be in compression, the longitudinal elements of said metal structure being arranged against the edges of the last-mentioned flange,

—and dismantling said metal structure after withdrawal of the prebending loads

whereby said metal structure prevents a lateral buckling of said last-mentioned flange.

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2. A method as claimed in claim 1, and placing a lubricant between said longitudinal elements of said metal structure and the edges of said last-mentioned flange.

3. A method as claimed in claim 1, and tightening said lon-

gitudinal elements of said metal structure against said edges of said last-mentioned flange so as to avoid their sliding on said edges during the prebending and to form a temporary frame complement for said last-mentioned flange.

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