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(54) Hinge device particularly for frames for doors, windows or the like.

(57) The hinge device comprises a male element (1) having a metal core (9) including a pin (11) and a female element (2) having a metal core (10) including a hole (12) adapted for engagement with the pin (11). Each element (1, 2) including a threaded side spigot (7,8) welded thereto and adapted to be threaded into holes formed in two respective members to be hingedly connected together. The metal cores (9,10) being coated with a layer (13,14,15) including aesthetically shaped lugs (5,6) of plastic material by the method of injection moulding, to impart characteristics of smoothness, corrosion resistance and durability to the hinge device.

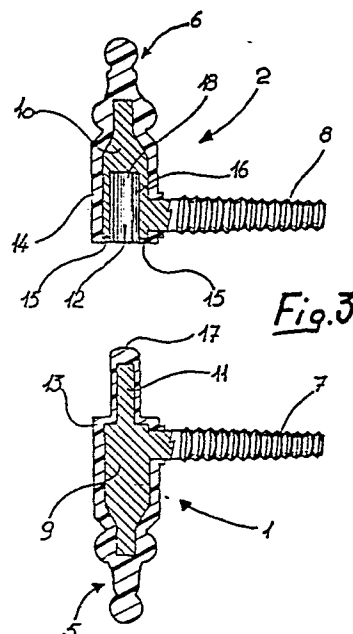


Fig. 3

Hinge device particularly for frames
for doors, windows or the like

This invention relates to a hinge device particularly for frames for doors, windows or the like.

Hinges for frames for doors or windows are usually
5 formed from metal materials, which are inherently unsuitable for use in corrosive environments such as a marine environment.

In this case, the hinges tend to oxidize and where the casements are not moved for long time periods,
10 there practically occurs locking of the movement with consequent breaking as the casement is subsequently moved.

Even when possibly using surface treatments, there is no real possibility of preventing corrosion and
15 thereby preserving such hinges.

For this reason hinges of particular materials such as brass have been utilized which are however particularly expensive and subjected to rapid mechanical wear.

20 These hinges even if lubricated have however a short life due to the fact that the surfaces which rub remove the lubricant and again become subjected to attack by ambient atmospheric agents.

It is an object of this invention to provide a
25 hinge which is particularly adapted to withstand corrosive environments such as environments in the proximity of sea coasts.

Another object is to provide a particularly strong and reliable hinge with excellent characteristics of smoothness, corrosion resistance and durability.

5 Another object is to provide a hinge which also retains its aesthetic appearance unaltered with time.

Still another object is to provide a hinge which is readily producible with equipment and technologies which are known in the art.

10 A not least object is to provide a hinge of relatively low cost and good quality.

These and other objects such as will become apparent hereinafter are achieved by a hinge device of the type composed of two complementary male and female elements, characterized in that each of the two
15 elements has a metal core adapted to serve the mechanical function, said metal core being thickly coated with a plastic material adapted to preserve the metal from corrosion and to impart the device with the desired configuration.

20 Further features and advantages of the invention will be apparent from the detailed description of a preferred embodiment given by way of example and not of limitation and illustrated in the accompanying drawings where:

25 Figure 1 is a side view of the device according to the invention;

Figure 2 shows a side view of the two cores of the male element and female element respectively, of the hinge; and

30 Figure 3 shows a sectional view of the two male

and female elements which make up the hinge.

With reference to the cited drawing figures, the hinge according to the invention is composed of two elements respectively male indicated at 1 and female indicated at 2.

Each of said elements has a cylindrical body respectively 3 and 4 wherein the hinge movements are contained which are completed with aesthetically shaped lugs 5 and 6 and with threaded side spigots 7 and 8 adapted to be threaded into holes formed respectively in the relatively movable members of a door, window, or the like assembly.

The spigots 7 and 8 are of metal, and conveniently of mild steel and are welded to two metal cores respectively male 9 and female 10.

The male core 9 has a metal pin 11 which has a conveniently smaller cross-section than the cross-section of the hole 12 provided in the female core 10.

The male core 9 like its pin 11 are coated with a layer 13 of a plastic material which is applied by inserting the core 9 into a mold and injecting the plastic material under pressure into said mold.

Finally, the whole core 9 and pin 11 are coated and only the spigot 7 is without covering.

According to a modification of the invention, the diameter of the plastics covered pin 11 may be equal to the diameter of cross-section of the hole 16 provided in the female element 2 of the hinge.

The female element 2 is also fully coated with plastics which creates a layer indicated at 14 which

also covers in particular the front section shown in Figure 3 and indicated at 15.

Only the inner portion 16 of the hole 12 is left uncovered by the plastic material even though the
5 covering thereof is possible.

The overall height of the plastics coated pin 11 is such as to make its top face 17 work on the bottom 18 of the hole 12 such that the load forces imposed by the weight of the door, window, or the like assembly
10 are applied at this point. It will be appreciated that, at the top face 17, the thickness of the coating is greater as compared to the other parts of the coating so that the resistance thereof is stronger and providing in addition a cushioning effect.

Moreover in order to obtain the above operative
15 conditions it is necessary that the depth of the hole 12 is slightly smaller than the sum of the length of the pin 11 and the thickness of the coating at the face 17. Since under certain compressive stresses the cap-
20 like coating at the face 17 can slightly expand radially, the diameter of pin 11 including the thickness of the coating surrounding the pin may be slightly less than the diameter of the hole 12.

The two hinge elements, so configured, are
25 practically unattackable by the weather agents because none of their metal parts are exposed to the atmosphere when assembled together.

Coating is conveniently carried out with a nylon which has excellent properties of resistance to
30 corrosion and also has self-lubricating characteristics

thereby the hinge device will require no maintenance with time.

5 Mechanical strength is imparted to the hinge device by the metal cores thereof being directly linked to the spigots which are threaded for engagement with the door, window, or the like frame while the anti-corrosion and aesthetic characteristics are achieved by the plastics coverings.

10 The life of a product constructed in this way is practically unlimited and the costs are particularly held down since the constituent parts and the manufacturing procedures are simple.

15 The use of a plastics covering, moreover, affords the faculty of obtaining any aesthetic shapes in accordance with models connected to styles, lines, or profiles of various types and even the colors may be selected for the same reasons without incurring any problems since it will be sufficient to act on the pigmentation of the plastic material.

20 It is apparent that by taking the steps from the same concept of combinations of elements, hinges of any types may be obtained which all fall within the protective scope of this invention.

25 For the same reason any materials and dimensions may also be selected and used according to necessity.

30 According to a method for coating a hinge device as above described, either the metal core 9 or 10 or both are placed in the manner of an insert into an injection molding mold, the plastic material is then injected into the mold and left to harden and thereupon

the coated core extracted from the mold.

Advantageously before insertion into the mold the hole 12 of the core 10 of the female element is closed by a plug.

5 Advantageously the metal cores 9,10 are placed into the mold with the spigot thereof projecting outside the mold through a hole provided in the mold, said spigot within the hole of the mold maintaining the core suspended within the mold before and during
10 the injection stage.

CLAIMS

1 1. A hinge device particularly for frames for
2 doors , windows or the like of the type composed of two
3 complementary male (1) and female (2) elements,
4 characterized in that each of the two elements (1,2)
5 has a metal core (9,10) adapted to serve the mechanical
6 function, said metal core (9,10) being thickly coated
7 with a plastic material (13,14,15) adapted to preserve
8 the metal from corrosion and to impart the invention
9 with the desired configuration (5,6).

1 2. A hinge device as claimed in claim 1,
2 characterized in that the male element (1) contains a
3 metal core (9) comprising a body (3) and a pin (11)
4 with a threaded metal spigot (7) associated therewith,
5 the body (3) and pin (11) being coated with a layer of
6 a plastic material (13)

1 3. A hinge device as claimed in claim 1,
2 characterized in that the female element (2) comprises
3 a cylindrical body (4), with a hole (12) of equal
4 cross-section to the diameter of the pin (11) as
5 complete with the plastics coating (14,15) and a
6 threaded metal spigot (8) associated therewith.

1 4. A hinge device according to claims 2 and 3,
2 characterized in that the length of the pin (11)
3 complete with the plastics coating (13), present in the
4 male element (1) of the hinge, has a longer length than
5 the depth of the hole (12) of the female element (2)
6 such that the load is applied to the head (17) of the
7 plastics (13) pin (11).

1 5. A hinge device according to claims 1, 2 and 4,
2 wherein the female element (2) comprises a cylindrical
3 body with a hole (12) having an internal diameter which
4 in non stressed conditions is slightly greater than the
5 diameter of the pin (11) including the thickness of the
6 coating surrounding the pin, thereby allowing under
7 stresses radial expansion of at least the top part of
8 the pin coating.

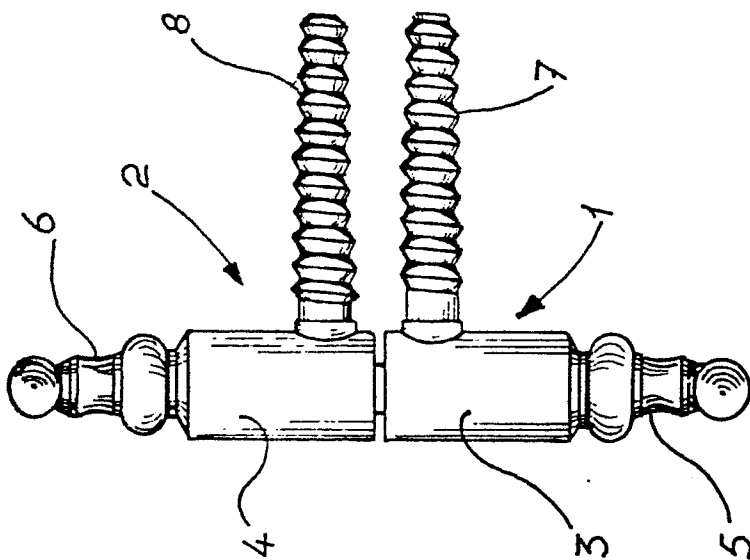
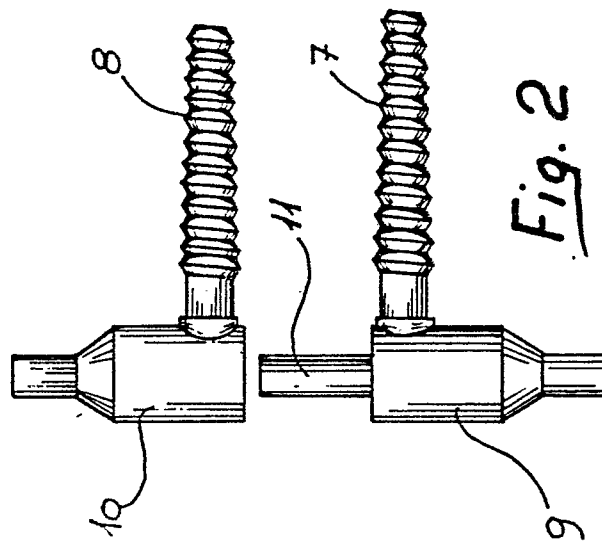
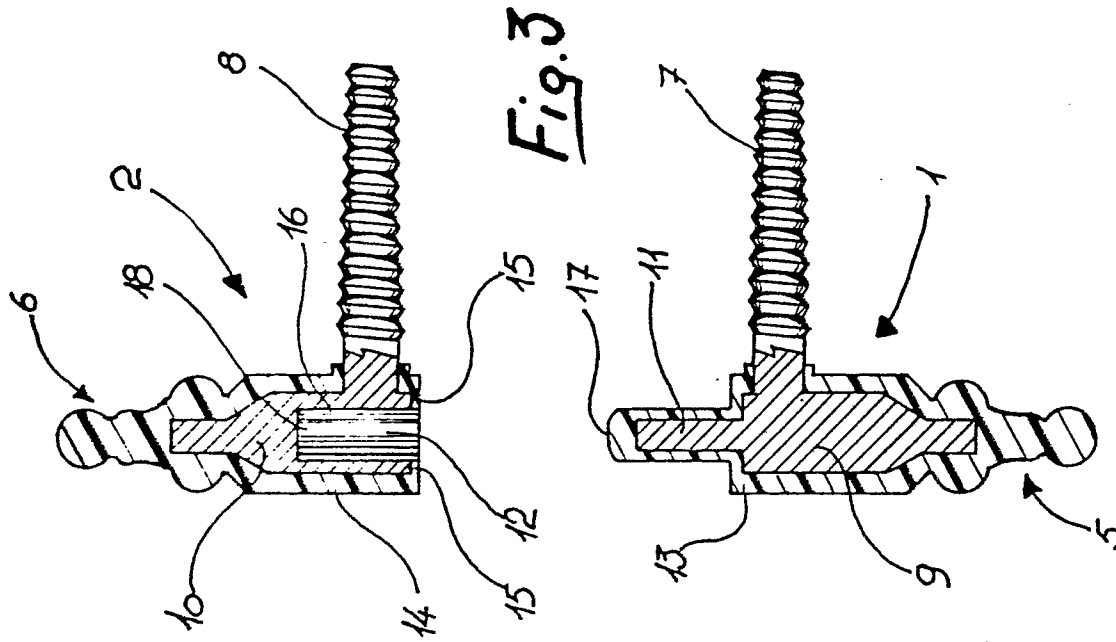
1 6. A hinge device according to claims 1-5, wherein
2 the coating of said pin (11) at the top (17) thereof
3 has a greater thickness than the remaining parts of the
4 coating.

1 7. A hinge as claimed in claims 1-5 characterized
2 in that said plastic material (13) is preferably nylon.

1 8. A method for coating a hinge device according
2 to claims 1-7, characterized in that the metal core
3 (9,10) of said elements (1,2) is placed in the manner
4 of an insert into an injection molding mold, the
5 plastic material is then injected into the mold and
6 left to harden and thereupon the coated core extracted
7 from the mold.

1 9. A method according to claim 8, wherein before
2 the metal core(10) of the female element 2 is placed
3 into the mold, the hole (12) is closed by a plug.

1 10. A method according to claims 8,9 wherein the
2 metal core (9,10) is placed into the mold with the
3 spigot (7,8) thereof projecting outside the mold
4 through a hole provided in the mold, said spigot (7,8)
5 within the hole of the mold maintaining the core (9,10)
6 suspended within the mold before and during the
7 injection stage.

*Fig. 1**Fig. 2**Fig. 3*