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(54) **SYSTEM USED TO PERMANENTLY FIX A PLASTIC OBJECT TO AN OBJECT MADE OF
DIFFERENT MATERIAL WITH HIGHER TOUGHNESS AND SURFACE HARDNESS**

SYSTEM ZUR DAUERHAFTEN FIXIERUNG EINES KUNSTSTOFFOBJEKTS AN EINEM OBJEKT
AUS EINEM ANDEREN MATERIAL MIT HÖHERER FESTIGKEIT UND OBERFLÄCENHÄRTE

SYSTÈME UTILISÉ POUR FIXER, DE MANIÈRE PERMANENTE UN OBJET EN PLASTIQUE À UN
OBJET CONSTITUÉ D'UN MATÉRIAU DIFFÉRENT À TÉNACITÉ ET DURETÉ DE SURFACE
ÉLEVÉES

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(73) Proprietor: **V.I.C. - Viterie Italia Centrale S.R.L.**

60044 Fabriano (AN) (IT)

(72) Inventors:

- **PERINI, Carlo**
I-60044 Fabriano (AN) (IT)
- **PETTINARI, Pierluigi**
I-06022 Fossato di Vico (PG) (IT)

(74) Representative: **Cutropia, Gianluigi et al**

Ing. Claudio Baldi s.r.l.
Viale Cavallotti, 13
60035 Jesi (AN) (IT)

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Description

[0001] The present patent application relates to a system used to permanently fix a plastic object to an object made of different material with higher toughness and surface hardness.

[0002] More precisely, the present invention has been developed to optimise the solutions that are currently available on the market to provide exact matching and mutual fixing between objects with different toughness and surface hardness values.

[0003] For the purpose of simplicity, the present description relates to the fixing of a plastic object to a cement object, being understood that the same fixing mode can be advantageously used, for instance, to fix a plastic object to a metal object, etc.

[0004] As a matter of fact, a typical - although not the only one - field of application of the new fixing technique may be the structure of a washing machine, where cement counterweights are fixed on the outside of plastic tubs.

[0005] The peculiarities and advantages of the invention will become evident after a short description of the prior technique.

[0006] So far, concrete objects are normally fixed to plastic objects by obtaining a sort of cylindrical centring column on the plastic object designed to be exactly engaged with male-female coupling into a corresponding through housing obtained on the structure of the concrete object; the said column is centrally provided with an axial passage designed to engage a self-tapping screw from the outside of the concrete object.

[0007] With the addition of a suitable washer, the head of the screw energetically interferes against the external face of the concrete object, maintaining tight adhesion to the plastic object.

[0008] Nevertheless, such a matching requires high fixing torques in order to obtain high residual torques after the unavoidable spring back of the plastic object.

[0009] Without such an energetic fixing, the friction force between the two objects would not be sufficient to ensure permanent perfect adhesion when the objects are subjected to high stress loads.

[0010] For instance, this condition would unavoidably occur during the vortical revolutions of the drum of the washing machine during spinning.

[0011] The problem is additionally worsened by the fact that in the two aforementioned objects the perfect matching of the contact surfaces determines some interference during mounting that prevents the easy matching of the two objects; for this reason, a certain mounting clearance is provided between the two objects.

[0012] Moreover, in order to ensure stable and balanced fixing, the plastic object is provided with at least two of the aforementioned columns and, consequently, the concrete object is provided with a corresponding number of through housings.

[0013] Because of the fact that the shrinkage of the

two different materials (plastics and concrete) is impossible to control, the mounting clearance must be especially increased, thus requiring considerably high reliable tightening torques.

[0014] Obviously, the presence of clearance reduces the exactness and stability of the matching, it being also evident that the said clearances are not completely recovered by means of a high tightening torque when the screw is engaged in the passage of the column obtained on the plastic object.

[0015] As a matter of fact, such a high tightening force would damage the fragile structure of the column - with traumatic breakage - because of the stress caused by traction and torsion.

[0016] It is impossible to increase the resistance of the said columns by providing them with a structure with higher thickness; in fact, such a solution is prevented by the need to obtain the simultaneous uniform cooling of all the parts of the plastic object during moulding, which - as it is known - does not allow to have areas with highly differentiated thickness on the same object.

[0017] In order to increase the resistance of the said columns, the same columns have been provided with external longitudinal wings; nevertheless, the geometry of traditional wings does not create exact interference with the internal walls of the corresponding concrete housings.

[0018] In such a case, the necessary fixing clearance is eliminated, together with the possibility to centre the two objects easily, especially when the matching of the two objects requires the simultaneous insertion of multiple columns inside multiple housings.

[0019] Moreover, a similar interference between the columns of the plastic object and the internal walls of the housings on the concrete object results in the extrusion of the plastic columns caused by the highly-abrasive hard surface of the concrete housings.

[0020] WO2007/126169 discloses a washing machine having the structure to reinforce fastening bosses formed on a front surface of a tub to mount a balance weight.

[0021] US2006/0000245 discloses a balance weight mounted on a tub of a washing machine, in order to balance the tub and reduce the vibration of the tub.

[0022] A careful evaluation of the prior technique has led to the development of the present invention, which is able to ensure satisfactory matching between a plastic object with centring columns and a corresponding concrete object with housings.

[0023] As a matter of fact, a first purpose of the fixing system of the invention is to ensure a practical, easy method to efficaciously fix the two aforementioned objects, thus avoiding translation and clearance also in the presence of rototranslational stress.

[0024] The second purpose of the present invention is to permit the engagement of tightening screws in the passages of the said columns also in case of high tightening torques (which ensure highly stable matching) without the risk of breaking the plastic material used to obtain

the said columns.

[0025] In particular, this result has been obtained by means of the special configuration given to the said columns, as explained in detail in the description below. For purposes of clarity the description of the present invention continues with reference to the enclosed drawings, which are intended for purposes of illustration only and not in a limiting sense, whereby:

- figure 1 is an axonometric exploded view of a plastic tub for washing machines and concrete counterweights assembled according to the fixing system of the invention;
- figure 2 is an axonometric view of one of the columns obtained on the tub of figure 1 and the corresponding housing (cross-section with a diameter plane) obtained on one of the counterweights;
- figure 3 is a view of the column of figure 2 seen from an angle parallel to its longitudinal axis;
- figure 4 is a view of the same column seen from angle 4-4 of figure 3;
- figure 5 is an axonometric view of an alternative constructive embodiment of the said column;
- figure 6 is a view of the column of figure 5 seen from an angle parallel to its longitudinal axis;
- figure 7 is an axonometric view of a second alternative constructive embodiment of the said column;
- figure 8 is a view of the column of figure 7 seen from an angle parallel to its longitudinal axis;
- figures 9 and 10 are views of an additional constructive embodiment of the said column seen from two different angles;
- figure 11 is a cross-sectional view of figure 10 with plane XI-XI;
- figures 12 and 13 are views of an additional constructive embodiment of the said column seen from two different angles;
- figure 14 is a cross-sectional view of figure 13 with plane XIV-XIV;
- figure 15 is an enlarged view of a detail of figure 14;
- figures 16 and 17 are views of an additional constructive embodiment of the said column seen from two different angles;
- figure 18 is a cross-sectional view of figure 17 with plane XVIII-XVIII;
- figure 19 is a cross-sectional view of figure 17 with plane XIX-XIX.

With reference to figure 1, a moulded plastic object (1) (a tub for washing machines in this specific case) is provided with one or more tapered columns (10) that protrude from corresponding bases, designed to be exactly engaged into corresponding through housings (20) obtained on the object (2) made of concrete material (a counterweight in this specific case).

[0026] Sometimes, the longitudinal axis of the bases (10a) coincides perfectly with the longitudinal axis of the columns (10), as shown in fig. 2 (where the base has a

circular section) and in fig. 7 (where the base has an octagonal section); in other cases, the said bases (10b) are shaped as a block, with longitudinal axis perpendicular to the longitudinal axis of the columns (10), as shown in fig. 3.

[0027] Moreover, the columns (10) are centrally provided with an axial passage (11) designed to receive a self-tapping screw (V) used to ensure the stability of the two cooperating objects (1, 2).

[0028] In particular, the screw (V) is inserted into the passage (11) of the column (10) from outside the concrete object (2) and, more precisely, through the external opening (21) of the housing (20) that receives the column (10).

[0029] In this way, once the threaded stem of the screw (V) is engaged inside the passage (11), the enlarged head of the screw (V) is able to travel energetically against the border (22) that surrounds the external opening (21) of the housing (20).

[0030] A washer (R) is preferably used in intermediate position to increase the tightness of the coupling ensured by the enlarged head of the screw (V).

[0031] Within the said technology, the peculiarity of the fixing system of the invention consists in the special configuration given to the fluted columns (10) of the plastic object (1) and to the corresponding housings (20) of the concrete object (2).

[0032] It must be noted that both the fluted columns (10) and the housings (20) have a truncated-conical profile.

[0033] The columns (10) are externally provided in longitudinal direction with wings (12) having a spiral cross-section; it being provided, in particular, that the wings (12) are curved in the direction that corresponds to the screw-on direction (shown by the arrow F) of the self-tapping screw (V) designed to be engaged in the passage (11) of each column (10).

[0034] A right-hand screw is used in the case of the column (10) shown in figs. 2 and 3, so that the wings (12) are curved in clockwise direction.

[0035] The truncated-conical profile of the columns (10) facilitates the insertion of the said columns (10) inside the housings (20).

[0036] As a matter of fact, insertion is made easier by the high "matching clearance" between each column (10) and the corresponding housing (20) at the beginning of the insertion, when the tapered end of the column (10) penetrates the internal larger opening (23) of the housing (20).

[0037] The easy mutual matching between each column (10) and the housing (20) is more advantageous when the matching between the two objects (1, 2) occurs by simultaneously inserting multiple columns (10) of the plastic object (1) into multiple housings (20) of the concrete object (2).

[0038] As soon as each column (10) has penetrated the corresponding housing (20) for half of its height, a contact between the wings (12) of the column (10) and

the internal walls (24) of the housing (20) is produced because of geometrical interference.

[0039] Once the matching has been completed, the wings (12) of the column (10) interfere exactly for the entire length against the corresponding internal walls (24) of the housing (20).

[0040] It is important to note the behaviour of the wings (12) under the action of the tightening torque applied on the corresponding column (10) after the self-tapping screw (V) is screwed on inside the axial passage (11).

[0041] The stress discharged on the column (10) generates a torsion of the column (10), thus favouring the creation of high friction in rotational direction between the wings (12) and the internal walls (24) of the housings (20), which prevents the uncontrolled free sliding of the wings (12) in the housings (20).

[0042] When the torsional torque caused by screwing on the self-tapping screw (V) increases, also the friction exerted by the wings (12) against the internal walls (24) of the housing (20) increases; in particular, this effect is produced following to the progressive elastic deformation generated on the wings (12), being subjected to a peak load.

[0043] The elastic deformation of the wings (12) increases the friction against the internal walls (24) of the housings (20) on one side, and absorbs the torsional moment that tends to discharge on the entire column (10) on the other side.

[0044] This condition totally prevents the risk of breaking the column (10) - as in the prior technique - due to excessive torsional stress.

[0045] It can be otherwise said that in such a case the set of spiral wings (12) acts as a sort of spring, whose compression directly causes the screwing on of the self-tapping screw (V) inside the axial passage (11) of the column (10).

[0046] Moreover, it must be noted that the spiral shape of the wings (12) prevents them from suffering dangerous abrasions caused by the internal walls (24) of the housing (20) of the concrete object (2) during the fixing operations of the two objects (1, 2).

[0047] This allows to obtain perfect matching between each column (10) and the corresponding housing (20), due to the fact that the geometry of the column (10) is not modified (or, better said, thinned out) and therefore maintains its matching capability without clearance with the internal geometry of the housing (20).

[0048] The same inventive principle can be advantageously applied also with columns (10) having a cylindrical, rather than truncated-conical shape; nevertheless, the said cylindrical shape makes it more difficult to insert the columns (10) inside the housings (20).

[0049] Likewise, the wings (12) of each column (10) can be straight, and not curved, as long as each of them is given an inclination equal to the screw-on direction of the self-tapping screw (V), and not a radial direction; reference is specifically made to figures 6 and 8.

[0050] It may be useful to explain the reason why the

present inventive idea may not be applied in case of wings with perfectly radial direction.

[0051] In such a case, the torsional stress applied to each column, together with the rotation of the column, would also cause a progressive loss of friction of the wings against the internal walls of the housing, consequent to the abrasion suffered by the wings because of the contact with the hard, rough internal walls of the object that houses them.

[0052] In this case, the wings would tend to slide with respect to the internal walls of the housing, thus generating the opposite condition to the one that has been obtained with the present invention in order to prevent the uncontrolled free rotation of the column when the self-tapping screw is engaged.

Following is the description of some alternative constructive embodiments of the said column (10).

Figures 9, 10 and 11 show a column (10A) that is basically identical to the column (10) of figs. 3, 4 and 5, except for the fact that it is provided with longitudinal wings (12) ending with a flute-beak profile (12a) that allows the wings (12) to adapt better to the surface of the housing (20) following to the plastic deformation of the external corners (12b) of the flute-beak profiles.

Figures 12, 13, 14 and 15 show a column (10B) characterised by the fact that the wings (120) are provided with a "boomerang" configuration, which includes a separation knee-piece (121) between the short initial section (120a) that branches out from the body of the column (10B) and the long final section (120b) with forward inclination in the screw-on direction of the self-tapping screw (V).

As shown in the enlarged view of figure 15, the final section (120b) is inclined forward by an angle (b) in the screw-on direction of the self-tapping screw, while the short initial section (120a) is inclined backwards by an angle (a). Under a peak load, the presence of the knee-piece (121) favours the elastic deformation of the wings (120), which is useful to recover possible small misalignments between the housings (20) obtained on the counterweights (2) and the columns (12B) that protrude from the plastic tub.

Figures 16, 17, 18 and 19 show a column (10C) characterised by the fact that the wings (122) have a variable inclination.

In particular, on the attachment (122a) to the base (10a), each wing (122) has a perfectly radial inclination as shown in the cross-sectional view of fig. 19, which cuts the column (120C) at the base.

The remaining section (122b) of each wing (122) is inclined forward by an angle in the screw-on direction of the self-tapping screw (V).

The radial section (122a) interferes with the surface of the housings (20) when the insertion of the column (10C) inside the housing (20) has been completed; in this case, the presence of the rigid, indeformable radial section (122a) efficiently opposes the dilatation of the hole (11) caused by the screw (V) engaged inside the hole (11).

Claims

1. System used to permanently fix a plastic object to an object made of different material with higher toughness and surface hardness, the system comprising:

- an object (2) made of non-plastic material having through housings (20) obtained on said object (2) made of non-plastic material,
- a plastic object (1) provided with one or more columns (10, 10A, 10B, 10C) with circular cross-section, designed to be engaged into the corresponding through housings (20) obtained on the object (2) made of non-plastic material, said one or more columns (10, 10A, 10B, 10C) having an axial passage (11), and
- a self-tapping screw (V) suitable for inserting from the outside of each through housing (20) of the object (2) made of non-plastic material, in order to fix the plastic object (1) to the object (2) made of non-plastic material, said self-tapping screw (V) being engaged inside the axial passage (11) provided on the column (10, 10A, 10B, 10C) of the plastic object,

the system being **characterised by** the fact that each column (10, 10A, 10B, 10C) of the plastic object is externally provided with some longitudinal wings (12, 120, 122) having at least a section with inclined direction, with respect to a radial direction, in the same direction as the screw-on direction (F) of the self-tapping screw (V).

2. System as claimed in claim 1, **characterised by** the fact that the wings (12, 120, 122) of each column (10, 10A, 10B, 10C) are curved according to a spiral profile, in the direction that corresponds to the screw-on direction of the self-tapping screw (V).
3. System as claimed in one of the above claims, **characterised by** the fact that the said columns (10, 10A, 10B, 10C) of the plastic object have a truncated-conical profile.
4. System as claimed in one or more of the above claims, **characterised by** the fact that each column (10, 10A, 10B, 10C) of the plastic object is supported at the top of a base (10a) with identical longitudinal axis.
5. System as claimed in one or more of claims 1 to 3, **characterised by** the fact that each column (10, 10A, 10B, 10C) of the plastic object is supported by a base (10b) with orthogonal longitudinal axis.
6. System as claimed in one or more of the above claims, **characterised by** the fact that each column

(10A) of the plastic object is provided with longitudinal wings (12) ending with a flute-beak profile (12a).

7. System as claimed in one or more of the above claims, **characterised by** the fact that each column (10B) of the plastic object is provided with wings (120) having a "boomerang" configuration, which includes a separation knee-piece (121) between a short initial section (120a) that branches out from the body of the column (10B) and a long final section (120b) with forward inclination in the screw-on direction of the self-tapping screw (V).
8. System as claimed in the above claim, **characterised by** the fact that the final section (120b) is inclined forward by an angle (b) in the screw-on direction of the self-tapping screw (V), while the short initial section (120a) is inclined backwards by an angle (a).
9. System as claimed in one or more of the above claims, **characterised by** the fact that each column (10C) of the plastic object is provided with wings (122) with variable inclination.
10. System as claimed in the above claim, **characterised by** the fact that, on an attachment (122a) to a base (10a) of the plastic object, each wing (122) has a perfectly radial inclination, while a remaining section (122b) of each wing (122) is inclined forward by an angle in the screw-on direction of the self-tapping screw (V).

Patentansprüche

1. System zur stabilen Befestigung eines Körpers aus Kunststoffmaterial an einem Körper aus einem anderen Material mit einer höheren Zähigkeit und Oberflächenhärte, wobei das System Folgendes umfasst:
- einen Körper (2) aus Nicht-Kunststoffmaterial mit durchgehenden Aufnahmesitzen (20), die in dem Körper (2) aus Nicht-Kunststoffmaterial herausgearbeitet sind,
 - einen Körper (1) aus Kunststoffmaterial mit einer oder mehreren Säulen (10, 10A, 10B, 10C) mit kreisförmigem Querschnitt, die dazu bestimmt sind, in entsprechenden durchgehenden Aufnahmesitzen (20) in Eingriff genommen zu werden, die in dem Körper (2) aus Nicht-Kunststoffmaterial herausgearbeitet sind, wobei die eine oder die mehreren Säulen (10, 10A, 10B, 10C) einen axialen Durchgang (11) aufweisen, und
 - eine selbstschneidende Schraube (V), die dazu geeignet ist, von außen in jeden durchgehen-

den Aufnahmesitz (20) des Körpers (2) aus Nicht-Kunststoffmaterial eingesetzt zu werden, um den Körper (1) aus Kunststoffmaterial an dem Körper (2) aus Nicht-Kunststoffmaterial zu befestigen, wobei die selbstschneidende Schraube (V) innerhalb des axialen Durchgangs (11) in Eingriff steht, der in der Säule (10, 10A, 10B, 10C) des Körpers aus Kunststoffmaterial vorgesehen ist,

wobei das System **dadurch gekennzeichnet ist, dass** jede Säule (10, 10A, 10B, 10C) des Körpers aus Kunststoffmaterial außenseitig mit einigen längslaufenden Flügeln (12, 120, 122) versehen ist, die mindestens einen Abschnitt aufweisen, der in Bezug auf eine radiale Richtung in derselben Richtung geneigt ist wie die Schraubrichtung (F) der selbstschneidenden Schraube (V).

2. System nach Anspruch 1, **dadurch gekennzeichnet, dass** die Flügel (12, 120, 122) einer jeden Säule (10, 10A, 10B, 10C) spiralartig in die Richtung gebogen sind, die der Schraubrichtung der selbstschneidenden Schraube (V) entspricht.
3. System nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Säulen (10, 10A, 10B, 10C) des Körpers aus Kunststoffmaterial ein kegelstumpfförmiges Profil aufweisen.
4. System nach einem oder mehreren der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** jede Säule (10, 10A, 10B, 10C) des Körpers aus Kunststoffmaterial auf der Oberseite einer Basis (10a) getragen wird, deren Längsachse mit ihrer eigenen zusammenfällt.
5. System nach einem oder mehreren der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** jede Säule (10, 10A, 10B, 10C) des Körpers aus Kunststoffmaterial von einer Basis (10b) getragen wird, deren Längsachse rechtwinklig zu ihrer eigenen steht.
6. System nach einem oder mehreren der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** jede Säule (10A) des Körpers aus Kunststoffmaterial längslaufende Flügel (12) aufweist, die in einem flötenkopffartigen Profil (12a) enden.
7. System nach einem oder mehreren der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** jede Säule (10B) des Körpers aus Kunststoffmaterial Flügel (120) mit einer boomerangartigen Ausgestaltung aufweist, die ein Teilungskniestück (121) zwischen einem kurzen, vom Körper der Säule (10B) abzweigenden Anfangsabschnitt (120a) und einem langen, nach vorn, in Schraubrichtung der selbstschneidenden Schraube (V) geneigten En-

dabschnitt (120b) umfasst.

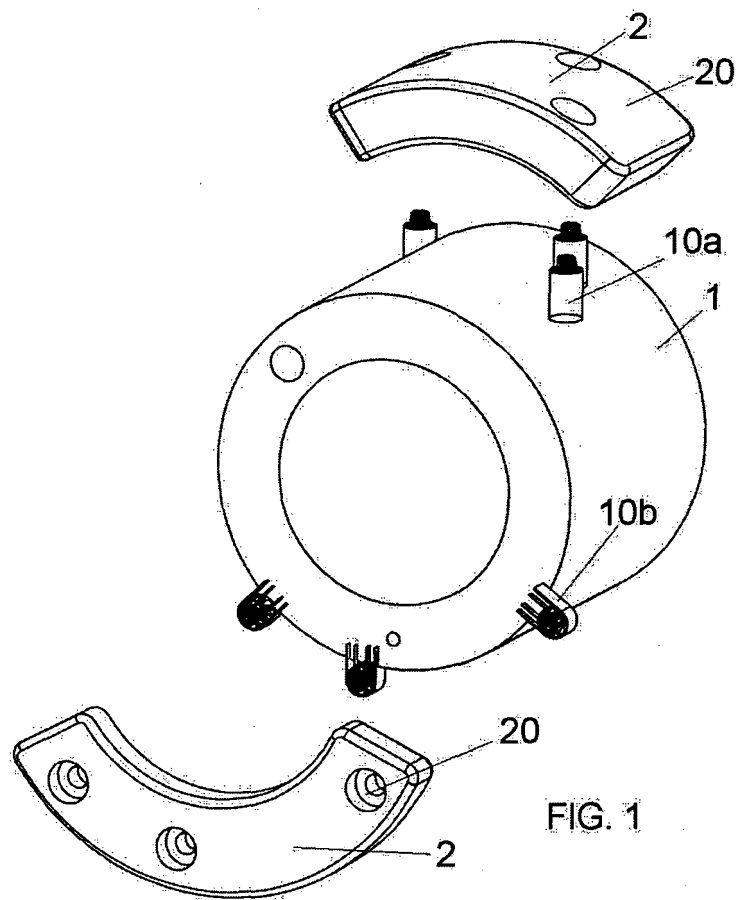
8. System nach dem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** der Endabschnitt (120b) um einen Winkel (b) in Schraubrichtung der selbstschneidenden Schraube (V) nach vorn geneigt ist, während der kurze Anfangsabschnitt (120a) um einen Winkel (a) nach hinten geneigt ist.
9. System nach einem oder mehreren der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** jede Säule (10C) des Körpers aus Kunststoffmaterial Flügel (122) mit variabler Neigung aufweist.
10. System nach dem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** jeder Flügel (122) an seinem Ansatz (122a) an der Basis (10a) des Körpers aus Kunststoffmaterial eine perfekt radiale Neigung aufweist, während der restliche Abschnitt (122b) eines jeden Flügels (122) um einen Winkel in Schraubrichtung der selbstschneidenden Schraube (V) nach vorn geneigt ist.

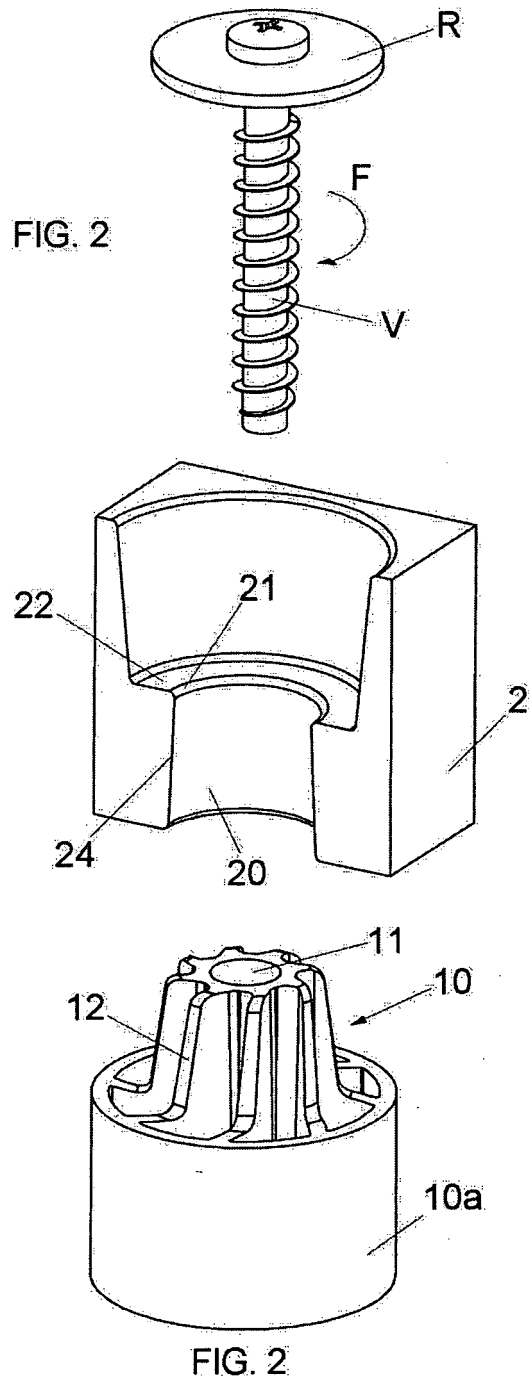
25 Revendications

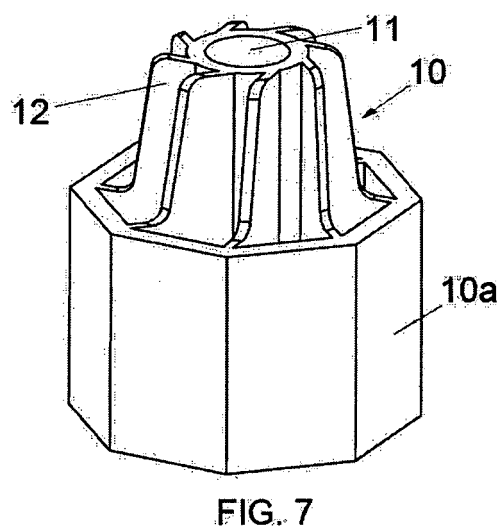
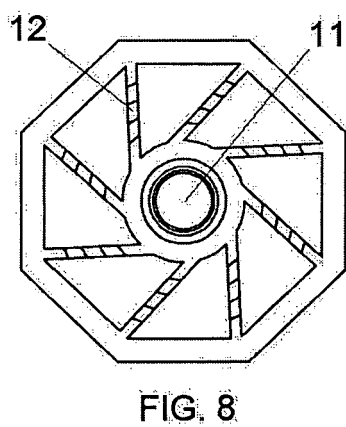
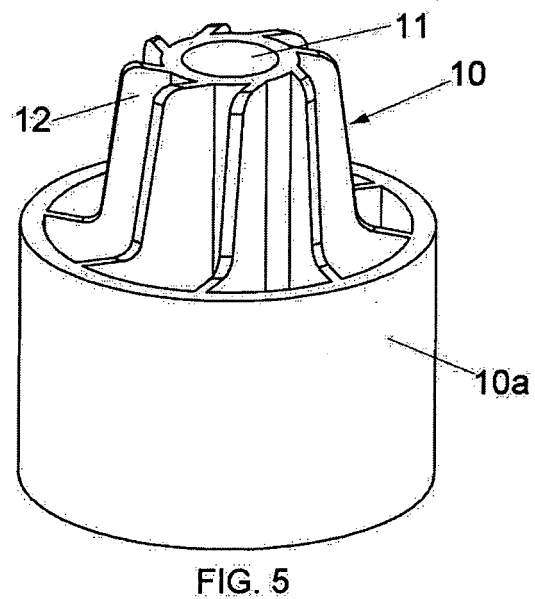
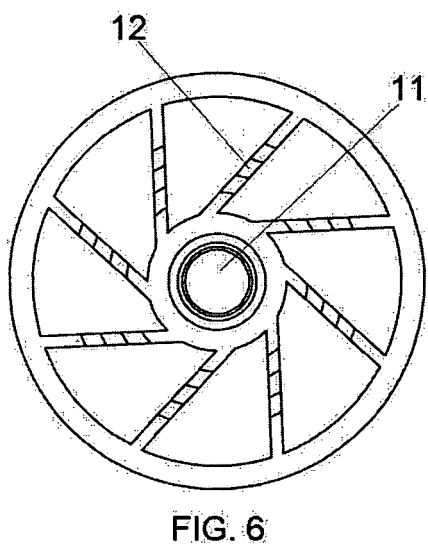
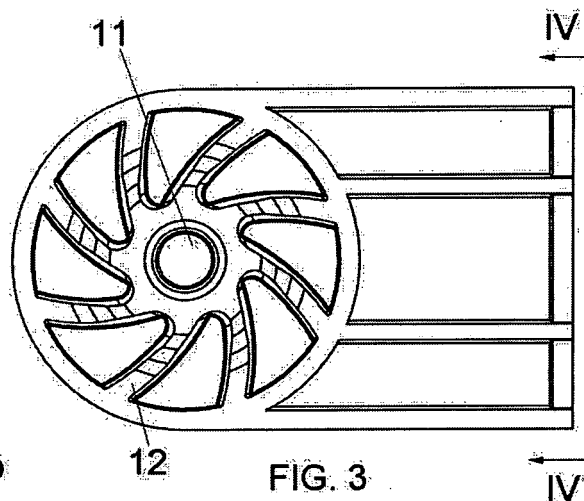
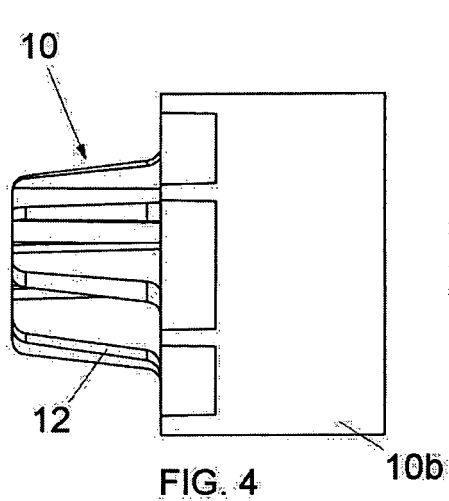
1. Système pour la fixation stable d'un corps en matériel plastique et d'un corps d'un matériel différent doté de majeure résistance et dureté superficielle, le système comprenant :
 - un corps (2) fait de matériel non plastique ayant des logements passants (20) réalisés dans ledit corps (2) de matériel non plastique,
 - un corps en plastique (1) muni d'une ou de plusieurs colonnes (10, 10A, 10B, 10C) de section circulaire, destinées à s'engager dans les logements passants correspondants (20) réalisés sur le corps (2) de matériel non plastique, ladite une ou plusieurs colonnes (10, 10A, 10B, 10C) ayant un conduit axial (11), et
 - une vis autotaraudeuse (V) apte à être introduite depuis l'extérieur de chaque logement passant (20) du corps (2) en matériel non plastique, afin de fixer le corps en plastique (1) au corps (2) de matériel non plastique, ladite vis autotaraudeuse (V) étant engagée dans le conduit axial (11) prévu dans la colonne (10, 10A, 10B, 10C) du corps en plastique,

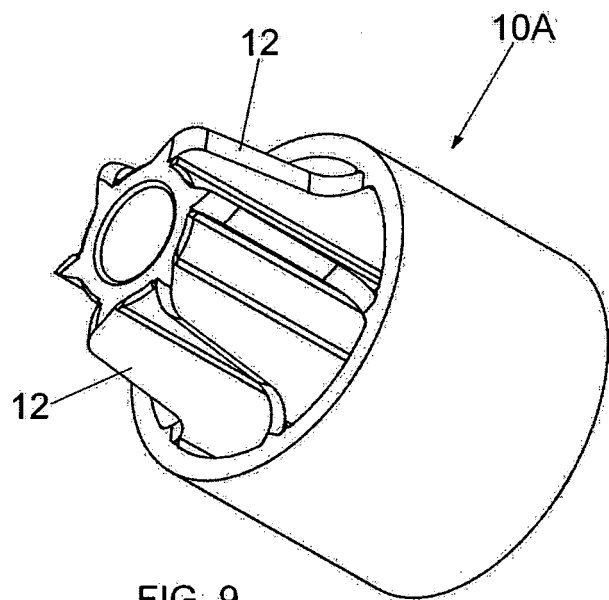
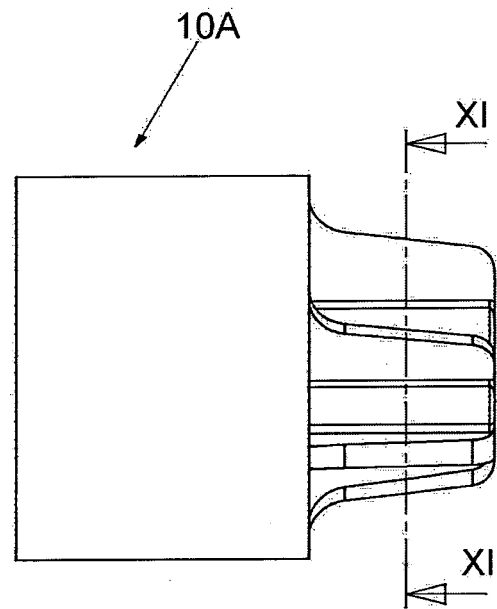
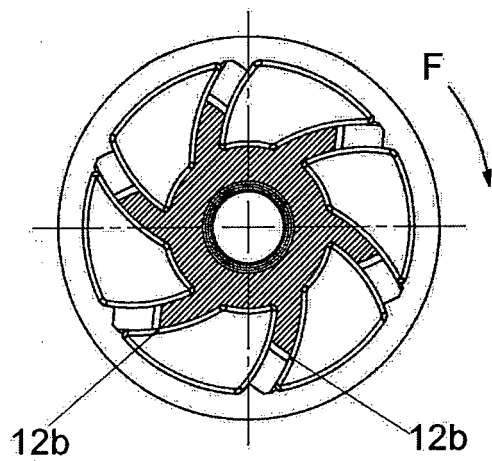
le système étant **caractérisé en ce que** chacune colonne (10, 10A, 10B, 10C) du corps en plastique est munie à l'extérieur d'aillettes longitudinales (12, 120, 122) ayant au moins une section avec direction inclinée par rapport à une direction radiale, dans le même sens de vissage (F) de la vis autotaraudeuse (V).

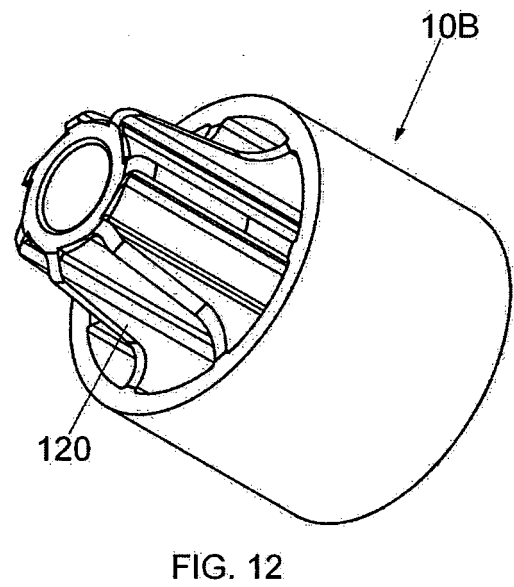
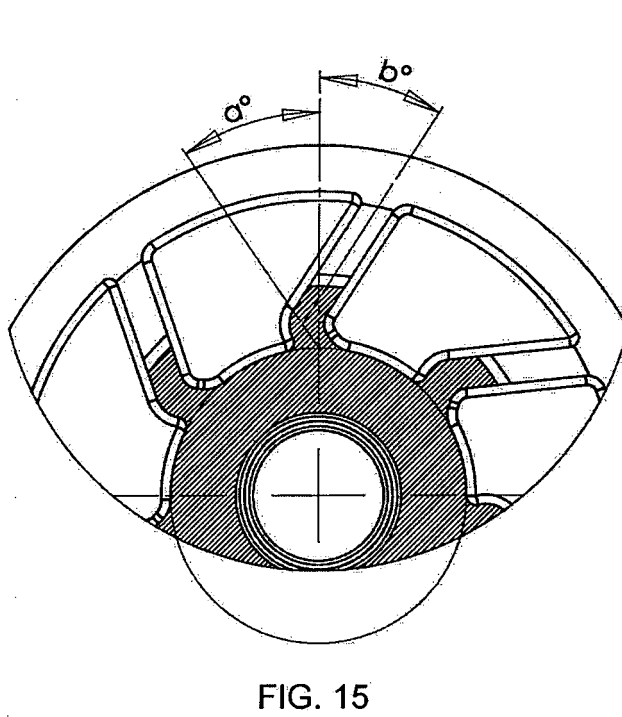
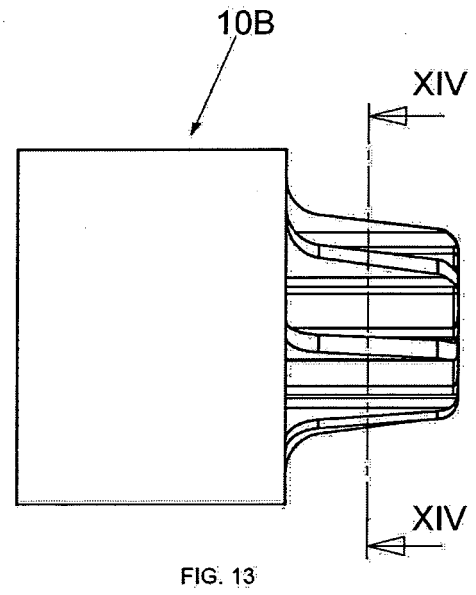
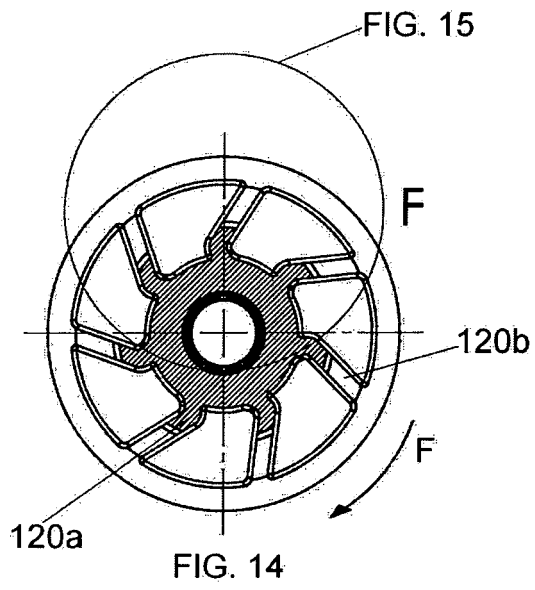
2. Système selon la revendication 1, **caractérisé en ce qu'il** prévoit que lesdites ailettes (12, 120, 122) de chaque colonne (10, 10A, 10B, 10C) résultent courbées, selon un profil en spirale, dans la direction correspondante au sens de vissage de ladite vis autotaraudeuse (V). 5
3. Système selon l'une des revendications précédentes, **caractérisé en ce que** lesdites colonnes (10, 10A, 10B, 10C) du corps en plastique adoptent un profil tronconique. 10
4. Système selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** chacune des dites colonnes (10, 10A, 10B, 10C) du corps en plastique est supportée au sommet d'une base (10a) ayant un axe longitudinal coïncidant avec le sien. 15
5. Système selon l'une ou plusieurs des revendications de 1 à 3, **caractérisé en ce que** chacune des dites colonnes (10, 10A, 10B, 10C) du corps en plastique est supportée par une base (10b) ayant un axe longitudinal orthogonal au sien. 20
6. Système selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** chacune des dites colonnes (10A) du corps en plastique présente des ailettes longitudinales (12) terminées par un profil en bec de flûte (12a). 25
30
7. Système selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** chacune des dites colonnes (10B) du corps en plastique présente des ailettes (120), ayant une configuration à « boomerang », comprenant une rotule (121) de séparation entre un bref segment initial (120a) qui se déploie du corps de la colonne (10B) et un long segment final (120b), incliné en avant selon le sens de vissage de ladite vis autotaraudeuse (V). 35
40
8. Système selon la revendication précédente, **caractérisé en ce que** ledit segment final (120b) résulte incliné en avant d'un angle (b) selon le sens de vissage de ladite vis autotaraudeuse (V), tandis que ledit bref segment initial (120a) résulte incliné en arrière d'un angle (a). 45
9. Système selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** chacune des dites colonnes (10C) du corps en plastique présente des ailettes (122) ayant une inclinaison variable. 50
10. Système selon la revendication précédente, **caractérisé en ce que** chaque ailette (122) présente une inclinaison parfaitement radiale, en correspondance de son segment de fixation (122a) à la base (10a), tandis que le segment restant (122b) de chaque ailette (122) résulte incliné en avant d'un angle selon 55

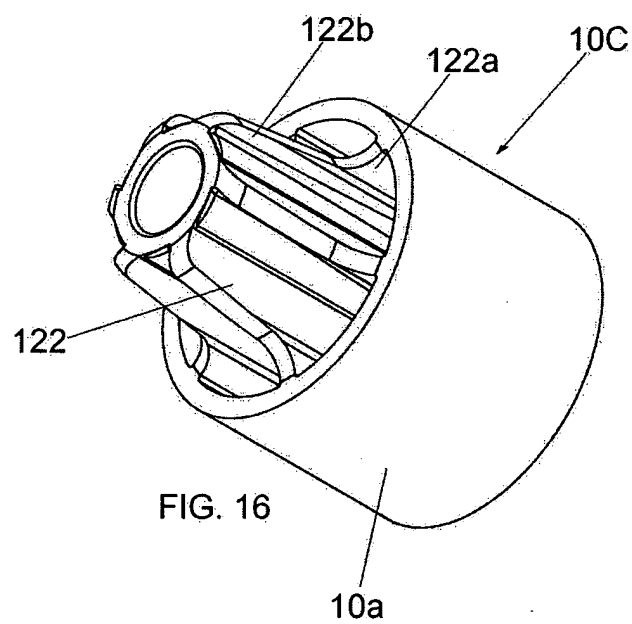
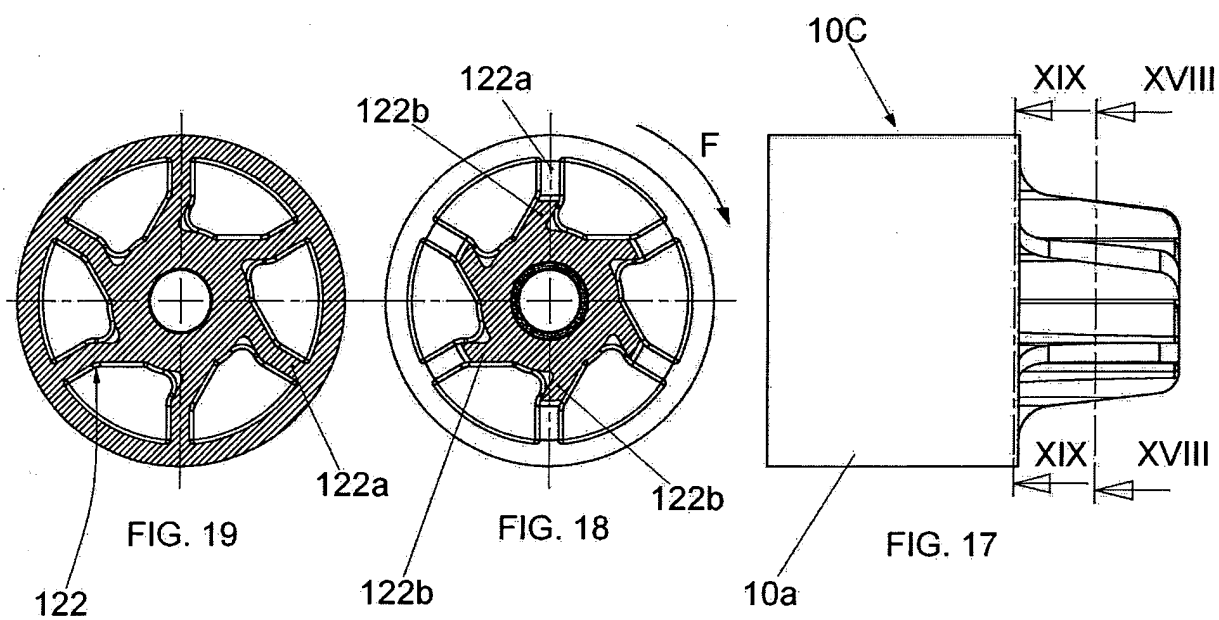












REFERENCES CITED IN THE DESCRIPTION

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