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(54) **WOOD SINGLE-UNIT CUTTER**

(57) A wood cutter, comprising a single body (20) of substantially cylindrical shape and one or more cutting inserts or knives (22), which are inserted in respective seats (21) formed radially in said body (20) in correspondence with a corner identified by at least two staggered horizontal planes which are obtained on said body (20).

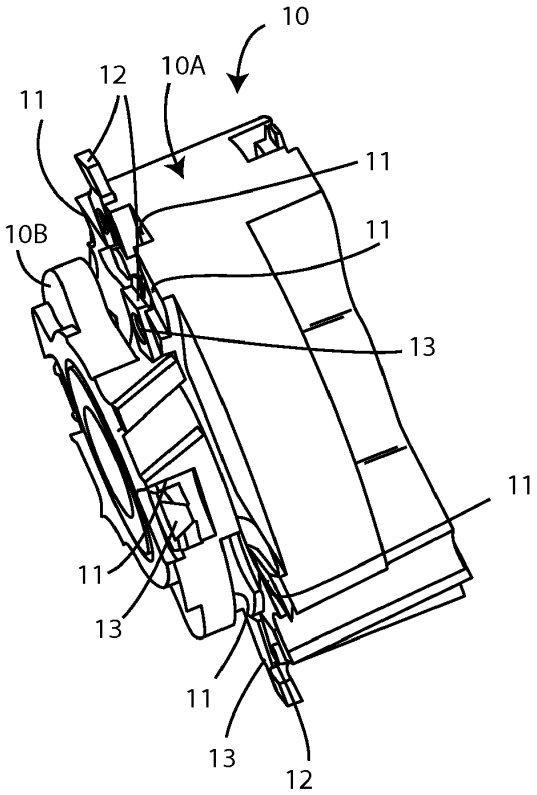

Fig. 1
Prior Art

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Description

[0001] The present invention generally relates to the cutters with cutting inserts for working wood or similar and it refers, more particularly, to a cutter for working wood comprising a monoblock portion.

[0002] Nowadays, cutters with cutting inserts, also called knives, are known; said knives are shaped according to the need and are singularly placed and fixed inside related slots formed peripherally in the body of the cutter with desired angles.

[0003] The cutter comprises a main body able to be rotated and a series of knives mounted on the periphery of the cutter body and having a substantially radial arrangement.

[0004] Since the knives, when they work the wood, are subjected to a tilting moment in the opposite direction with respect to the advancement, due to the resistances they encounter in cutting the piece being worked and due to the centrifugal force deriving from the rotation of the cutter, each of said knives is blocked in the cutter's body so as to counteract said forces and to ensure a precise and permanent arrangement of the structure; usually, each knife is removably coupled with the cutter's body at a relative slot, by means of one or more locking elements or blocks and of at least one screw, which locks the knife on a wall of said slot with pressure.

[0005] In view of the fact that the knives must be periodically replaced, it is important that the milling tools allow a quick and easy assembly and disassembly of the knives, even on the machine, while still ensuring an accurate and stable locking on the main body of said machine, also by considering the high cutting speeds and the subsequent high centrifugal forces which are generated.

[0006] Another drawback of the known milling tools is the complexity and bulkiness of the cutter body, as well as the difficulty in throwing away the wooden chips removed from the knives during processing, with the consequent frequent cleaning operations of the tool, which are necessary especially when said tool works at high speeds and/or with relevant cutting depth. The object of the present invention is therefore to overcome the above mentioned drawbacks and, in particular, to provide a cutter for working wood, which allows performing different cutting, engraving and/or shaving operations.

[0007] Another object of the present invention is to provide a cutter for working wood, which has a reduced number of components, with respect to the prior art, and which therefore has a considerable construction economy, as well as greater precision in the processing, with respect to the known structures and techniques.

[0008] Another object of the present invention is to provide a cutter for working wood, which allows the operator to replace the knives more comfortably and quickly, even when the tool is still mounted on the machine, with respect to the known cutters.

[0009] A further object of the present invention is to provide a cutter for working wood, which has a smaller bulk and greater precision, by performing the same processing, with respect to the known cutters.

[0010] The above mentioned and other objects, according to the present invention, are achieved by making a cutter for working wood, according to the alleged claim 1; other detailed technical features of the cutter according to the present invention are present in the dependent claims.

[0011] Further characteristics and advantages of the cutter for working wood, which is the object of the present invention, will become more clear from the following description, which refers to a preferred but not limitative embodiment of the wood cutter and which refers to the attached drawings, in which:

- figure 1 shows a perspective view of a known milling tool for working wood;
- figure 2 shows a perspective view of a cutter for working wood, according to the present invention;
- figure 3 shows an enlarged detail of the cutter shown in figure 2;
- figures 4, 5 show respective side views of the cutter shown in figure 2;
- figure 6 shows a cross-section of the cutter of figure 2;
- figures 7A, 7B show a schematic enlargement of the detail indicated with J in figure 4, respectively in a rest position and in a position for extracting the cutting insert of the cutter, according to the invention;
- figures 8A, 8B and 8C show respective side views of a first embodiment of the cutting insert used in the wood cutter, according to the present invention;
- figures 9A, 9B show two perspective views of the cutting insert shown in the previous figures;
- figures 10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H and 10I show a series of cross-sectional views of further embodiments of the cutting insert used in the wood cutter, according to the present invention.

[0012] With particular reference to the figure 1, a known cutter 10 has at least two bodies 10A, 10B, preferably made of steel or aluminum alloy and preferably having a substantially cylindrical shape; the bodies 10A, 10B have a series of slots or peripheral seats 11, where respective removable tools consisting of cutting inserts or knives 12 are housed and locked.

[0013] As can be directly seen from the alleged figure 1, the bodies 10A, 10B of a known cutter 10 have as many peripheral slots 11 as there are knives 12 to be used and each knife 12 is singularly fixed in a respective slot 11.

[0014] The number of knives 12 depends on the number and quality of the operations to be performed (cutting, engraving, shaving, etc.) and each knife 12 is removable from its seat by acting axially and from above, by means of a special key which acts on a respective screw locking 13; therefore, the greater are the number

of knives 12 used, the greater are the complications regarding accessibility to the locking screws 13 for replacing the worn knives 12 with other new sharpened knives.

[0015] In order to overcome this drawback, the cutter according to the present invention comprises a single body 20, which is substantially cylindrical, and one or more cutting inserts or knives 22 which are inserted in respective seats 21 formed radially in the body 20 in correspondence with an edge identified by at least two offset horizontal planes of the body 20; advantageously, the edge is identified by a horizontal plane 24 of the cutting body 20 projecting or retracting with respect to a further horizontal plane 25 of said cutting body 20 (as shown in detail in the alleged figures 2, 3, 4, 5 and 6).

[0016] Moreover, each knife 22 has a substantially cylindrical portion 35, which is inserted in the seat 21, and an elongated shaped portion 26 which is configured to perform different wood working operations, so that a single cutting insert or knife 22 is used to make incisions, cuts, shavings, etc. Figures 8A, 8B, 8C, 9A and 9B show a first embodiment of a shaped cutting insert or knife 22, which is configured to perform cutting, engraving and shaving operations in wood, while figures 10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H and 10I show different embodiments of the cutting insert 22 and the relative mutual positioning of said cutting insert 22 with respect to the cutter's body 20.

[0017] Moreover, the knife 22 has an appendix or central wedge 27, formed between the cylindrical portion 35 and the elongated shaped portion 26, on which a block 28 abuts during the knife 22 replacement operation.

[0018] The replacement operation takes place by inserting a special key 29 inside a double-threaded grain 30, placed inside the block 28, which allows to move the block 28 and push the knife 22 out of the seat 21, thanks to the stop of the block 28 on the wedge 27 of the knife 22 (as shown in detail in the attached figures 7A and 7B, where, in particular, F1 indicates the direction of rotation of the key 29, which in turn causes the vertical movement of the knife 22, thus releasing said knife 22 from the housing 20 of the cutter's body 20).

[0019] It has thus been found that the solution object of the present invention allows to achieve the aforementioned objects and, in particular, allows to use a single cutter body and a single insert to perform wood processing (smoothing, incisions, cuts, etc.), also allowing the cutter to work at high peripheral speeds required by the new machinery with an increase in productivity and a good finish; the cutting insert is interchangeable and has a radial fixing, so as to obtain further advantages in terms of accessibility for the operator during maintenance operations and/or replacement of the cutting inserts.

[0020] Further advantages resulting from the use of a wood cutter according to the present invention are constituted by the fact that less tolerances are detected during the manufacture of the cutter, with respect to the prior art, so that the cutters have more assembled bodies where the relative cutting inserts are housed.

[0021] The technical features of the wood cutter according to the present invention are therefore clear from the above description, as well as the related advantages.

[0022] In particular, said advantages relate to the following technical aspects:

- cutter with a single body;
- accessory (cutting insert) of a substantially cylindrical shape;
- radial installation of the cutting insert.

[0023] Finally, it is clear that numerous variations can be made to the wood cutter of the present invention, without departing from the novelty principles inherent in the inventive idea of the appended claims, just as it is clear that, in the practical embodiment of the invention, materials, shapes and dimensions of the technical details may be any according to requirements and said details may be replaced with other technically equivalent ones.

Claims

1. A wood cutter, **characterized in that** it comprises a single body (20) of substantially cylindrical shape and one or more cutting inserts or knives (22), which are inserted in respective seats (21) formed radially in said body (20) in correspondence with a corner identified by at least two staggered horizontal planes which are obtained on said body (20).

2. The cutter according to claim 1, **characterized in that** said corner is identified by a first horizontal plane (24) of said body (20) of the cutter, which is projecting or re-entering with respect to a second horizontal plane (25) of said body (20).

3. The cutter according to at least one of the previous claims, **characterized in that** each knife (22) has a substantially cylindrical portion (25), which is inserted in one of said seats (21), and an elongated portion (26), which is adapted to make different working on wood, such as incisions, cuts, shaves, etc.

4. The cutter according to claim 3, **characterized in that** each knife (22) has a central end or wedge (27), which is obtained between said substantially cylindrical portion (25) and said elongated portion (26), on which abut a dowel (28) during a knife replacement operation (22).

5. The cutter according to claim 4, **characterized in that** a double threaded grain (30) is placed inside said dowel (28) and **in that** a suitable key (29) is inserted inside said grain (30) so as to move said dowel (28) and thus to push said knife (22) out of said seat (21), by advancing said dowel (28) which therefore abuts on said wedge (27) of the knife (22).

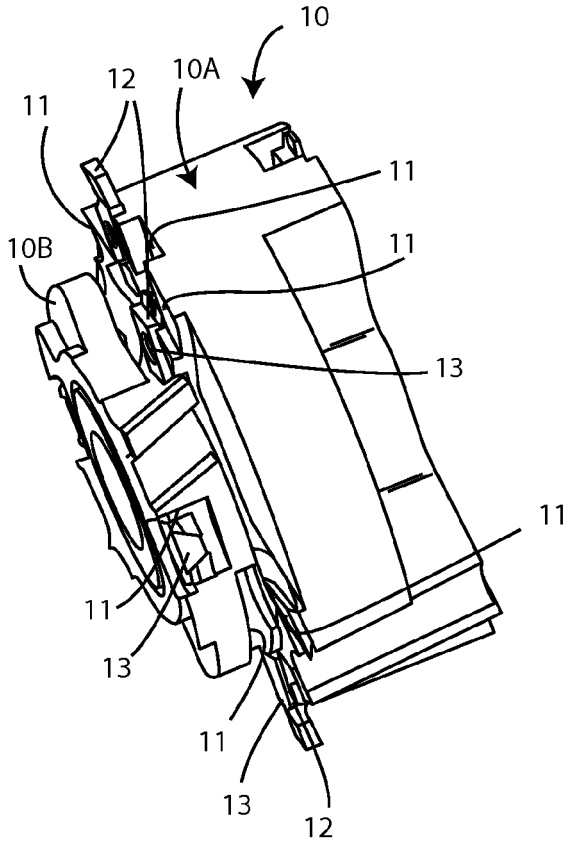

Fig. 1
Prior Art

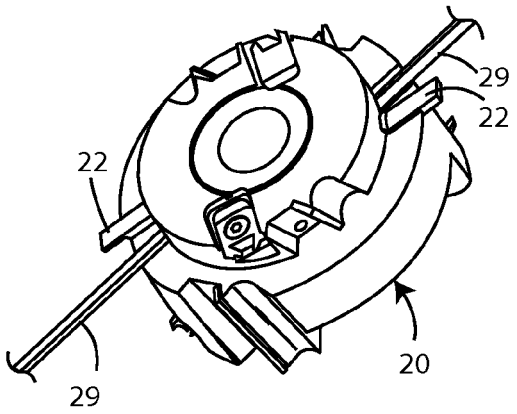

Fig. 2

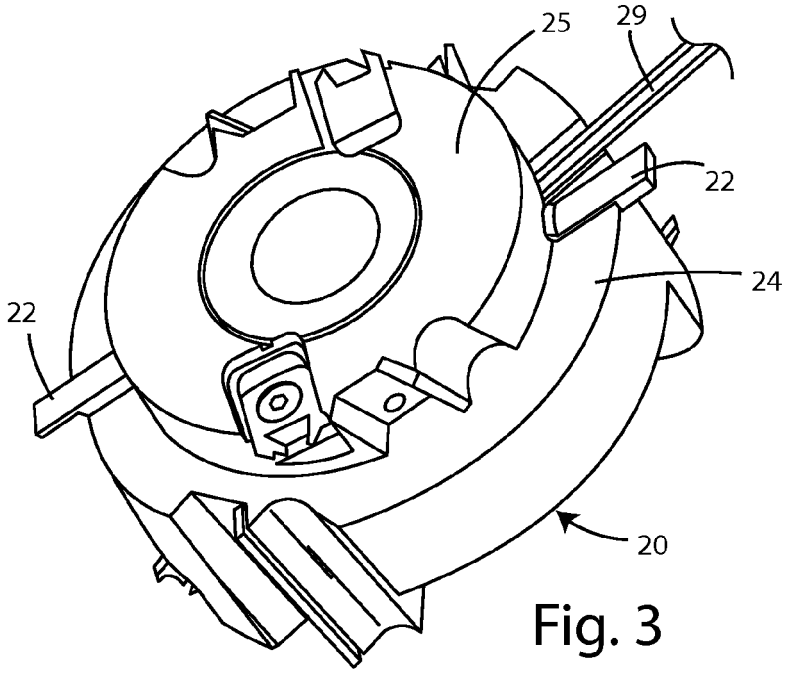

Fig. 3

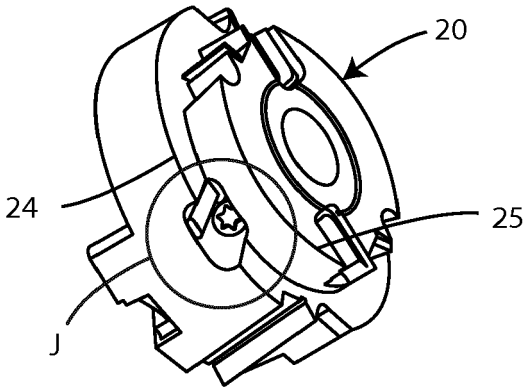

Fig. 4

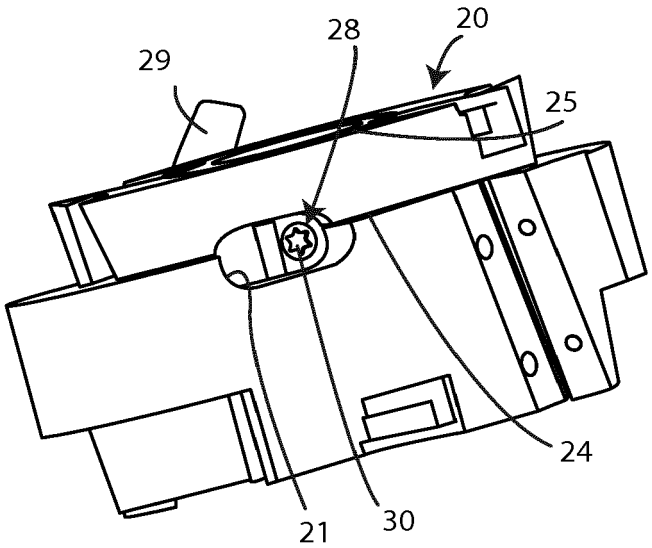

Fig. 5

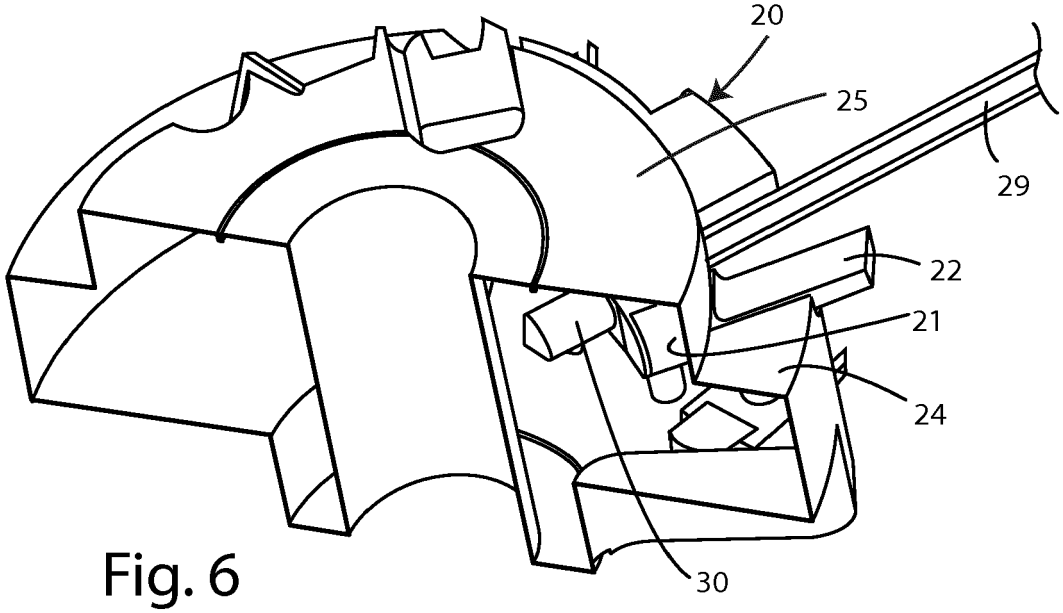

Fig. 6

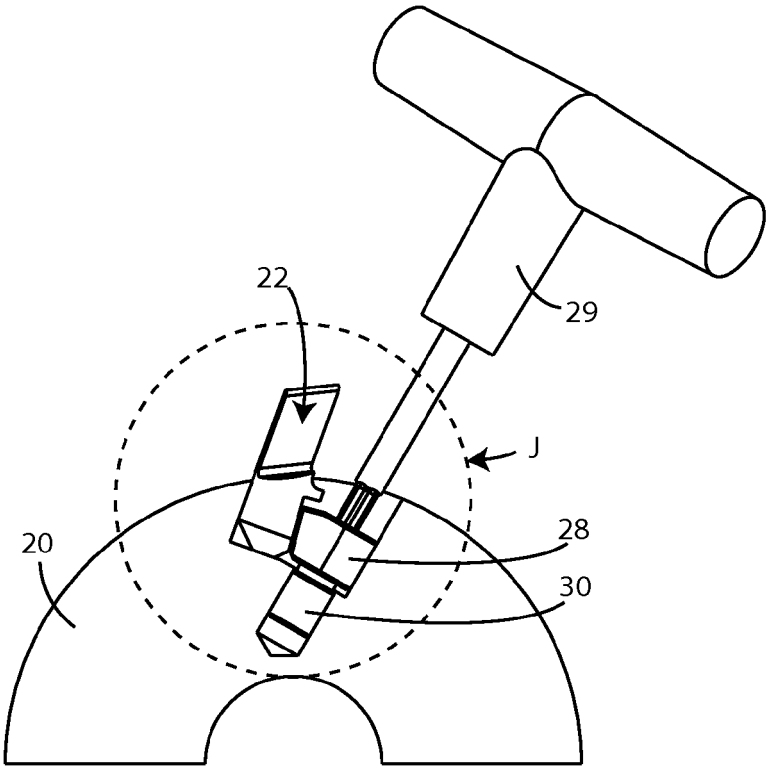

Fig. 7A

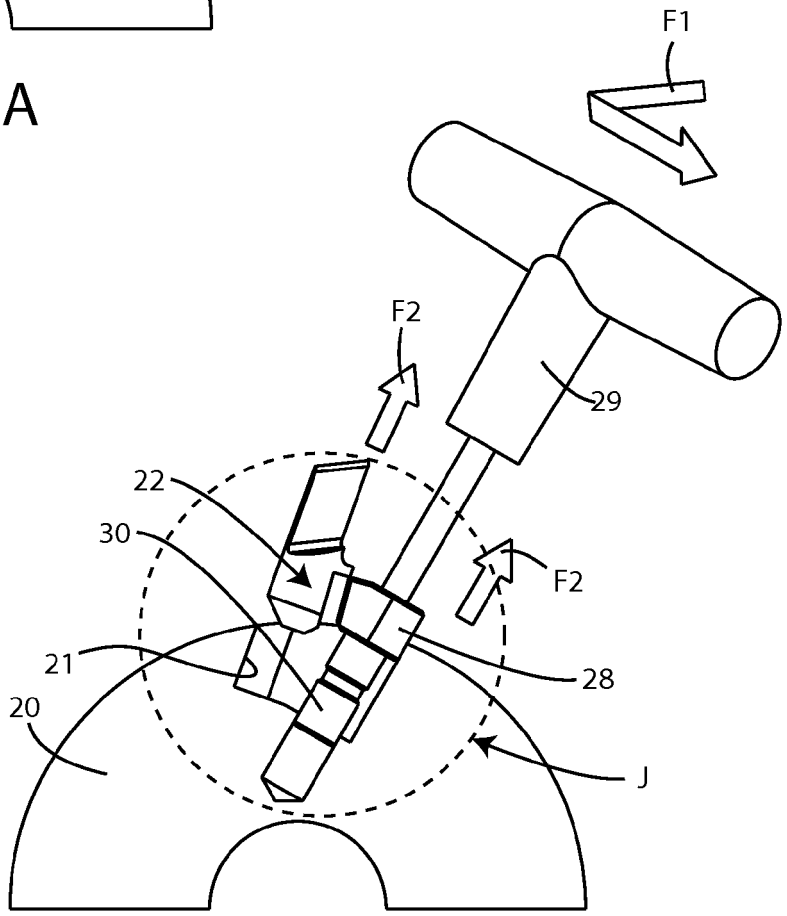

Fig. 7B

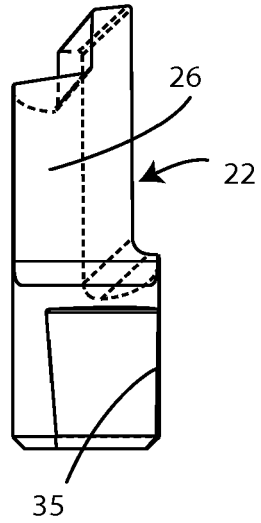

Fig. 8A

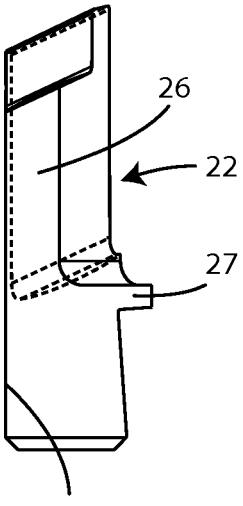

Fig. 8B

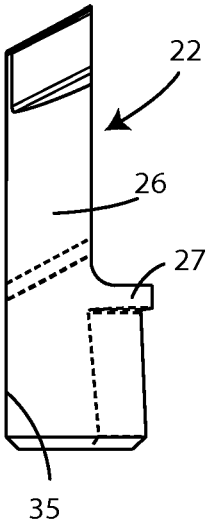

Fig. 8C

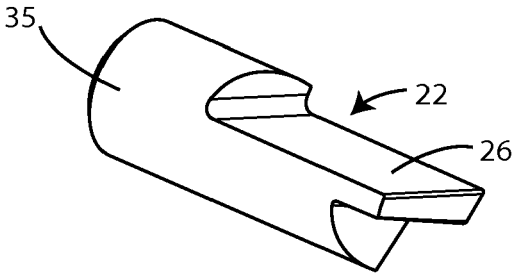

Fig. 9A

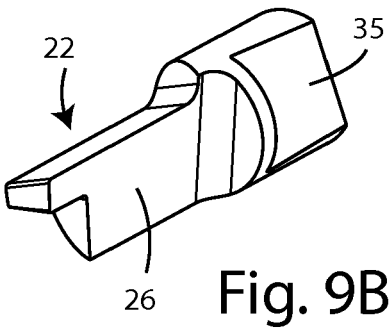

Fig. 9B

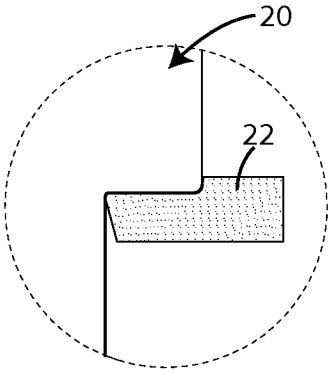

Fig. 10A

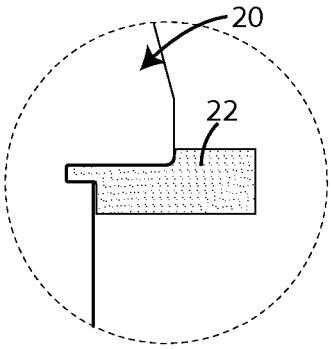

Fig. 10B

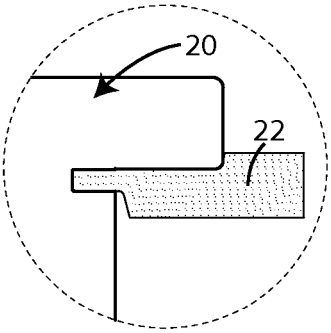

Fig. 10C

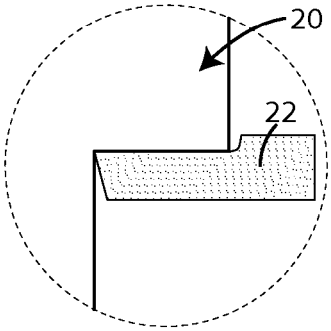

Fig. 10D

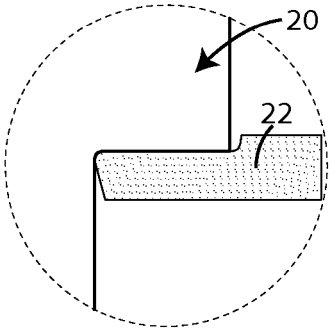

Fig. 10E

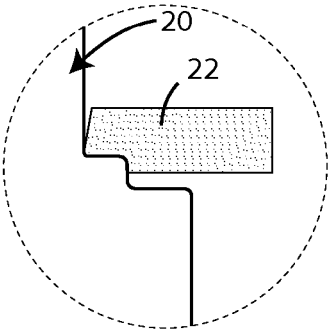

Fig. 10F

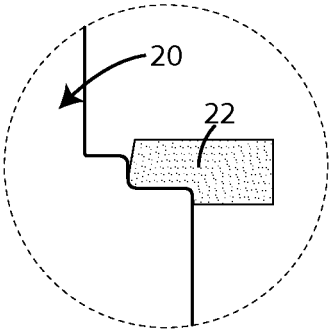

Fig. 10G

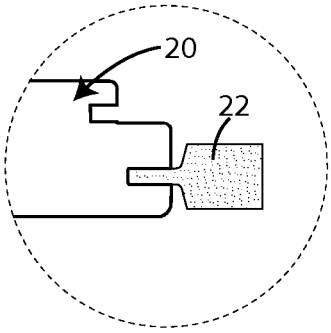

Fig. 10H

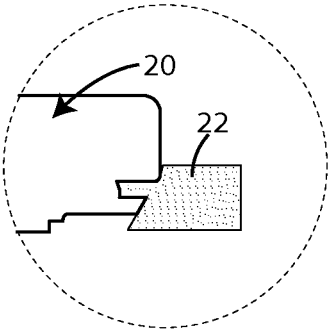

Fig. 10I

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EUROPEAN SEARCH REPORT

Application Number
EP 19 19 7983

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2014/056659 A1 (ATHAD SHIMON [IL]) 27 February 2014 (2014-02-27) * abstract * * figures * * paragraph [0001] * * paragraph [0051] - paragraph [0053] * -----	1-3 4,5	INV. B27G13/00 B27G13/10
X A	EP 1 291 106 A2 (LOH OPTIKMASCHINEN AG [DE]) 12 March 2003 (2003-03-12) * abstract * * paragraphs [0026], [0027], [0029] * * figures * -----	1-3 4,5	
X	WO 99/28073 A1 (ISCAR LTD [IL]; SATRAN AMIR [IL]; EIZEN YARON [IL]) 10 June 1999 (1999-06-10) * abstract * * figures 1-12 * -----	1-5	

TECHNICAL FIELDS SEARCHED (IPC)

B27G
B23C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17 January 2020	Hamel, Pascal

CATEGORY OF CITED DOCUMENTS

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