(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 095 602 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.05.2001 Bulletin 2001/18

(51) Int. Cl.[7]: **A47G 33/00**

(21) Application number: **00123226.3**

(22) Date of filing: **26.10.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **29.10.1999 IT TO990939**
07.01.2000 IT TO200011

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(54) A method of assembling a cup or similar trophy

(57) A method of assembling a cup or similar trophy is described and comprises the steps of:

- providing an axial retaining element (42) and an axial interconnecting member (40) having a free axial opening (45) at a first end and a head portion (43) at a second end,
- arranging the components (20-26) of the cup axially in succession along the interconnecting member (40),
- associating the retaining element (42) axially with the axial opening (45) of the interconnecting member (40), and
- bringing about coupling of the retaining element (42) with the interconnecting member (40) so as to achieve a final condition in which the components (20-26) of the cup are clamped in an assembled condition.

In an alternative embodiment, the head portion is formed as a result of the insertion of a further retaining element (44), similar and preferably identical to the first, in a corresponding opening (46), in the same manner as at the opposite end.

A cup which can be produced by the method is also described.

Fig.2

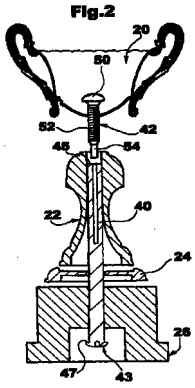
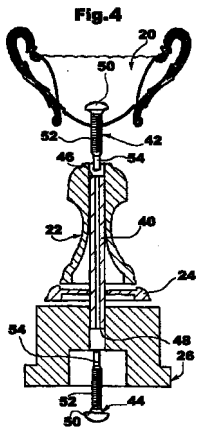


Fig.4



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Description

[0001] The present invention relates to a method of assembling a cup or similar trophy comprising a plurality of components, and a cup, of the type defined in the introductory part of Claim 12, which can be produced by the method.

[0002] In particular, the present invention relates to an assembly method and to a cup assembled thereby, in which the components of the cup are mounted in succession along an axis of the cup and are fixed in this position by means of fastening members arranged through mounting holes provided in each component.

[0003] The components of a cup (generally a bowl element, one or more shaped intermediate elements, and a plinth) are produced separately in various shapes and from various materials and are assembled in a last step to produce a large range of models of assembled cups and trophies.

[0004] In this field, it is impossible, in the current state of the art, to consider fully automating the system for the assembly of the cup and conventional systems requiring the use of manual labour are therefore employed. The effect of the manual labour on the cost of the finished product is very great and, at the same time, production capacity is limited by the complexity of the assembly method and by the number of fastening members used.

[0005] In the prior art, the fastening members comprise an axial connecting tie rod made of metal, which is externally threaded throughout its length or at least at its ends, and along which are arranged the components of the cup, one or more centring members for centring the components relative to the tie rod, and end axial retaining elements which can be coupled with the tie rod in order to clamp the components of the cup in the assembled configuration.

[0006] The length of the threaded tie rod used is determined by the model and by the dimensions of the cup to be assembled.

[0007] Figure 1 shows, in an exploded, longitudinal section, a cup assembled according to the known technique in which the components of the cup and the respective fastening members are shown in the positions in which they are arranged during assembly.

[0008] During a first stage of the assembly method, a first retaining element such as a cap nut 10 is coupled with an end of the tie rod, indicated 12 by being screwed thereon, and the assembly is then placed on a work bench provided with a gripper support (not shown) for clamping the cap nut to prevent any movement during the subsequent steps of the method. The tie rod thus adopts a substantially vertical position relative to an operator engaged in the assembly, to facilitate the arrangement of the components of the cup.

[0009] The components of the cup (that is, in the example of Figure 1: a bowl element 20, a shaped stem 22, an annular base 24 and a plinth 26) are arranged axially along the tie rod in inverted positions, in reverse order, that is, starting with the bowl and finishing with the plinth. These elements are centred relative to one another and relative to the axis of the tie rod by means of one or more centring elements 30 which are necessary because, for reasons of cost and production efficiency, the width of the tie rod used is considerably less than the dimensions of the mounting holes in the components into which it is inserted, so that excessive play is created between them and the components cannot therefore be centred automatically.

[0010] Whereas the centring operation between the bowl element and the intermediate components of the cup is performed by means of the centring elements referred to, the components have to be centred manually relative to the plinth.

[0011] A second retaining element in the form of a metal nut 35, possibly associated with a washer 37, is screwed onto the free end of the tie rod until the entire structure is clamped tightly, completing the assembly.

[0012] The method described is complex and expensive since it requires a large number of fastening members. Moreover, the dimensions required for some of said members depend on the final dimensions of the cup to be assembled or on the number of components thereof.

[0013] In particular, it is fundamental, at a preliminary stage, to calculate the length of the tie rod required for the assembly of the components selected in a manner such that the rod is accessible through a recess 39 formed in the base of the plinth of the cup for the screwing-up of the nut, but does not project too far so as to compromise the stability and equilibrium of the finished product.

[0014] The assembly system according to the prior art therefore has the disadvantage of being a complex and expensive system both in terms of manual labour and in terms of stock control costs, since it is necessary to have a large number of fastening members available to permit the assembly of different trophy models.

[0015] The object of the present invention is to provide a satisfactory solution to the problems set out above, avoiding the disadvantages of the prior art.

[0016] According to the present invention, this object is achieved by means of an assembly method having the characteristics recited in Claim 1.

[0017] A further subject of the invention is a cup which can be produced by the method, and which has the characteristics recited in Claim 12.

[0018] In summary, the method according to the invention provides for the use of only one axial interconnecting member having an axial opening at a first end and a head portion projecting transversely relative to the rest of the body at a second end, the components of the cup being arranged along the axial interconnecting member the transverse dimensions of which correspond substantially to the standard dimensions of the mounting holes provided in the components, and of a

retaining element which can be coupled in the axial opening to clamp the components of the cup in the assembled configuration, in cooperation with the head portion.

[0019] According to a first embodiment, the head portion is formed integrally with the interconnecting member.

[0020] In a second embodiment, the head is formed as a result of the insertion of a further retaining element, similar and preferably identical to the first, in a corresponding opening, in the same manner as at the opposite end.

[0021] The method according to the invention is advantageously quicker than the method described above since it comprises a single step (in a preferred embodiment, a screwing step) for the coupling and clamping together of the fastening members, and the components of the cup are centred automatically when they are positioned along the interconnecting member provided.

[0022] The method is also less expensive since it enables the number of fastening members for the assembly of a single cup to be reduced because centring elements are no longer required. Moreover, members of predetermined dimensions may be used to produce a plurality of cups of different sizes and models, as will be explained further below.

[0023] Further characteristics and advantages of the invention will be explained in greater detail in the following detailed description, given by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 is an exploded view showing, in longitudinal section, a cup assembled according to the prior art, the assembly method for which is described in the introductory part of this description,

Figure 2 is an exploded view showing, in longitudinal section, a cup assembled according to the method of the invention, in which the components of the cup and the respective fastening members are shown in the positions in which they are arranged in a first embodiment of the assembly,

Figure 3 is an exploded view showing, in longitudinal section, a cup assembled according to the method of the invention, in which the components of the cup and the respective fastening members are shown in the positions in which they are arranged in a variant of the first embodiment,

Figure 4 is an exploded view, showing, in longitudinal section, a cup assembled according to the method of the invention, in which the components of the cup and the respective fastening members are shown in the positions in which they are arranged in a second embodiment, and

Figure 5 is a longitudinal section of the cup of Figure 4 in an assembled configuration.

[0024] According to a first embodiment, and with reference to Figures 2 and 3, the components are assembled by means of an axial interconnecting member 40 and an axial retaining element 42.

[0025] The interconnecting member 40 is produced in cylindrical form by injection moulding of plastics material with a high degree of hardness. It has an integral head portion 43 projecting radially from the rest of the body at one end and a cylindrical opening 45 for housing at least a portion of the retaining element 42 at the other end. The head portion 43 defines an annular abutment surface 47 relative to the body of the member 40 and, at its outer surface, has a seat for a screwing tool (for example, a TORX driver).

[0026] The interconnecting member 40 can be inserted through a mounting hole provided in each component of the cup and has an outside diameter substantially corresponding to the diameter of the hole. For example, in prize trophies commonly produced, the mounting hole has a diameter of 10 mm and the interconnecting member 40 is preferably produced with a body having an outside diameter of 9.86 mm. The head portion 43 has a transverse dimension substantially greater than the dimension of the mounting hole in order to keep the lowermost component (or the uppermost component, according the embodiment shown in Figure 3) of the cup in abutment and to cooperate with the retaining element 42 in clamping the cup in an assembled configuration.

[0027] The axial retaining element 42 is formed as a self-tapping screw. It has a convex head 50 with a recess in which the seat for a screwing tool (for example, the same TORX driver) is formed, and a shank which has a threaded portion 52 adjacent the head and a smooth end portion 54.

[0028] A support and retaining member (not shown) having a concave seating provided with a tool shaped so as to cooperate with the seat formed in the head portion 43 of the interconnecting member 40 is fixed to a work bench and is arranged to receive and to hold the head portion of the member 40 in its seating.

[0029] During a first step of the assembly method, the interconnecting member 40 is arranged on the support member, in the seating provided. The components of the cup are then arranged along the member 40 in succession, starting with the plinth 26, which is brought into abutment with the annular surface 47 of the head portion 43, and finishing with the bowl element 20. The components are automatically centred relative to one another and, in particular, relative to the plinth, because the diameters of the interconnecting member 40 and of the mounting hole of each component correspond precisely, so that any possibility of transverse play is excluded.

[0030] The retaining element 42 is then inserted

through the bowl element 20 and into the corresponding opening 45 of the member 40.

[0031] As will be clear to an expert in the art, in a variant such as that shown in Figure 3 it is also possible to achieve a substantially similar configuration by arranging the components of the cup in the reverse order.

[0032] The retaining element 42 and the interconnecting member 40 are then screwed together and the components of the cup are clamped in the assembled condition by action on the retaining element 42 by means of a screwing tool arranged for cooperating with the seat in the head 50 of this element.

[0033] The screwing tool acts directly on the retaining element 42 which thus rotates relative to the interconnecting member 40 held by the support member and engages in the corresponding opening 45, forming the internal thread therein by plastic deformation. The screwing of the retaining element 42 finishes when a condition is reached in which the components of the cup are clamped together. This condition may even be reached without the threaded portion of the element 42 being screwed fully into the corresponding seat since a partial screwing thereof suffices to withstand even large pulling forces much greater than those typically applied to the finished product.

[0034] If a retaining element with an advantageously long threaded portion (at least 20 mm in a preferred embodiment for cups of the most common sizes) is used, its engagement in the interconnecting member can thus be limited by screwing it in only partially, according to the height of the cup to be assembled, so that a single interconnecting member of a standardized size can be used for the assembly of a large range of models of different heights.

[0035] This may possibly be achieved with the use of one or more tubular spacing components or spacers (not shown), for example, also made of plastics material, disposed along the shank of the retaining element and arranged for cooperating in abutment between the head of this element and the interconnecting member.

[0036] For small cups, this assembly method has been found optimal since it enables the same retaining element of standardized size to be used by being screwed fully into the interconnecting member, possibly with the provision of a shorter interconnecting member, which does not appreciably affect production costs since the operation to produce such a member from plastics material is very inexpensive (a shorter interconnecting member may even be produced from a member of standardized size with a substantially tubular body, simply by cutting off an end portion thereof from the end remote from the head portion).

[0037] A second embodiment is described below with reference to Figures 4 and 5, in which the same reference numerals as in the previous drawings have been used to indicate identical or similar elements; in this embodiment, the components of the cup are assembled by means of an axial interconnecting member 40 and a pair of axial retaining elements, that is, an upper element 42 and a lower element 44, respectively, the attributes "upper" and "lower" being determined by the specific orientation of the appended drawings.

[0038] The interconnecting member 40 is again produced in cylindrical form (and, in this particular embodiment, in tubular form) from plastics material with a high degree of hardness, and has cylindrical end openings 46, 48 each of which can house at least a portion of a respective retaining element 42, 44. Both of these elements have the same characteristics as the element 42 already described with reference to Figures 2 and 3. The insertion of the retaining element 44 in the corresponding axial opening 48 contributes to the formation of a head portion operatively similar to the portion 43 of the previous embodiment.

[0039] A magnetized support (not shown) having a concave seating provided with a tool shaped so as to cooperate with the seat formed in the head 50 of the lower retaining element 44 is fixed to a work bench and is arranged to receive and to hold the convex head 50 of the element 44 in its seating.

[0040] During a first step of the assembly method, the lower retaining element 44 is placed on the magnetized support, in the seating provided. The interconnecting member 40 is then associated therewith so as to form the head portion, by the insertion of the smooth portion 54 of the shank of the element 44 in the end opening 48 of the interconnecting member 40, without performing any screwing operation.

[0041] During a subsequent step, the components of the cup are arranged along the member 40 in succession, starting with the plinth 26, and finishing with the bowl element 20. The upper retaining element 42 is then inserted through the bowl element 20 and into the corresponding opening 46 of the member 40.

[0042] The clamping components are then screwed together and the components of the cup are clamped in the assembled condition by action on the retaining element 42 by means of a screwing tool arranged for cooperating with the seat in the head 50 of the element.

[0043] The two screw retaining elements 42, 44 are coupled with the interconnecting member 40 by a single operation.

[0044] The screwing tool acts directly on the upper retaining element 42 which thus rotates relative to the interconnecting member 40 and is engaged in the corresponding opening 46 forming the internal thread therein by plastic deformation. Upon completion of its travel, the element 42 is fully screwed into the member 40 and continuation of the screwing operation brings about rotation of the member 40 and causes the lower retaining element 44 to be screwed into the opening 48.

[0045] The screwing of the lower retaining element stops when a condition (shown in Figure 5) in which the components of the cup are clamped together has been reached. This condition may even be reached without

the threaded portion of the element being screwed fully into the corresponding seat since, in this case too, a partial screwing thereof suffices to withstand even large pulling forces much greater than those typically applied to the finished product.

[0046] As described with reference to the first embodiment, tubular spacing components or spacers (not shown) may be disposed along the shanks of the retaining elements.

[0047] As will be clear to an expert in the art, in a variant, it is also possible to achieve the same result by coupling the upper retaining element 42 with the magnetized support, arranging the components of the cup in reverse order and, lastly, coupling the lower retaining element 44 to bring about clamping of the components.

[0048] The use of the fastening members described, that is, interconnecting members of standardized size for a large variety of cups, and identical retaining elements, advantageously reduces the number of components required for the assembly and consequently reduces the storage and stock control burdens for the assemblers.

[0049] Moreover, the particular construction of the retaining element or elements and of the interconnecting member means that it is no longer necessary to perform either a separate preliminary step for coupling between the fastening members or an operation to centre the components of the cup relative to its axis, so that the assembly time and the costs connected therewith are considerably reduced in comparison with the conventional system.

[0050] The assembly method requires, in particular, only one screwing step (or, in other possible embodiments, an equivalent axial clamping step) and eliminates the need to operate manually within the lower cavity of the plinth of the cup in order to complete the clamping of the components, which operation is particularly demanding because of the limited space available.

Claims

1. A method of assembling a cup or similar trophy comprising a plurality of components (20-26), characterized in that it comprises the steps of:

- providing an elongate axial interconnecting member (40) having a first clear axial opening (45; 46) at a first end and a head portion (43; 44) projecting transversely relative to the rest of the body at a second end, and an axial retaining element (42) which can be housed at least partially in the opening (45; 46),

- arranging the components of the cup (20-26) axially in succession along the interconnecting member (40),

- associating the retaining element (42) axially with the axial opening (45; 46) of the interconnecting member (40), and

- bringing about coupling of the retaining element (42) with the interconnecting member (40) so as to achieve a final condition in which the components (20-26) of the cup are clamped between the retaining element (42) and the head portion (43; 44) in an assembled condition.

2. A method according to Claim 1, characterized in that the retaining element (42) is coupled with the interconnecting member (40) by moving the element (42) and keeping the interconnecting member (40) stationary.

3. A method according to Claim 2, characterized in that the interconnecting member (40) is arranged beforehand with its head portion (43; 44) on a support member provided for holding the head portion.

4. A method according to any one of the preceding claims, characterized in that the retaining element (42) is coupled with the interconnecting member (40) by means of a screwing operation.

5. A method according to any one of the preceding claims, characterized in that it comprises the steps of providing at least one spacer of predetermined thickness and of interposing the spacer between the retaining element (42) and the interconnecting member (40) so as to reduce the depth of the insertion of the element (42) in the corresponding opening (45) of the interconnecting member (40).

6. A method according to Claim 1, in which the axial interconnecting member (40) has a second axial opening (48) at the second end for housing at least one portion of a second retaining element (44), the method being characterized in that it comprises the preliminary step of associating the interconnecting member (40) and the second retaining element (44) axially so as to bring about insertion of at least a portion (54) of the element (44) in the respective axial opening (48) of the member (40) and to form the head portion.

7. A method according to Claim 6, characterized in that the second retaining element (44) is arranged beforehand on a support member provided for holding it, before being associated with the interconnecting member (40).

8. A method according to Claim 6 or Claim 7, characterized in that the final condition in which the components (20-26) of the cup are clamped in an

assembled condition is achieved by bringing about the coupling of both of the retaining elements (42, 44) with the interconnecting member (40) by the approach of the elements (42, 44) towards one another.

9. A method according to Claim 8, characterized in that the coupling of the retaining elements (42, 44) with the interconnecting member (40) is achieved by moving only one of the elements (42) and keeping the other element (44) stationary, so as to couple the retaining element (42) moved with the interconnecting member (40) and consequently to bring about the coupling of the interconnecting member (40) with the stationary retaining element (44).

10. A method according to any one of Claims 6 to 9, characterized in that the retaining elements (42, 44) are coupled with the interconnecting member (40) by a screwing operation.

11. A method according to any one of Claims 6 to 10, characterized in that it comprises the steps of providing at least one spacer of predetermined thickness and of interposing the spacer between at least one retaining element (42; 44) and the interconnecting member (40) so as to reduce the depth of insertion of said element (42; 44) in the corresponding opening (46; 48) of the interconnecting member (40).

12. A cup or similar trophy comprising a plurality of coaxial components (20-26) each having a respective mounting through-hole, and means (40, 42, 43; 40, 42, 44) for clamping the components in a assembled configuration, characterized in that the clamping means comprise:

an elongate axial interconnecting member (40) associated with at least some of the components (20-26) through the respective mounting holes and having a first axial opening (45; 46) at a first end and a head portion (43; 44) projecting transversely relative to the rest of the body at a second end, and

an axial retaining element (42) inserted in the opening (45; 46) of the member (40) and coupled therewith so as to clamp the components (20-26) together between the retaining element and the head portion (43; 44).

13. A cup according to Claim 12, characterized in that the retaining element (42) is a connecting screw.

14. A cup according to Claim 13, characterized in that the connecting screw (42) has a shank having a threaded portion adjacent the head (52) and a smooth end portion (54).

15. A cup according to Claim 13 or Claim 14, characterized in that the axial opening (45; 46) of the interconnecting member (40) has a smooth internal surface and the connecting screw (42) is a self-tapping screw.

16. A cup according to any one of Claims 12 to 15, characterized in that the clamping means comprise a spacer interposed between the retaining element (42) and the interconnecting member (40) so as to reduce the depth of insertion of the element (42) in the opening (45; 46) of the interconnecting member (40).

17. A cup according to any one of Claims 12 to 16, characterized in that the head portion (43) is formed integrally with the interconnecting member (40) and has a transverse dimension substantially greater than the dimension of the mounting holes of the components (20-26) of the cup.

18. A cup according to any one of Claims 12 to 16, characterized in that the head portion is formed by a second axial retaining element (44) inserted in a corresponding second axial opening (48) of the member (40) in the same manner as the first retaining element (42).

19. A cup according to Claim 18, characterized in that the second retaining element (44) is substantially identical to the first retaining element (42) and can be coupled with the interconnecting member (40) with the interposition of at least one spacer so that the depth of its insertion in the corresponding axial opening (48) is reduced.

20. A cup according to Claim 18 or Claim 19, characterized in that the axial interconnecting member (40) is produced in tubular form.

21. A cup according to any one of Claims 12 to 20, characterized in that the interconnecting member (40) has a transverse dimension substantially corresponding to the dimension of the mounting holes of the components (20-26) of the cup so that the interconnecting member can be coupled with the components (20-26) through each hole without transverse play.

Fig.1

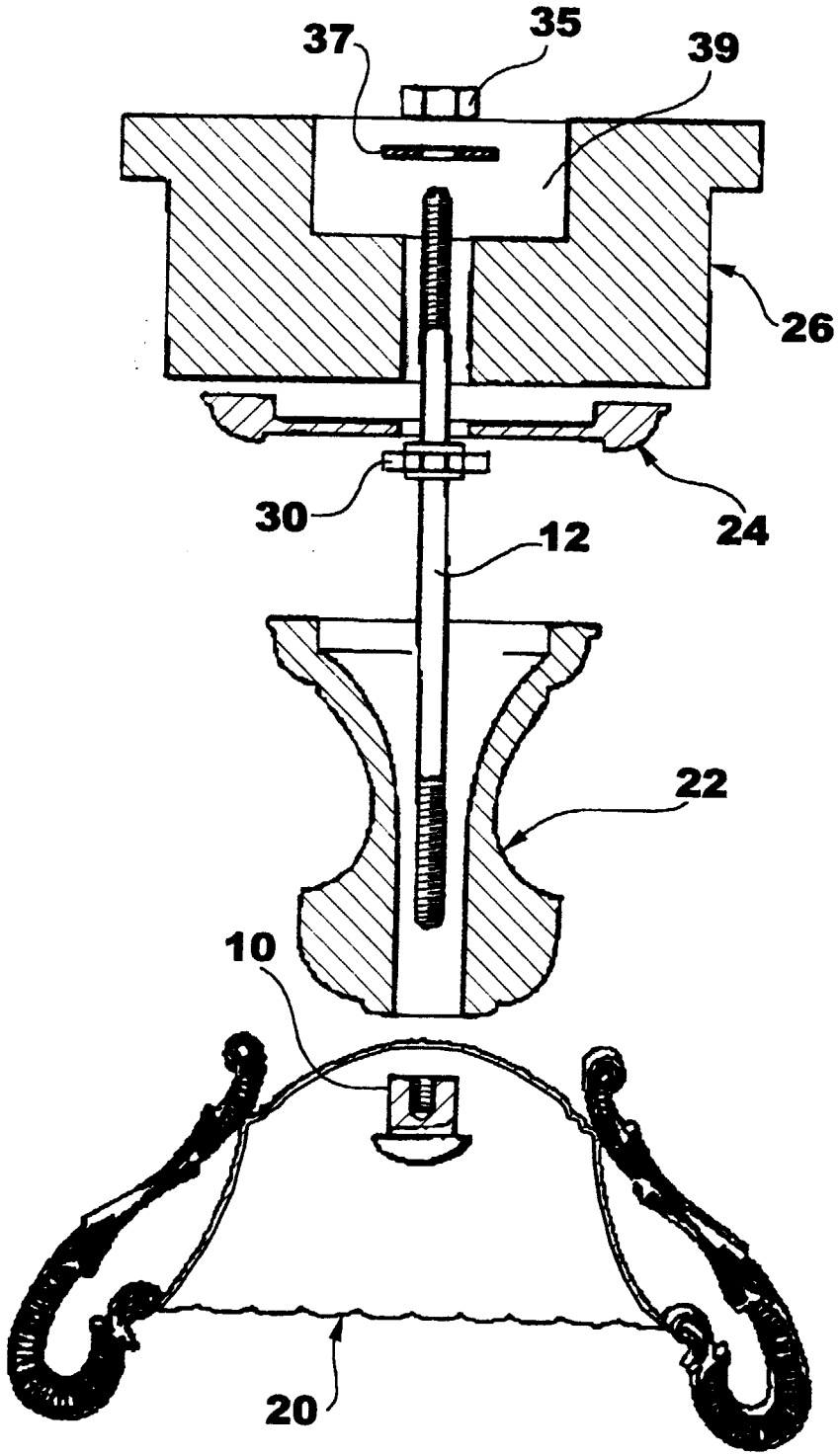


Fig.2

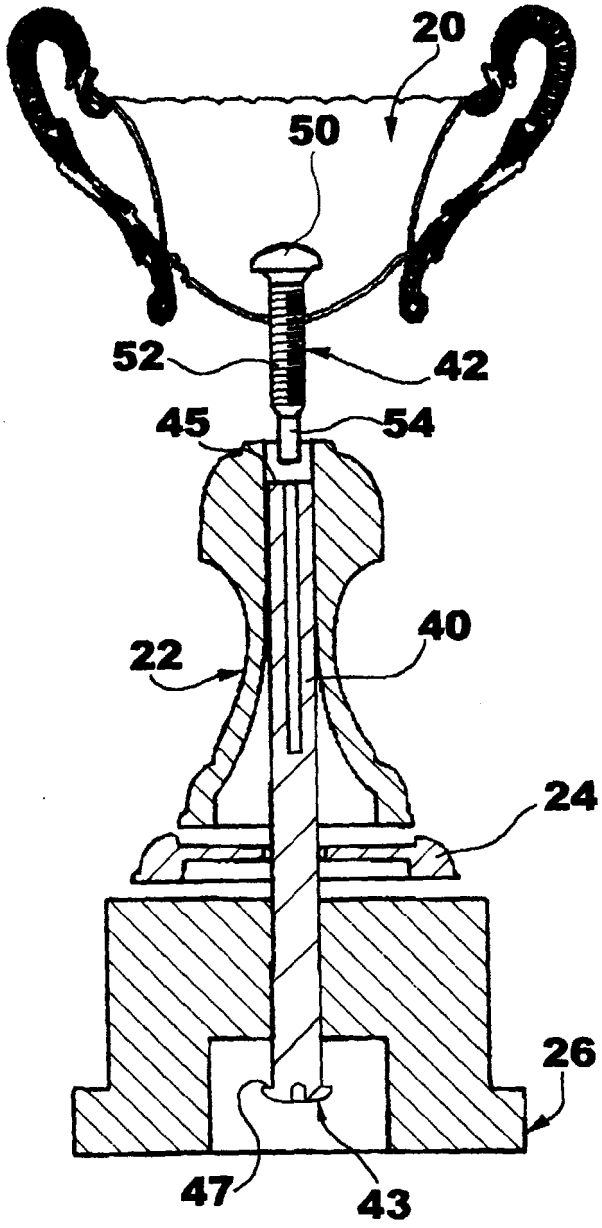


Fig.3

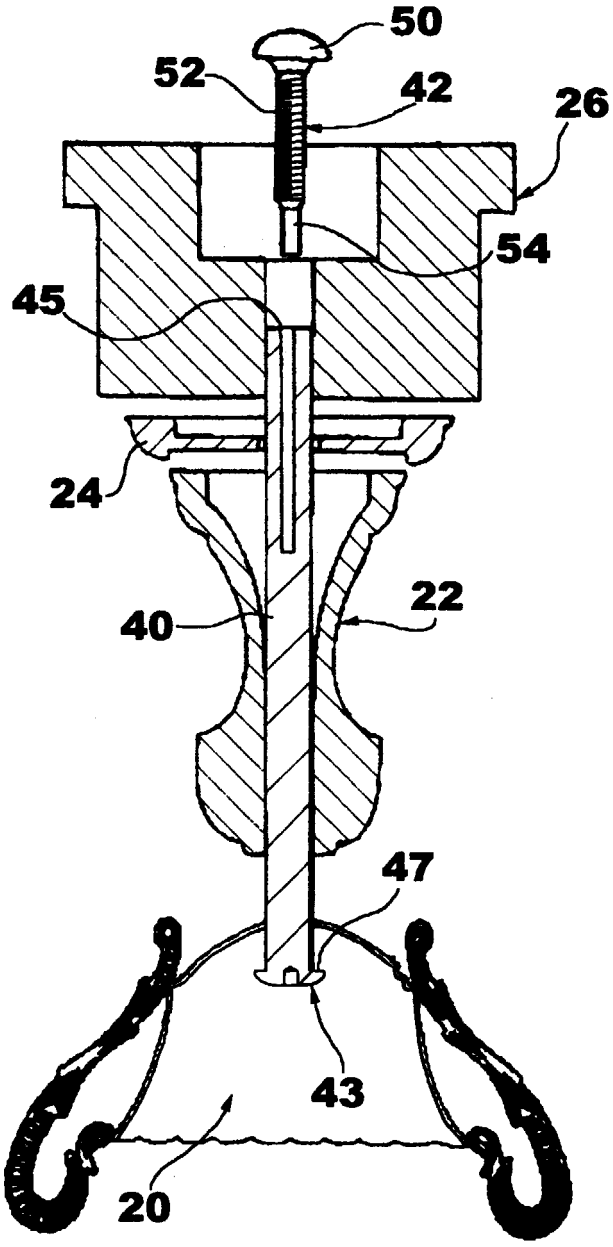


Fig.4

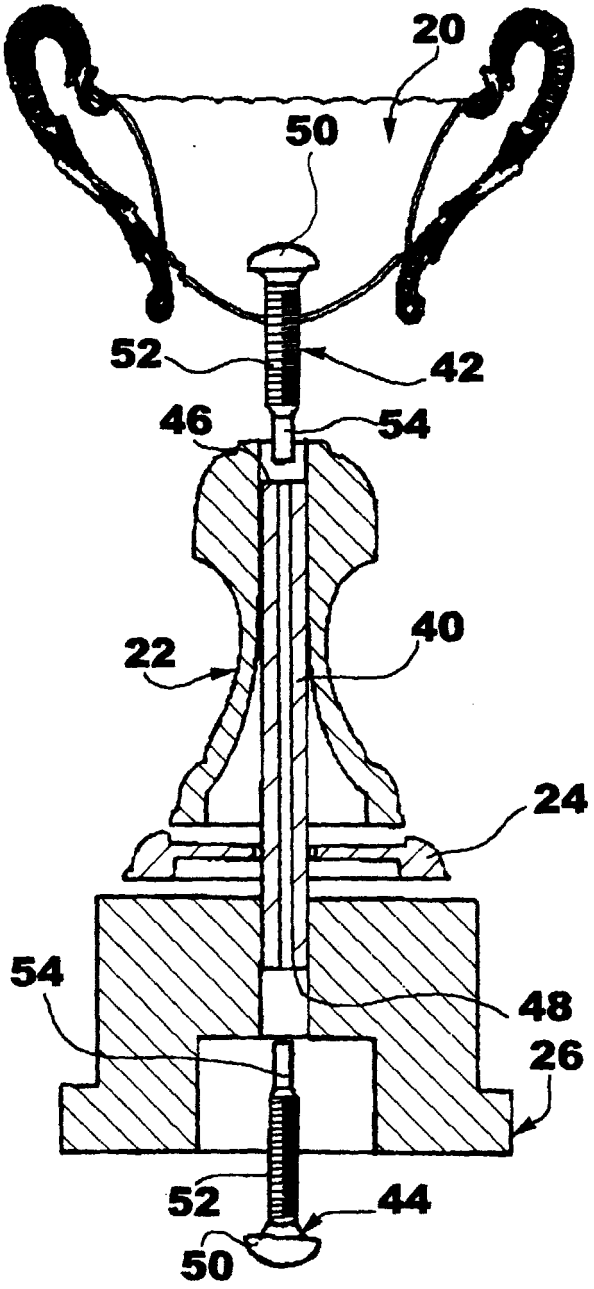
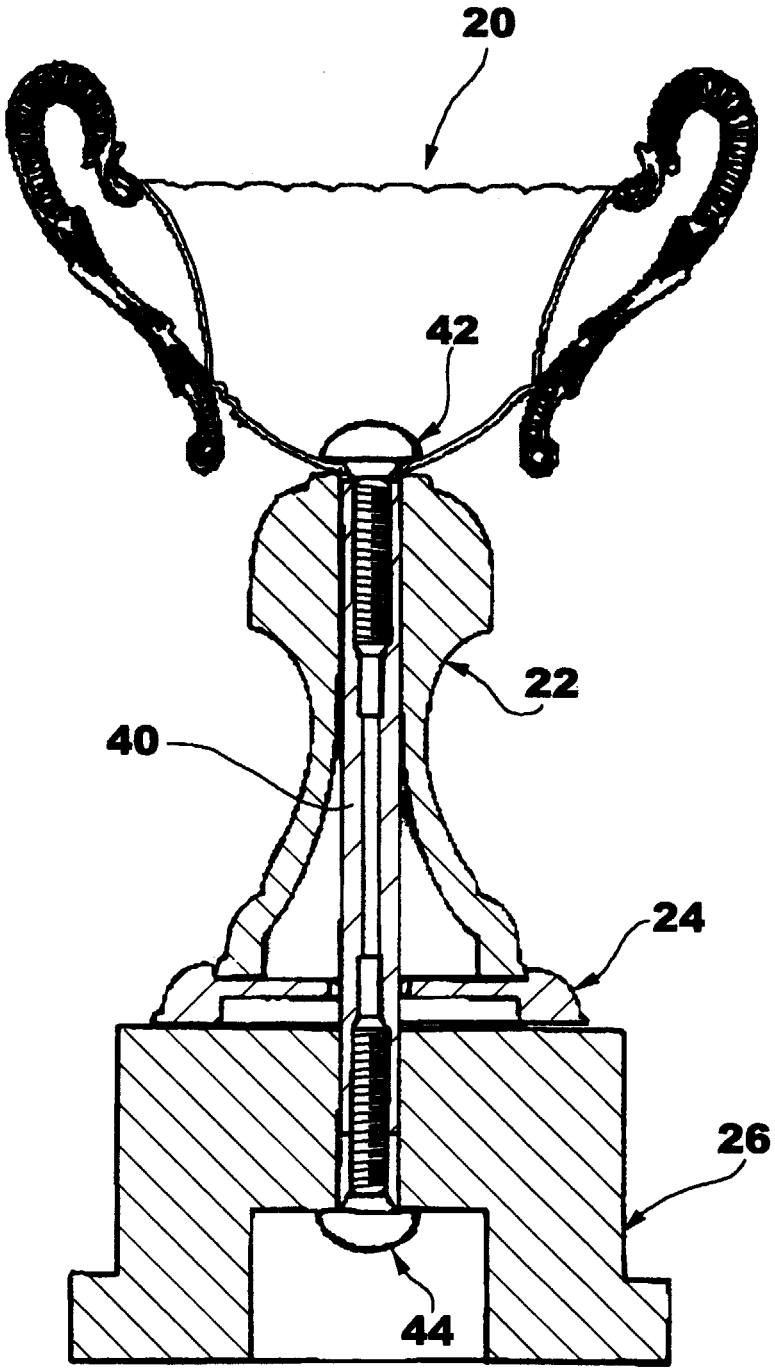


Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 3226

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 2 254 802 A (EDWARD E.GILL) 2 September 1941 (1941-09-02) * figure 1 *	1-5,12, 13	A47G33/00
A		6-11, 14-21	

X	US 2 171 919 A (RAY E. DODGE) 5 September 1939 (1939-09-05) * page 1, right hand col.,lines 18 - 43 * * claims 1,2 * * figures 2,3 *	1,12-14	
A		2-11, 15-21	

X	FR 2 481 196 A (LECOMTE MARC) 30 October 1981 (1981-10-30) * claim 1 * * figure 1 *	1,12-14	
A		2-11, 15-21	
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X	GB 667 555 A (FREDERICK ARNOLD WATERHOUSE) * claim 6 * * figures 1,2 *	1	A47G F16B
A		2-4,6-10	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	24 January 2001	Schaeffler, C

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 12 3226

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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24-01-2001

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82