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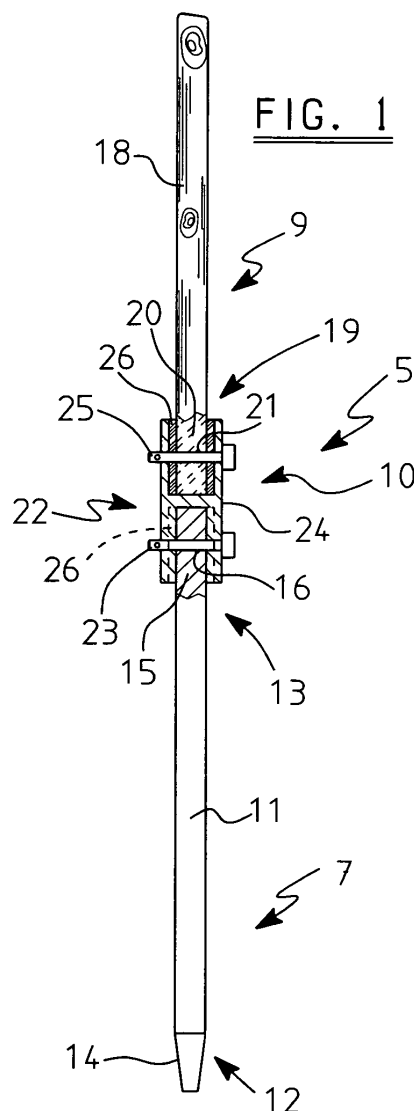
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(54) **Structure of post for use in marine and lake environments**

(57) Structure of post for use in marine and lake environments comprising at least a driving element to be at least partially driven into the depth of said environment, at least an emerging element to emerge from said environment and connecting means to connect said driving element and said emerging element so as to make it possible to set up said driving element according with lasting constructive solutions and to make said emerging element of materials typical of said environment. Thanks to this solution, the structure solves the drawbacks encountered in the prior of the art because it combines the positive aspects of wooden posts and of prefabricated posts.



Description

[0001] This invention refers to a structure of post for use in marine and lake environments particularly, but not exclusively, in a lagoon environment.

[0002] In this environments the use of wooden posts, generally known as stakes and dolphins, driven into the bottoms is particularly widespread, because these posts lend themselves to numerous and diversified uses. The traditionally most important application of these posts is encountered in realizing berthing points for boats, preferably of a small size. Another example of the use of these posts is found in delimiting navigable passages for watercrafts in general. A further example of the application of these posts is found in realizing supporting works for embankments. An additional example, of not lesser importance than the preceding ones, is in particular encountered in the Venetian lagoon, where posts have been used to consolidate the muddy seafloor between the islands.

[0003] The main drawback encountered in this type of posts consists in their rapid deterioration caused by particular marine molluscs, known as teredos, which in their larval state attach to their surfaces and dig deep galleries extending in both a horizontal and vertical direction. These galleries progressively reduce the cross sectional strength of the posts, which tend to break under berthing impacts. This drawback consequently determines the need to carry out periodical post replacements, thus entailing high replacement costs.

A second drawback encountered in this type of posts consists in their high cost, due to the fact that they require prized wood qualities such as oak, larch, and chestnut of large and perfectly grown trees. These posts must in fact often reach a length of over ten meters and a diameter of over thirty centimetres.

A third drawback of these posts is found in the fact that the posts removed after replacing operations cannot be reutilized and must be disposed of in accordance with suitable, environmentally compatible techniques.

A fourth drawback of these posts is encountered in the fact that their maintenance is complex and costly, because it requires the application of special, particularly expensive means appropriately fitted to this purpose.

A fifth drawback of these posts consists in the serious ecological damage due to the cutting of the trees needed for realizing these posts. The relevance of this drawback is for example highlighted by the consideration that in Venice alone over ten thousand posts are replaced each year.

A sixth drawback encountered in the application of these posts derives from the micro-seismic phenomena occurring each time a pile is planted. These micro-seismic motions turn out to be particularly damaging in the delicate and fragile balance of lagoons in general, and of the Venetian lagoon in particular.

In order to overcome at least partially the drawbacks encountered in the application of wooden posts, prefabricated posts made of metal, metal/concrete and plastic/wood have been proposed in the market.

In particular, the prefabricated posts made of metal and of metal/concrete do not appear to be entirely suitable, because in case of an impact some serious damage may ensue to the boats. Moreover, these posts are absolutely unsuited for application in the historical environment of the Venetian lagoon, and in particular of a city like Venice.

The posts constructed of wood and plastic have in turn a high cost, are not always suitable for reasons of external appearance, and in any case appear to be unsuitable in environments subject to wide thermal excursions, because of the different thermal expansion of their constituent materials.

[0004] The aim of this invention is to set up a structure of post for use in marine and lake environments, capable of solving the drawbacks and problems encountered in wooden posts and posts prefabricated according to the prior art described above.

Within this aim, an important object of the present invention is to set up a structure of post for use in marine and lake environments capable of combining the positive aspects of wooden posts with the advantages of prefabricated posts.

Another object of the present invention is to set up a structure of post capable of maintaining the typical appearance of the emerging and visible portion.

A further object of the present invention is to set up a structure of post capable of totally eliminating the disastrous consequences deriving from the micro-seismic motions provoked by the planting of the posts.

An additional object of the present invention is to set up a structure of post capable of substantially reducing the consumption of the wood needed for its construction.

One more object of the present invention is to set up a structure of post capable of considerably reducing its general maintenance and replacement costs.

Another scope of the present invention is to set up a structure of post capable of keeping the traditional landscape of the Venetian lagoon and of the city of Venice in an unchanged condition.

Not the last object of the present invention is to set up a structure of post capable of being realized in a plurality of materials such as wood, cement, iron, plastics, etc..

[0005] This aim, as well as this and other objects that will be more clearly apparent in the following, are achieved by a structure of post for use in marine and lake environments according to the attached claims.

According with first advantageous features of the invention, such structure of post for use in marine and lake environments comprises at least one driving element to be at least partially driven into the depth of such environment, at least one emerging element to emerge from this environment and connecting means to connect such driving element and such emerging elements.

This solution allows achieving the aim of the invention, according to which the structure of post is capable of combining the positive aspects of wooden posts with the

advantages of prefabricated posts and to keep the typical appearance of the emerging and visible portion unchanged, because such driving element can be realized in accordance with the lasting constructive solutions typical for instance of the prefabricated posts, and such emerging element is made of materials typical of marine and lake environments, such as for instance wood.

According to advantageous second features of the invention, such driving element comprises threading means to thread such driving material into such depths. This solution allows achieving the object of the invention, according to which the structure of post is capable of totally eliminating the disastrous consequences deriving from the micro-seismic phenomena provoked in driving the posts, because the driving occurs in a progressive manner.

According with other advantageous features of the invention, the structure of post allows substantially reducing the consumption of wood needed for its construction, as the application of this material is limited only to the emerging portion.

According with yet other advantageous features of the invention, the structure of post allows substantially reducing general maintenance and replacement costs, because the maintenance and replacement operations are limited only to the emerging element of the pile structure.

According with further advantageous features of the invention, the structure of post allows keeping the traditional landscape of the Venetian lagoon and of the city of Venice in an unchanged condition, because the emerging element can be realized in traditional forms and using traditional wooden materials.

According with yet other advantageous features of the invention, the structure of post allows employing lasting materials such as wood, cement, iron, plastics etc. in order to set up the driving element.

[0006] These and other advantageous features of the invention will become better apparent from the description of embodiments of the structure of post for use in marine and lake environments according to the invention, which are illustrated, for indicative yet non limiting purposes, in the attached drawings, in which:

- Figure 1 represents a partially sectionalized side view of the structure of post according to the invention, in a first executive form;
- Figure 2 represents a partially sectionalized side view of the structure of post according to the invention, in an alternative executive form; .
- Figure 3 represents a side view of the structure of post according to the executive form of Figure 1, under operating conditions;
- Figure 4 represents a side view of the structure of post according to the executive form of Figure 2, under operating conditions;

[0007] With reference to the figures in the enclosed drawings, the structure of post is indicated as a whole by

the reference number 5, and the marine and lake environments is indicated as a whole by the reference number 6.

This structure 5 comprises above all a driving element, indicated as a whole by the reference number 7, which is at least partially to be driven into the depth 8 of said environment 6. Said structure 5 also comprises at least one emerging element, globally indicated by the reference number 9, so as to emerge from said environment 6. Finally, said structure 5 comprises connecting means, indicated as a whole by the reference number 10, to connect said driving element 7 and said emerging element 9. It is thus possible to set up said driving element 7 in accordance with lasting constructive solutions, and make said emerging element 9 of materials typical for said environment 6.

In detail, said driving element 7 comprises a cylindrical rod 11, introducing means 12 provided at the lower extremity of said cylindrical rod 11 to introduce said rod into said depth 8 and first coupling means 13 provided next to the upper extremity of said rod 11 to couple said rod 11 to said connecting means 10. In even greater detail, said introducing means 12 comprise a shoe 14 and said first coupling means 13 comprise a first inserting terminal 15 at said upper extremity and a through hole 16 provided across said first inserting terminal 15.

In the alternative form of embodiment of said structure 5 illustrated in Figure 2, said driving element 7 comprises threading means indicated as a whole by the reference number 17, to screw said driving element into said depth 8.

Said emerging element 9 in turn comprises a cylindrical crop end 18 and second coupling means 19 provided at the lower extremity of said cylindrical crop end 18 to couple said cylindrical crop end 18 to said connecting means 10. In detail, said second coupling means 19 comprise a second inserting terminal 20 at said lower extremity and a through hole 21 provided across said second inserting terminal 20. Moreover, said emerging element 9 is preferably realized of wood.

Said connecting means 10 are in turn comprising a receiving element 22 to receive said first and second inserting terminal 15, 20 and at least one connecting pin 23 inserted across said receiving element 22 and in said through hole 16 provided across said first inserting terminal 15.

In the alternative form of embodiment of said structure 5 shown in Figure 2, said receiving element 22 is realized in a manner firmly affixed to said driving element 7.

In detail, said receiving element 22 comprises a tubular body 24.

Said structure 5 also comprises a safety pin 25 inserted across said receiving element 22 and in said through hole 21 provided in said second inserting terminal 20.

In conclusion, said structure 5 comprises an interposing sleeve 26 interposed between said first inserting terminal 15 or said second inserting terminal 20 and said receiving element 22.

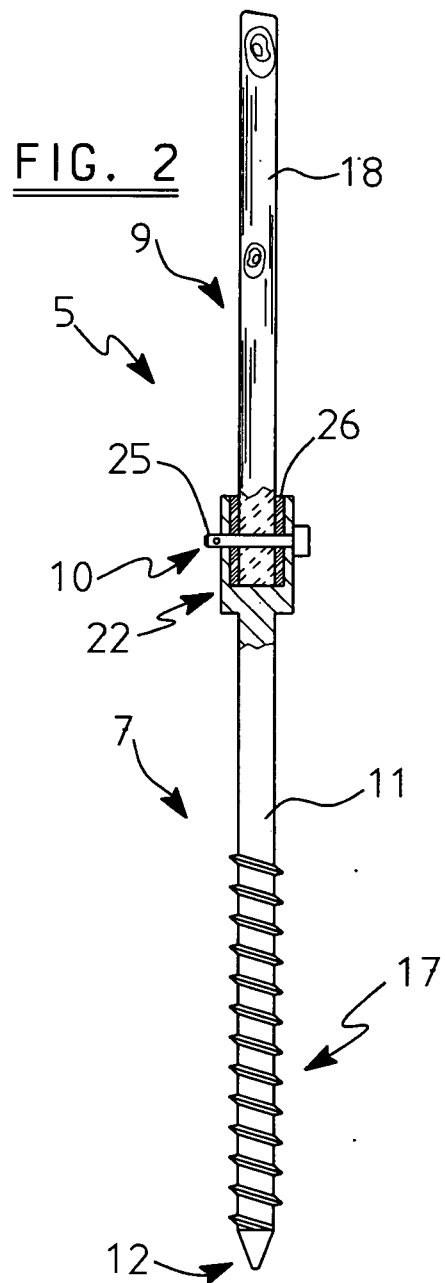
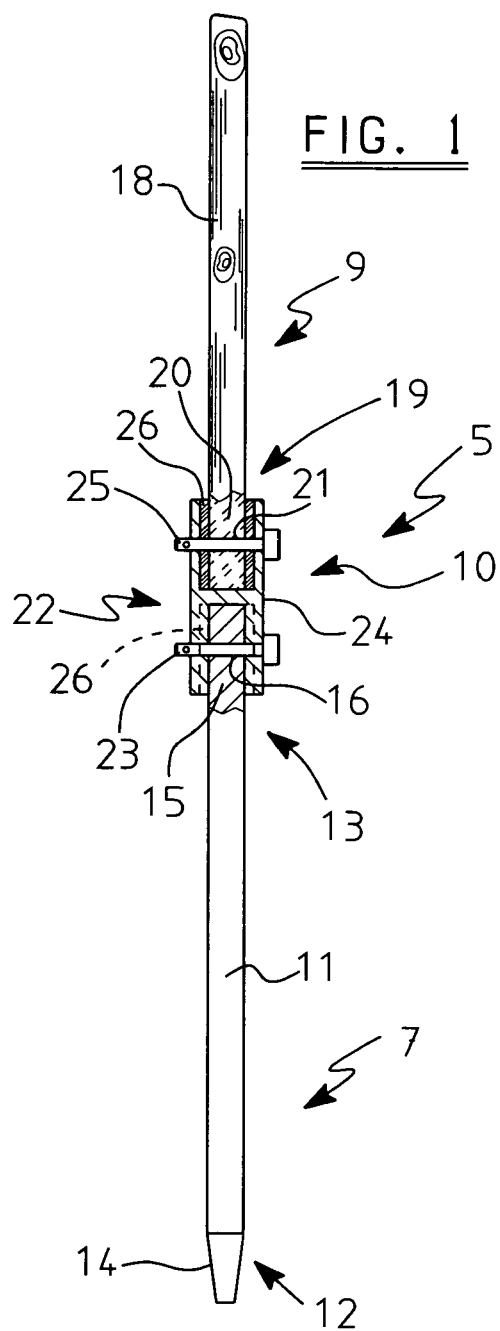
[0008] It has in practice been verified that the structure of the post for use in marine and lake environments thus described achieves its aim and the intended objects.

[0009] The structure of post according to the invention is susceptible to undergo numerous modifications and variants, all falling within the scope of the same inventive concept.

[0010] In the practical embodiment, the materials employed, the shapes, dimensions and the executive details may differ from those indicated here, but be technically equivalent to the same, without thereby abandoning the scope of the invention.

Claims

1. Structure of post for use in marine and lake environments, comprising at least a driving element to be at least partially driven into the depth of said environment, **characterized in that** it comprises at least an emerging element to emerge from said environment and connecting means to connect said driving element and said emerging element so as to allow setting up said driving element according with lasting constructive solutions and make said emerging element of materials typical for said environment. 20
2. Structure, according to claim 1, **characterized in that** said driving element comprises a cylindrical rod, introducing means provided at the lower extremity of said cylindrical rod to introduce said rod in said depth, and first coupling means provided next to the upper extremity of said rod so as to couple said rod to said connecting means. 30
3. Structure, according to claims 1 or 2, **characterized in that** said introducing means comprise a shoe. 35
4. Structure, according to one or more of the previous claims, **characterized in that** said first coupling means comprise a first inserting terminal at said upper extremity and a through hole provided across said first inserting terminal. 40
5. Structure, according to one or more of the previous claims, **characterized in that** said driving element comprises threading means to screw said driving means into said depth. 45
6. Structure, according to one or more of the previous claims, **characterized in that** said emerging element comprises a cylindrical crop end and second coupling means provided at the lower extremity of said cylindrical crop end to couple said cylindrical crop end to said connecting means. 50
7. Structure, according to one or more of the previous claims, **characterized in that** said second coupling means comprise a second inserting terminal at said lower extremity and a through hole provided across said second inserting terminal. 55
8. Structure, according to one or more of the previous claims, **characterized in that** said emerging element is preferably realized of wood. 5
9. Structure, according to one or more of the previous claims, **characterized in that** said connecting means comprise a receiving element to receive said first and second inserting terminal and at least a connecting pin inserted across said receiving element and into said through hole provided in said first inserting terminal. 10
10. Structure, according to one or more of the previous claims, **characterized in that** said receiving element is set up as being firmly affixed to said driving element. 15
11. Structure, according to one or more of the previous claims, **characterized in that** said receiving element comprises a tubular body. 25
12. Structure, according to one or more of the previous claims, **characterized in that** it comprises a safety pin inserted across said receiving element and into said through hole provided in said second inserting terminal. 30
13. Structure, according to one or more of the previous claims, **characterized in that** it comprises an interposing sleeve interposed between said first inserting terminal or said second inserting terminal and said receiving element. 35



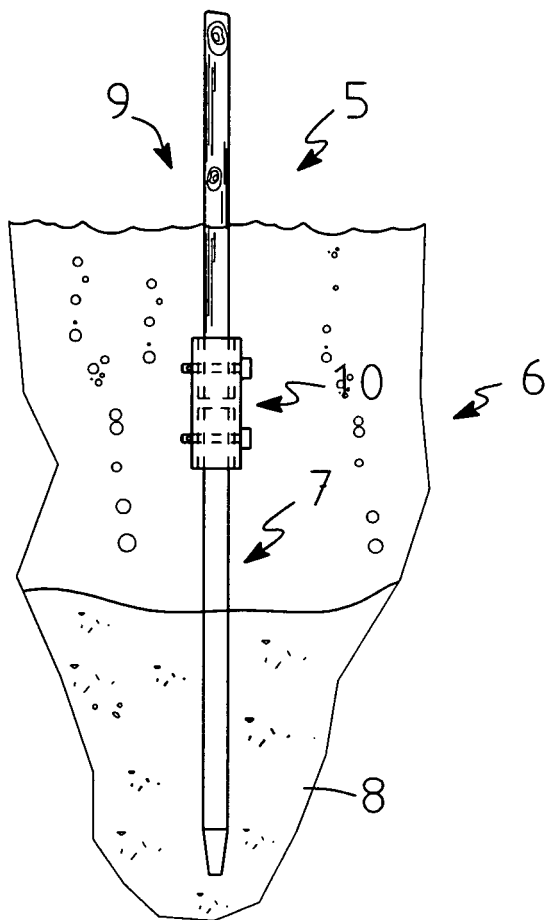


FIG. 4

