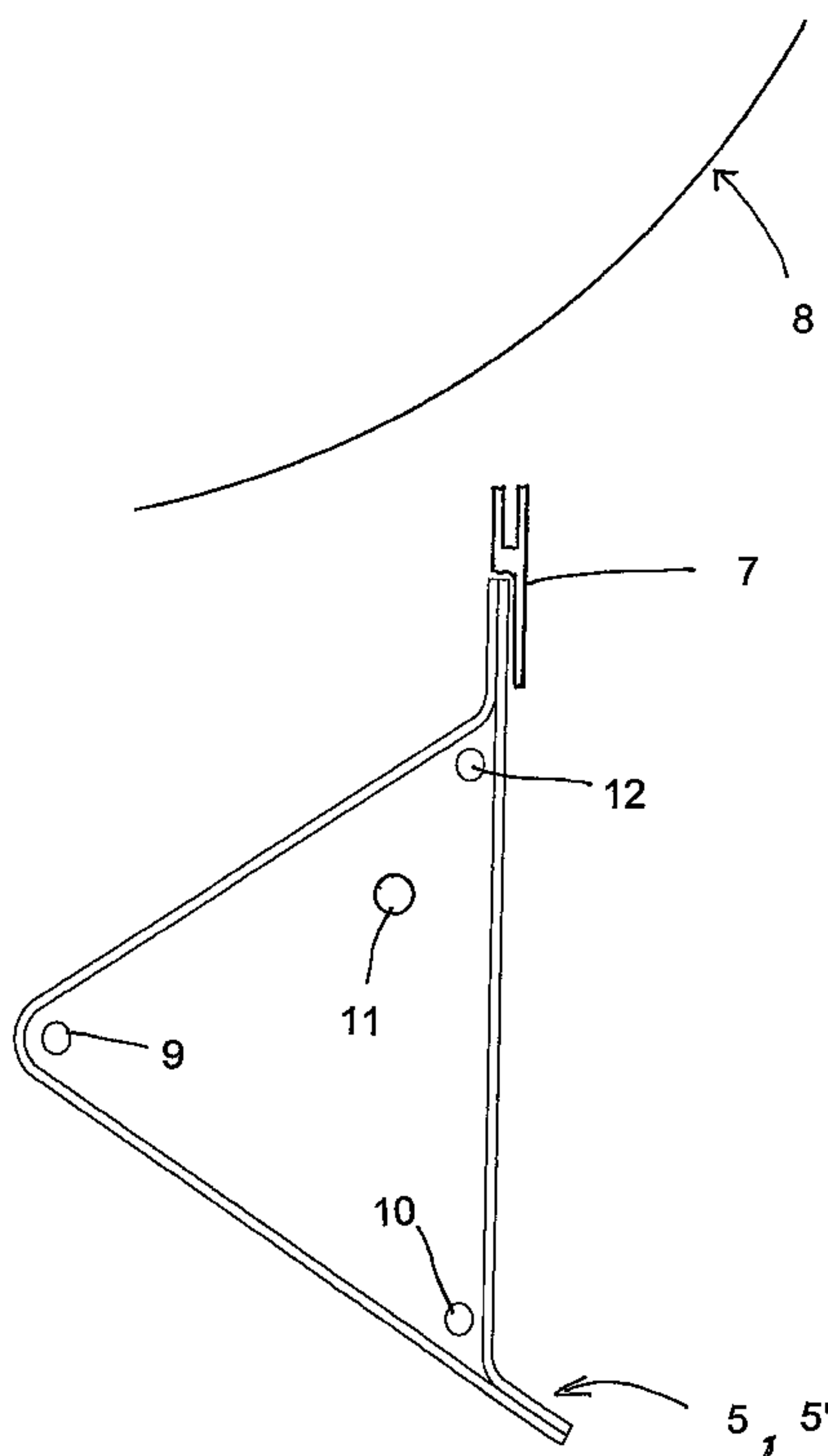




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 (71) Demandeur/Applicant:
RUNTECH SYSTEMS OY, FI
 (72) Inventeur/Inventor:
KANNISTO, KARI, FI
 (74) Agent: MACRAE & CO.

(54) Titre : CONSTRUCTION DE CYLINDRE ET PROCEDE DE FABRICATION DE CELUI-CI
 (54) Title: BEAM CONSTRUCTION AND METHOD FOR MANUFACTURING THE SAME



(57) Abrégé/Abstract:

A beam construction, particularly a so-called doctor beam, for use mainly in pulp and paper mills to carry blade holders (7) intended to hold doctor blades. The beam (1) is a composite-construction hollow beam, which also includes at least one composite construction pre-tensioning rod (9, 10, 12). The construction has an essentially triangular cross-section.

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(71) Applicant (for all designated States except US): **RUN-TECH SYSTEMS OY** [FI/FI]; Kastarintie 25, FI-35990 Kolho (FI).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **KANNISTO, Kari**; Venetie 4, FI-35600 Halli (FI).(74) Agent: **LAITINEN, Pauli, S.**; Patentti-Laitinen OY, P.O. Box 29, FI-02771 Espoo (FI).

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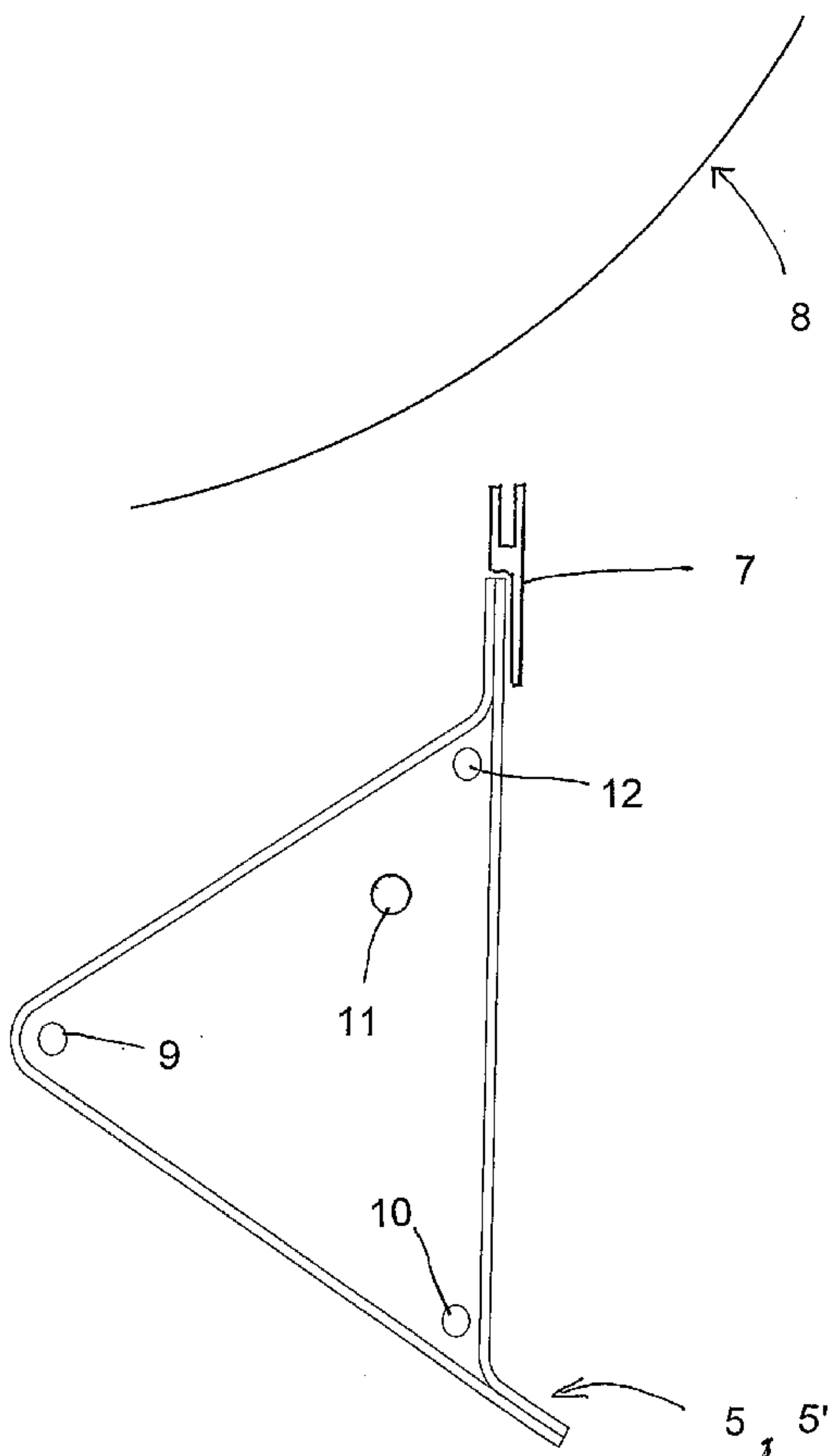
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(54) Title: BEAM CONSTRUCTION AND METHOD FOR MANUFACTURING THE SAME



(57) Abstract: A beam construction, particularly a so-called doctor beam, for use mainly in pulp and paper mills to carry blade holders (7) intended to hold doctor blades. The beam (1) is a composite-construction hollow beam, which also includes at least one composite construction pre-tensioning rod (9, 10, 12). The construction has an essentially triangular cross-section.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Beam Construction and Method for Manufacturing the Same

The present invention relates to a beam construction, particularly to a bearer
beam construction, such as a doctor beam, and more specifically to a doctor
5 beam that is used mainly in pulp and paper mills to hold in place a doctor blade,
which is intended to scrape excess detrimental particles off the top of a roll. The
invention also relates to a method for manufacturing the beam construction.

When reference is made to doctor beams in mills like those mentioned above, this
10 nearly always means massive steel beams, which may be of considerable length,
as the rolls used in pulp/paper mills can be quite large and the beam typically
extends from one end of the roll to the other.

The steel beams are very heavy, which means that all of the structures must be
15 very strong and stiff. Their large size and weight makes the beams difficult to
install and maintain. In addition, such a beam is very expensive.

Attempts have also been made to make composite-construction beams, which are
lighter than steel beams. One such is disclosed in US patent 5,356,519, which
20 discloses an essentially triangular beam, in which the structure is formed by three
essentially V-shaped pieces rivetted to each other.

The present invention is intended to create an improved doctor beam. The
intention is specifically to lighten the beam while at the same time to give it
25 installability and serviceability characteristics of a whole different order to those of
known steel beams. The intention is also to improve the stiffness of a composite-
construction beam. Naturally, an additional intention is also to reduce the price of
the beam.

30 The aforementioned and other advantages and benefits of the present invention
are achieved in the manner described as characteristic in the accompanying
Claims

In the following, the invention is examined in greater detail with reference to the

accompanying patent drawings, which show some of the characteristic features of a beam according to the invention.

Thus:

5

Figure 1 shows one embodiment of the invention, with the main components separated; and

Figure 2 shows a cross-section of the assembled version of the same beam.

10

The characteristic features of the method according to the invention will become apparent from the following description.

Thus Figure 1 shows two main components 2, 5, 6 and 3, 4, 5', and 6' of the beam according to the invention. The components are manufactured particularly from a so-called pre-preg material using moulding technology in an autoclave. The advantages of moulding technology are the smooth external surfaces, which help to keep the product clean.

20 The prepreg material is a pre-impregnated so-called B-fabric, in which the impregnating agent is typically an epoxy resin, which in the moulding stage is still in a mouldable state. The reinforcement or fabric is, on the other hand, formed from various fibres, most usually glass-fibre and carbon-fibre. The fibre can be oriented as desired, either in one direction or else crosswise in different ways. For example, it is possible to use one-direction tapes, in which case the components of the beam are made by laying the tapes in layers, with the fibres in the different layers crossing each other in different directions. The material is, as such, known and in general use, for example, in the aviation industry. The material is available as a woven fabric and as a tape, i.e. as a one-direction fabric.

30

In order to be able to have the greatest effect on the strength of the construction, flange components 5, 6 and 5', 6,' which come outside the essentially triangular base structure, are formed in the components 2 and 3, 4 and are brought against each other only in the assembly stage of the beam and, in that stage, are glued

onto each other, the joint being secured mechanically, for example, by bolts. In the finished beam, the flanges 5, 6 and 5', 6' act as stiffeners against deflection and vibration, as well as an attachment surface for blade holders.

5 The disclosed manufacturing technique allows the thickness of the materials of the components of the beam to be selected as desired. For example, this can be easily done by laying more layers at points where it is assumed that the stronger material would be advantageous. Obviously, the thickness of the material can be made to vary in both the longitudinal and transverse directions. The deflection,
10 vibration, and similar properties can also be substantially affected by the choice of the type of fabric.

Figure 2 in turn shows a cross-section of an assembled doctor beam 1 according to the invention. The beam 1 generally forms a triangular structure, in which there
15 are sides 2, 3, and 4. The sides need not necessarily be equally long, in other words, the triangular structure is not equilateral, instead the lengths of the sides are chosen by taking into account deflection and vibration properties, as well as the available space. It is simple to fit the beam according to the invention to existing structures, as the dimensions of its structure can be changed relatively
20 easily. As can be clearly seen from the description of Figure 1, the beam according to the invention has a composite construction.

The second flange component 6 of the assembled beam is used to attach the holder 7 of the doctor blade. The doctor blade, which is not marked in the figure,
25 rests on the surface of the roll being doctored, at a short distance from the holder 7.

Figure 2 shows pre-tensioning rods 9, 10, and 12, with the aid of which both the deflection and the torsion of the beam can be controlled simply, by
30 tightening/loosening the pre-tensioning rods. The pre-tensioning rods too are made from a composite material that corresponds to the construction of the beam. This ensures that incompatibility of the materials will not, for example due to temperature variations, alter the adjustment values so as to detrimentally affect how they operate, or the end result of the work they perform. There is at least one,

and optimally three pre-tensioning rods. Two pre-tensioning rods can also be used. The locations of particularly the three rods are close to the corners of the beam, which is essentially triangular.

- 5 Various conventional means, mainly screws, which can be adjusted to change the tension in the pre-tensioning rods, exist for tensioning and adjusting the pre-tensioning rods.

10 In the above, the figures show only one cross-sectional form, though it is exceptionally good and appropriate for this purpose. However, the invention is not restricted to this form, instead, as is known, many other cross-sectional or other shapes can be used to create strong constructions. Various kinds of reinforcing ridges, grooves, or similar can also be used to strengthen the construction. If composite-construction and steel beams are compared to each other in terms of
15 weight and installability, it will be noted that the composite construction is light and slim, even though no kind of reinforcing structure whatever is added to it in practice.

20 If desired, an adhesive can be led inside the beam according to the invention, for example a hot adhesive to prevent the beam sweating and to promote ventilation in general. The air can be fed mechanically, but even spontaneous ventilation can be created, by making holes oriented in a rational manner at suitable points in the beam. The orientations can be affected by many factors in the beam and its surroundings. One air-feed connection is marked with the reference number 11 in
25 Figure 2.

Claims:

1. Beam construction, particularly a so-called composite-construction doctor beam, for use mainly in pulp and paper mills to carry blade holders (7) intended to hold doctor blades, **characterized** in that the construction is formed of two separate components (2; 3,4) that are nevertheless attached to each other, and to include at least one composite construction pre-tensioning rod (9, 10, 12).
2. Beam construction according to Claim 1, **characterized** in that the construction has an essentially triangular cross-section, in such a way that flange components (5, 5', 6, 6') are formed from two of its three corners.
3. Beam construction according to Claim 2, **characterized** in that the components (2 and 3, 4) are attached to each other by the flange components (5, 5', 6, 6').
4. Beam construction according to Claim 1, **characterized** in that there are at least two, mainly three pre-tensioning rods (9, 10, 12).
5. Beam construction according to Claim 1 or 2, **characterized** in that the pre-tensioning rods (9, 10, 12) are located inside the beam construction near the corners or the triangle.
6. Beam construction according to any of the above Claims, **characterized** in that the flange component (6, 6') includes a doctor-blade holder (7).
7. Beam construction according to any of the above Claims, **characterized** in that it includes holes for ventilating the interior space of the beam and/or a connection (11) for leading a mechanical airflow into the beam.
8. Beam construction according to Claim 1, **characterized** in that the composite construction of the pre-tensioning rods (9, 10, 12) corresponds to the composite construction of the beam.
9. Method for manufacturing a beam construction, particularly a so-called

composite-construction doctor beam, which is intended to be used mainly for carrying blade holders (7) intended to hold the doctor blades of the rolls of pulp and paper mills, **characterized** in that two separate composite-construction components (2; 3,4), in which there are flange components (5, 5', 6, 6'), are
5 manufactured and the components (2; 3,4) are attached to each other, in order to form an essentially triangular structure and the beam thus formed is equipped with at least one composite-construction pre-tensioning rod (9, 10, 12).

10. Method according to Claim 9, **characterized** in that the construction is
10 equipped with three composite-construction pre-tensioning rods, which are located inside the construction near to its corners.

11. Method according to Claim 9, **characterized** in that the components (2; 3,4)
are manufactured by laminating one-direction reinforcement, in which the
15 reinforcing fibres lie in the same directions, in a manner with the different directions crossing each other.

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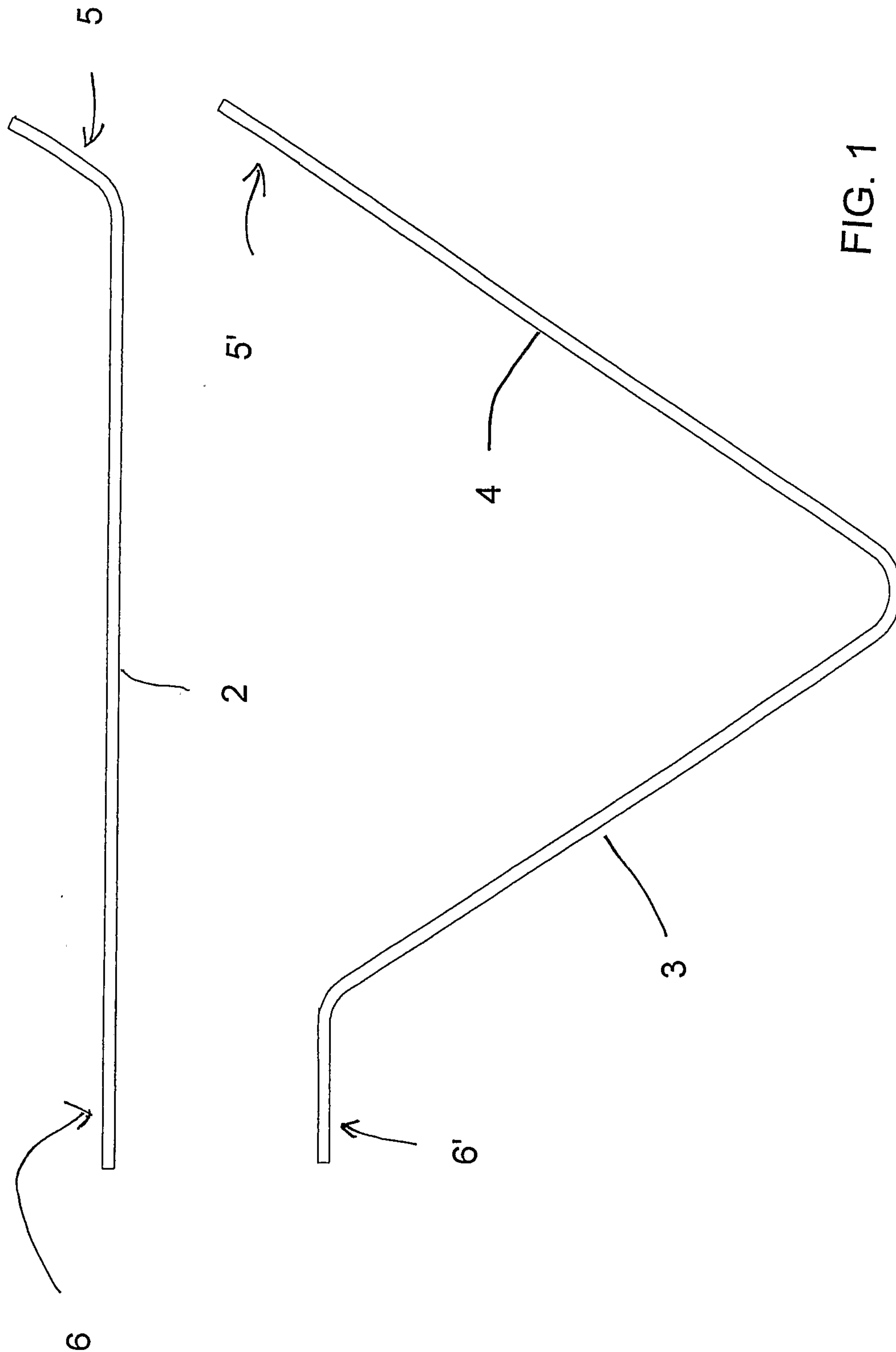


FIG. 1

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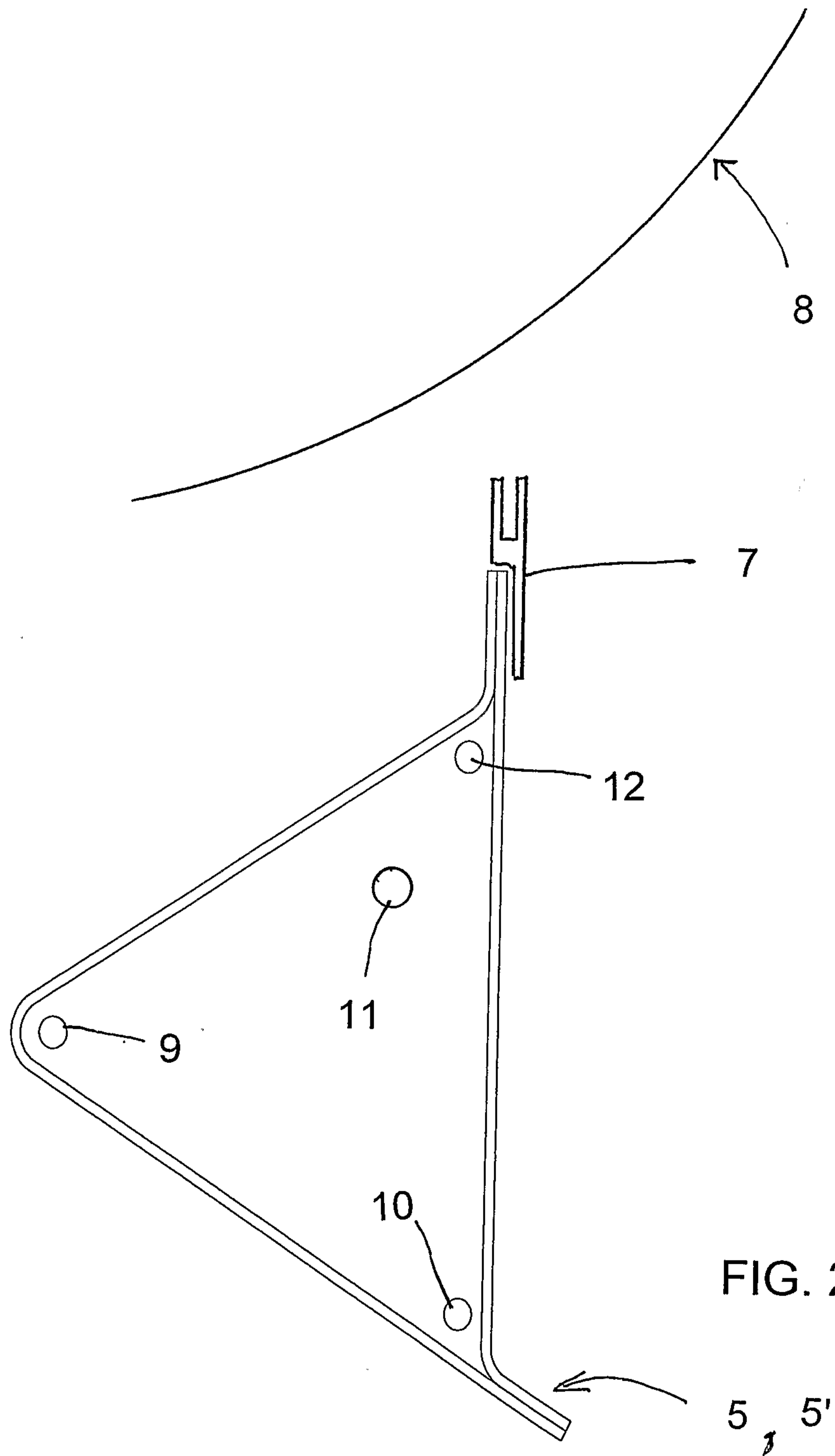


FIG. 2

