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(54) Title: FASTENING DEVICE FOR FURNITURE

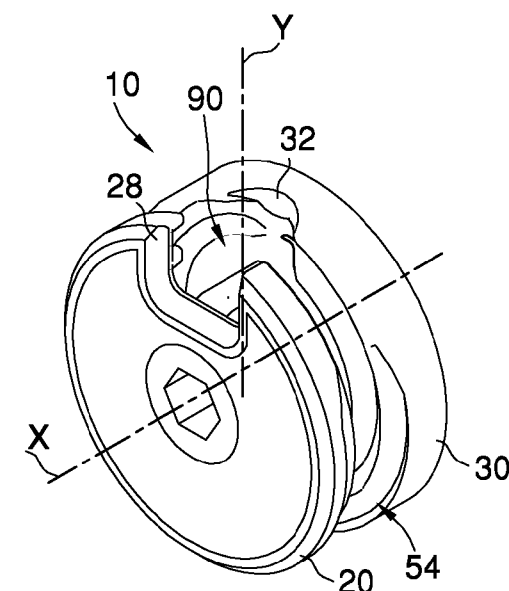


Fig. 1

(57) Abstract: It is described an eccentric clamping device (10) for furniture able to pull a pin (P) by rotation. In order to improve the pulling of the pin and limit assembly plays, the eccentric device has an area of insertion (90) for the pin, and a path with eccentric development which is adapted in the area to grip and pull the pin, when the device is rotated, toward the center of the device. The object is distinguished because the path includes two track sections (60, 62) placed side by side able to grip together on the pin after less than a turn of rotation of the device.

FASTENING DEVICE FOR FURNITURE

The invention regards a fastening device for furniture, of the type with which a pin is pulled through rotation of the device.

Devices of this type have been known for a long time and have an enormous spread thanks to their simple but effective principle of operation. In order to join two parts, e.g. of a bed or closet, a pin is fixed in a part, and in the other the device, usually lodged rotatably in a blind hole. The device has one spiral in relief that grips on the head of the pin; turning the device the spiral pulls the pin and fastens the two parts.

A very common model has one spiral long two complete turns. The pin is leaned initially on the spiral, which by turning pulls it firstly with an arc and, after a turn, with two. The grip on the pin with two arches of spiral is nearly always necessary in order to prevent slackening of the pin with time. So long a spiral allows a very wide pulling run for the pin, an advantage that however has exhausted in the years thanks to the always greater precision of pieces and the assembly boring in the piece of furniture. In low-cost furniture, where the precision may instead lack, or with pins of non-standard dimensions, this model exhibits the disadvantage that the pulled pin cannot catch up the second spiral arc because there has not been one rotation of at least 360°. A faintly mounted piece of furniture turns out.

The main object of the invention is to improve this state of the art.

Another object is to facilitate the mounting regardless the direction of rotation of the device.

The objects are achieved by a device according to claim 1, to which we refer.

The device has a (guiding) path with eccentric development adapted to grip on a pin and to pull it, when the device is rotated, towards the center of the device. The path comprises two track segments placed side by side adapted to grip together on the pin after less than one turn of rotation of the device.

The development of the tracks is preferably spiral-shaped, which starting from the initial engagement with the pin (corresponding to an insertion zone for the pin) narrows and/or converges towards the axis of rotation of the device. As in some well-known devices, the tracks may also have circular eccentric development with respect to its axis of rotation, but the pin retention is lower.

For "track" is meant either a relief or raised portion of the device, or a groove or recess, variants that represent means able to pull the head of the pin. These variants for the "tracks", and all the features of the tracks, can be used – on the other hand - in every type of device (also known) such as the one described here. Preferably it is chosen that such means begin to grip after about half a turn or less, particularly at the beginning of the rotation of the device (e.g. after an angle of 10 degrees to 30).

Being able to effectively pull the pin with two tracks without a lot of turns, the device ensures optimum and fast traction, without

loosening.

To make the traction indifferent to the rotational direction, the path of the tracks can be specular to a plane perpendicular to that on which they lie and passing through said area of insertion. And thus a half turn is enough in one verse or the other to pull the pin completely.

To make the device simply but durably, it can comprise two separate and parallel discs, on at least one of whose faces turned towards the other the tracks are made. For added strength one can choose to make the tracks on both discs.

A disc (or both) can have the edge interrupted by a pass-through recess or have a bend to allow insertion of the pin perpendicularly to the disc.

To not exceed the overall size of the device, one of said track segments (that radially outermost) may be obtained on the edge of a disc, e.g. forming for a tract the more peripheral part thereof.

Each track segment can be a projecting relief or a groove made in the device.

For advantageous working it is sufficient that the two track segments cooperate to pull the pin within a turn of the device. The greater the arc covered with two track segments placed side by side, the greater the arc wherein there is complete drawing effect. However, the track segments can have start and end at different points and not necessarily on the same radius. A first segment can have one end at a

zone of initial engagement with the pin. to pull it at once, while a second segment can begin, and therefore pull, after a certain arc, after which the pin will be pulled by both. To maximize effectiveness one or each of the track segments can have one end at said engagement or insertion area, thus the pin is drawn by two segments as soon as the device is rotated.

For an even greater and more ready traction the tracks at the insertion area can be joined together, i.e. the tracks have an uninterrupted development or extension in said area. The benefit is an immediate grip on the pin. To allow the insertion of the pin in the device one can provide, as mentioned above, that a disc has an indented edge, and/or that the tracks in the insertion area have a variation in shape. Such variation in shape can comprise a depression and/or a thinning of the tracks tending to enlarge the insertion zone, in particular the tracks can decline with reduced projection or grow thinner (if they are reliefs) and/or the area of insertion can be wider than the distance between the discs, to create a funnel-shaped formation for the pin. In the case of grooved tracks, the relative groove can have in the discs a depth which is increasing or greater in the insertion zone.

The invention and its advantages will be even more clear from the following description of a preferred embodiment of the device, illustrated in the drawing in which

Figure 1 shows a three dimensional view of the device seen from

above;

Figure 2 shows a side view of the device;

Figure 3 shows a sectional view according to the plane III-III;

Figure 4 shows a sectional view according to the plane IV-IV;

Figure 5 shows a plan view of the device seen from below;

Figure 6 shows a three dimensional view of a variant of the device seen from above;

Fig 7 shows in cross-section a variant of Figure 6 according to a section plane similar to plane III-III (passing between two discs);

Figure 8 shows a three dimensional view of a second variant of the device seen from above;

Figure 9 shows in cross-section a variant of Figure 8 according to a section plane similar to plane III-III (passing between two discs);

Figure 10 shows a side view of a third variant of the device;

Figure 11 shows a three-dimensional cross-section of the variant of Figure 10 according to section plane XI-XI;

Figure 12 shows a three-dimensional cross-section of the variant of Figure 10 according to the section plane XII-XII.

The device 10 comprises two parallel discs 20, 30 separated by a concentric cylinder or central body 50. The discs 20, 30 are of equal diameter and are rigidly joined at the center by the cylinder 50, so they can rotate together around a common axis X passing through their centers. Between the discs 20, 30 is present, therefore, an annular empty space 54, where one can insert the head P of a known

pin (shown hatched in Figure 3) to pull it. The head P is inserted between the two discs 20, 30 perpendicular to the X axis (along an axis Y) on one side of the device 10, where a guiding recess 32 in disc 30 favors the insertion. further facilitated by a peripheral indentation 28 in the edge of the disc 20 in position axially opposite the recess 32 (i.e. along X). The indentation 28 also allows the insertion of the head P parallelly to the axis X, from above, at the same time with the mounting of the device 10 in a blind hole of a cabinet. The recess 32 and the indentation 28 form a radial opening 90 for the head P, which is properly radially positioned within the space 54 abutting against a tooth 52 protruding from the cylinder 50.

The facing surfaces of the discs 20, 30 are smooth in front of the tooth 52 (i.e. in radial direction) and comprise tracks 60, 62 in relief starting at the sides of opening 90 and running all around the cylinder 50.

Each disc 20, 30 comprises equal tracks 60, 62, and the device 10 has specular tracks with respect to the axes X and Y (and to the plane passing through these axes).

The brief interruption of the tracks 60, 62 in front of the tooth 52 is used to avoid interference during insertion of the head P, which in known manner has two traction rings AN in the middle of a waist V. The distance between the tracks 60, 62 corresponds substantially (except for a small tolerance to compensate for the curvature) to that between these rings AN, so that the tracks 60, 62 can lean on the

rings AN and pull the head P. In fact, the tracks 60, 62 have eccentric development, in particular they approach the cylinder 50 (or the center of the discs 20, 30) as they angularly move away from the opening 90.

The track 60 is the most external, and starts at the opening 90 as extension along the X-axis of the outer edge of the relative disc it belongs to, then moving away more and more from the perimeter edge, becoming a relief distinct from the edge as it angularly travels the discs 20, 30 toward the side of the device 10 opposite to the opening 90.

The tracks 60, 62 have symmetrical course (mirrored) with respect to a plane Y passing through the axis of the pin and substantially perpendicular to the facing surfaces of the discs 20, 30 (or, which is the same, a plane passing through the X-axis that divides in about half the opening 90). In this way the direction of rotation of the device 10 becomes indifferent during the pulling of the head P.

At the center of the discs 20, 30 there is a blind hole 74 with polygonal section, in order to rotate the device with an Allen wrench.

The disc 30, without indentation 28, is the one that remains in sight after the insertion of the device 10 in a blind hole of the cabinet. On the outer face of the disc 30 there are radial ribs 70 for stiffening and lightening, and on one of these is an indicator 72 of the angular position.

In rare cases it can happen that the stroke of the pin can be exceptionally long. To avoid that the traction on the head P of the pin

might drop by turning the device 10 too much (more than half a turn), optionally and advantageously there can be provided in the device 10 for the pin a stop or end-of-travel means, located for example at a point diametrically opposite the opening 90. In the example shown transversally to the tracks 60, 62 a notch or relief 99 is used, that can be easily obtained as an extension of the same tracks.

The invention is open to many variants. E.g. only one disc can have the two tracks 60, 62, or the tracks 60, 62 on one or two discs could not be specular to the axis X but spiraling around the cylinder 50 for more than half a turn, so as to increase the tightening stroke of the pin. The device 10 can be in one piece, or the discs 20, 30 can be attached to each other jointly by welding, riveting, adhesives or other fastening means.

A variant 100 (Fig. 6 and 7) comprises two parallel discs 120, 130 separated by a concentric cylinder or central body 150 that joints them integrally and has a protruding tooth 152 for the abutment against the pin.

Here and in the following we show for the variants only the differences, it being understood that they can be applied alone or in group to all the devices according to the invention.

The device 100 has on each disc 120, 130 two tracks in relief 160, 162, which run all around the body 150 without interruption. The tracks 160, 162 preferably have mirrored course with respect to a

plane Z and/or have a spiralling trend.

The absence of interruption of the tracks 160, 162 in front of the tooth 152 serves to maximize the grip on the pin and prevent rotation angles without traction. The pin can be introduced through a window or indentation 128 on the disc 120, as before.

A tooth 199 present on the inner track 162, toward the body 150, acts as end-stop means for the pin.

Another variant 200 (Fig. 8 and 9) comprises two parallel discs 220, 230 separated by a concentric cylinder or central body 250 that joins them integrally.

The device 200 has on each disc 220, 230 two tracks in relief 260, 262 (mirrored with respect to a plane parallel to the lying plane of the discs), running all around the body 250 to finish at the edges of a bend 228a, 228b that interrupts the circular edge of each respective disc 220, 230.

The pin can be introduced through the bend 228 of any of the discs 220, 230, so the mounting becomes indifferent to the orientation of the device.

Another variant 300 (Fig. 10 - 12) comprises two parallel discs 320, 330 separated by a concentric cylinder or central body 350 that joins them integrally.

As can be seen from the profile of Fig. 10, on each of the discs 320, 330 there are two tracks 360, 362 in negative, i.e. grooved. The tracks 360, 362 are specular with respect to a plane parallel to the laying plane of the discs, they run all around the body 350 to unite

uninterruptedly on the disc 320, and to end at the edges of a bend 328 that interrupts the circular edge of the disc 330.

The advantage of the grooved tracks is greater resistance, greater compactness of the device and easy of production.

CLAIMS

1. Fastening device (10) for furniture adapted to pull a pin (P) by rotation, comprising

- an insertion zone (90) for the pin,
- a path with eccentric development that is adapted in the zone to grip and pull the pin, when the device is rotated, toward the center of the device;

characterized in that the path comprises two track segments (60, 62) arranged side by side and adapted to grip together the pin after less than one rotation turn of the device.

2. Device according to claim 1, comprising tracks whose path is specular with respect to (i) a plane perpendicular to that on which they lie and (ii) passing through said zone.

3. Device according to claim 1 or 2, comprising two parallel and separated discs (20, 30), said tracks being made on at least one of the faces turned towards each other of the discs.

4. Device according to claim 3, wherein a disc has the circular edge interrupted by a pass-through recess (28).

5. Device according to claim 3, wherein each disc has the circular edge interrupted by a pass-through recess (228a, 228b).

6. Device according to claim 3 or 4 or 5, wherein the two discs are rigidly connected by a central concentric neck (50) which has a radial expansion (52) which forms an abutment for the pin.

7. Device according to any one of the preceding claims 3 to 6, wherein the insertion zone is an opening between the two discs, which

is widened toward the outside through a recess (32) on at least one disc.

8. Device according to any one of the preceding claims 3 to 7, wherein one of said track segments is obtained on the edge of a disc.

9. Device according to any one of the preceding claims, wherein the two track segments are each formed by a relief protruding from an approximately flat surface of a disc.

10. Device according to any one of the preceding claims 1 to 8, wherein the two track segments are each formed by grooves obtained on an approximately flat surface of a disc.

11. Device according to any one of the preceding claims, wherein the two track segments have roughly constant relative distance.

12. Device according to any one of the preceding claims, wherein one or each of said track segments has one end at said zone.

13. Device according to any one of the preceding claims 1 to 11, wherein the path is uninterrupted at said zone.

14. Device according to one of the preceding claims, wherein the track segments at said zone comprise a shape variation aimed at widening the insertion zone.

15. Device according to claim 14, wherein the track segments are reliefs and the shape variation comprises a depression or thinning of the track segments.

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Fig. 2

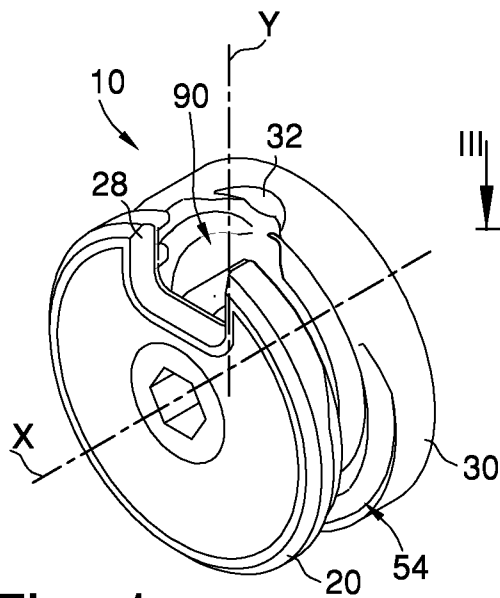


Fig. 1

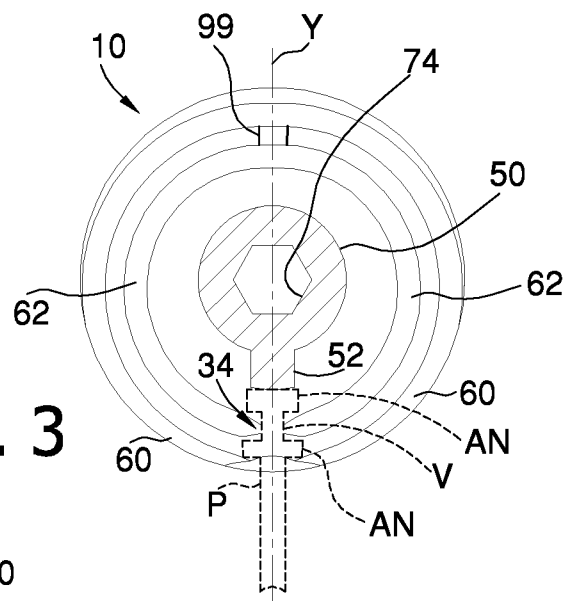
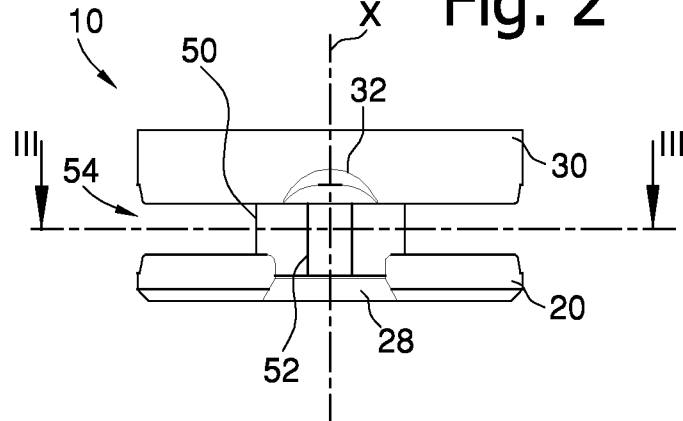


Fig. 3

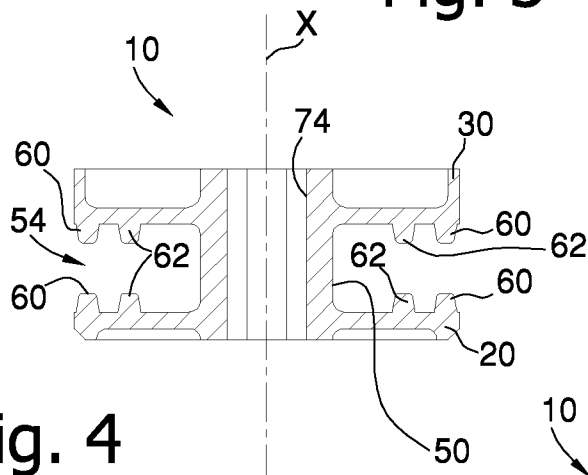


Fig. 4

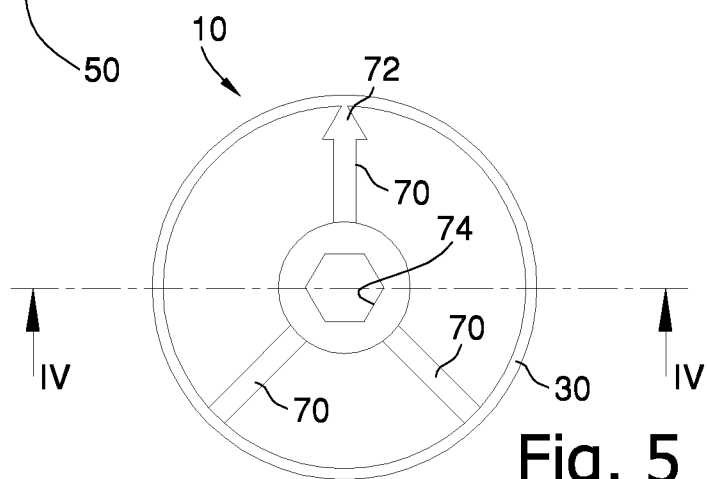


Fig. 5

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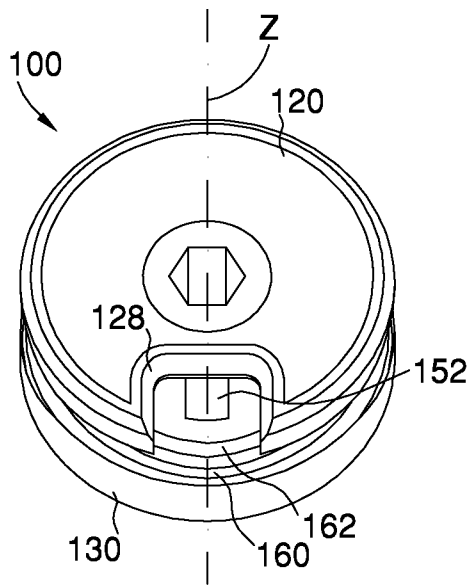


Fig. 6

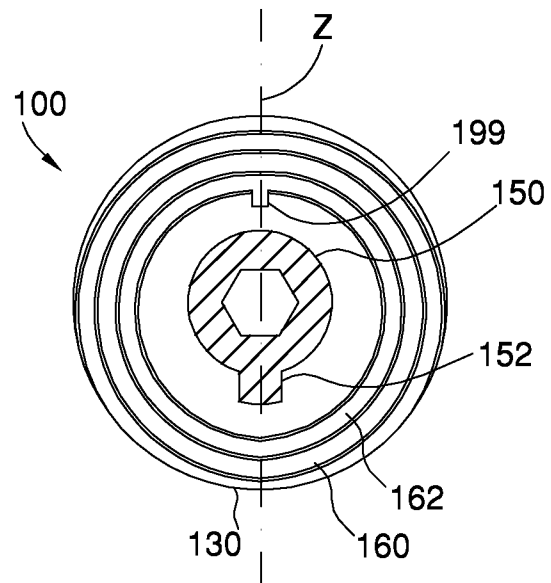


Fig. 7

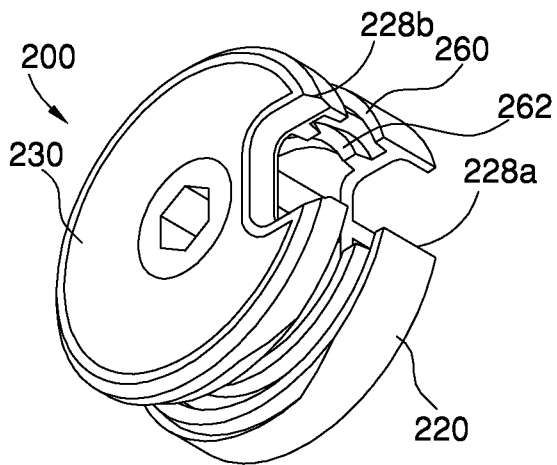


Fig. 8

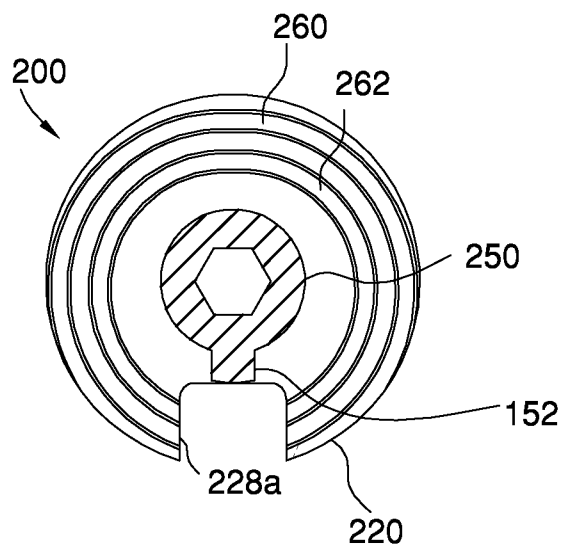


Fig. 9

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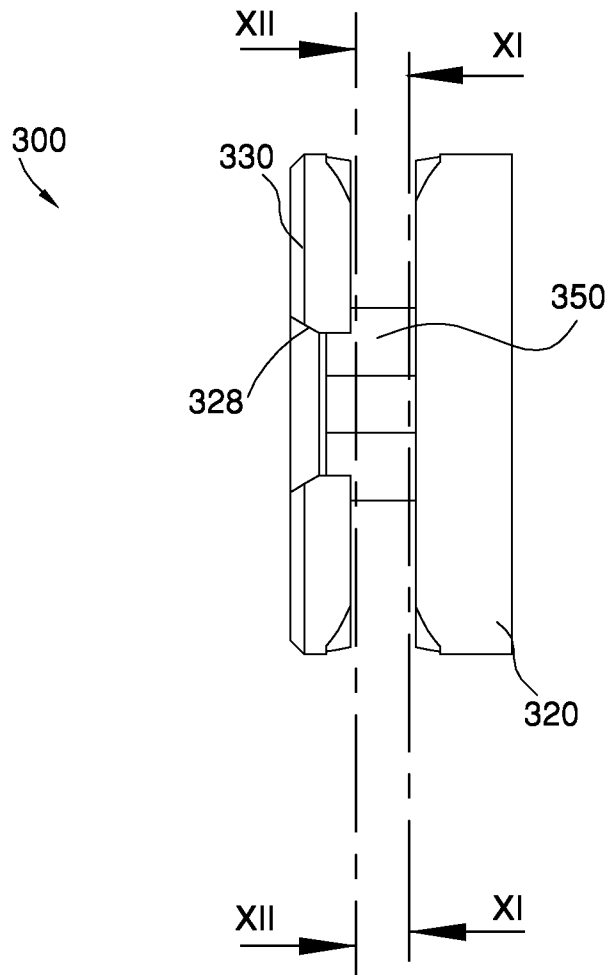


Fig. 10

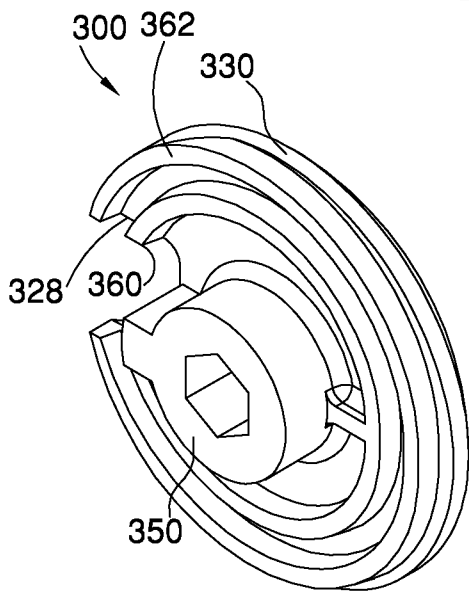


Fig. 11

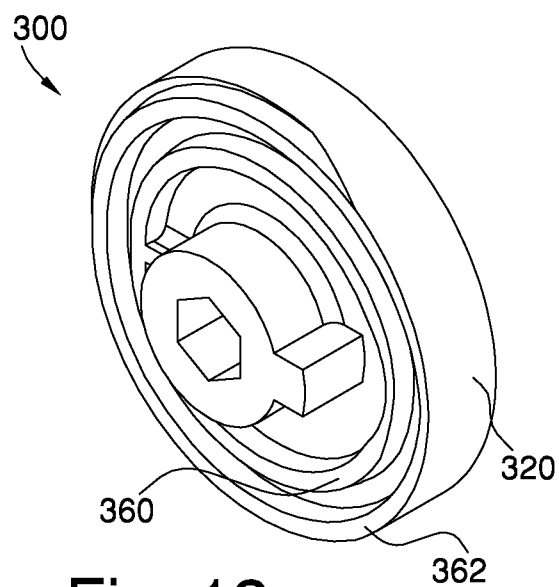


Fig. 12

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2011/053231

A. CLASSIFICATION OF SUBJECT MATTER

INV. F16B12/20

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F16B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 201 20 256 U1 (HAEFELE GMBH & CO [DE]) 7 March 2002 (2002-03-07) page 7, line 13 - page 9, line 16; figures 1-3	1-15
X	----- EP 1 455 096 A2 (RIOJA CALVO MIGUEL ANGEL [ES]) 8 September 2004 (2004-09-08) paragraph [0020] - paragraph [0026]; figures 1-7	1-3,6, 8-13 4,5,7, 14,15
X	----- DE 27 11 280 A1 (CONFALONIERI UMBERTO & C SRL) 10 November 1977 (1977-11-10) page 4, line 14 - page 7, line 30; figures 1-3	1-4,8-13 5-7,14, 15
X	----- EP 1 860 331 A1 (FESTOOL GMBH [DE]) 28 November 2007 (2007-11-28) paragraph [0012] - paragraph [0036]; figures 1-5	1,2,11, 12 3-10, 13-15
A	-----	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

16 February 2012

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23/02/2012

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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