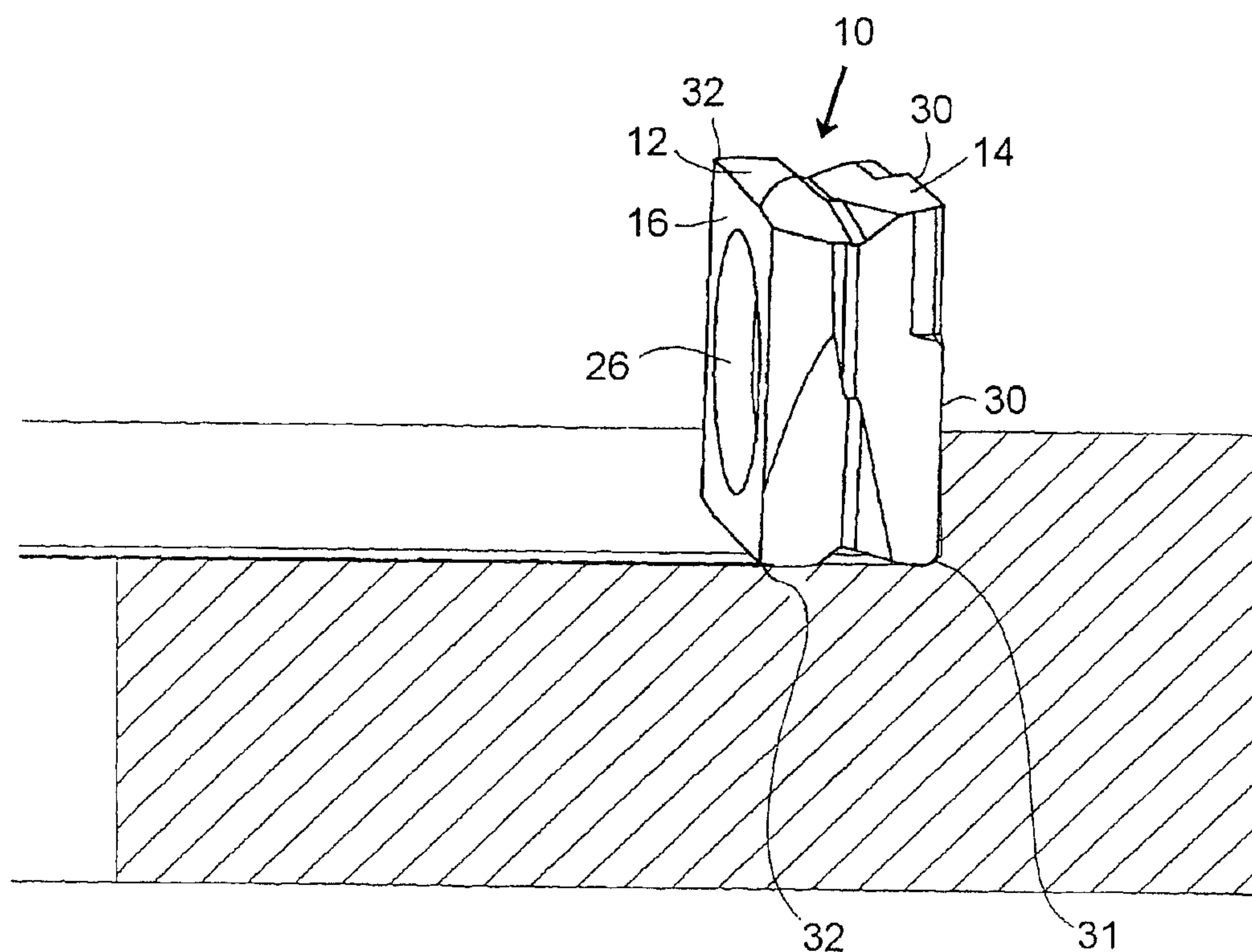




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(54) Title: INDEXABLE INSERT



(57) Abrégé/Abstract:

The invention relates to an indexable insert (10) with two partial bodies (12, 14), which merge into one another and which have a polygonal base but are rotated toward one another. The indexable insert is characterized in that a number of rough cutting edges (30, 31) are provided on a partial body (14) and a number of smooth cutting edges (32) are provided on the other partial body (12), which are arranged in such a manner that a rough cutting edge (30, 31) of a partial body (14) and a smooth cutting edge (32) of the other partial body (12) can simultaneously act upon a workpiece.

Abstract

The invention relates to an indexable insert (10) with two partial bodies (12, 14), which merge into one another and which have a polygonal base but are rotated toward one another. The indexable insert is characterized in that a number of rough cutting edges (30, 31) are provided on a partial body (14) and a number of smooth cutting edges (32) are provided on the other partial body (12), which are arranged in such a manner that a rough cutting edge (30, 31) of a partial body (14) and a smooth cutting edge (32) of the other partial body (12) can simultaneously act upon a workpiece.

Indexable Insert

The invention relates to an indexable insert with two partial bodies, which merge into one another and which have a polygonal base, but are rotated toward one another.

Such an indexable insert is known from the German patent application published for opposition, No. 1 232 436. An indexable insert whose base is in each case, for example, a square offers the possibility to form eight cutting edges. By arranging the two partial bodies rotated toward one another, the cutting edges can be adjusted in the desired geometry.

It is the object of the invention to improve the known indexable insert in such a manner that new application possibilities result.

To achieve this object, it is provided according to the invention that one partial body has a number of roughing edges and the other partial body, a number of finishing edges, which are arranged in such a manner that a roughing edge of a partial body and a finishing edge of the other partial body can simultaneously act upon a workpiece. The invention is based on the knowledge that different cutting edges can be provided on the same indexable insert in such a manner that the workpiece can be roughed and finished in one operation. It is not necessary to re-adjust the indexable insert for this purpose as both the roughing edges and the finishing edges are configured with the rake angle suitable for the corresponding machining operation. This is possible without problems because the respective roughing and finishing edges used simultaneously are provided on different partial bodies of the indexable insert and can, therefore, be designed independently of one another.

In general, each partial body can be any n-angled surface, n being any natural number.

Advantageous embodiments of the invention result from the sub-claims.

The invention will be described in the following by means of an embodiment illustrated in the enclosed drawings, in which:

- Figure 1 is a perspective view of an indexable insert acting upon a workpiece;
- Figure 2 is a side view of a milling cutter with a number of indexable inserts according to Figure 1, acting upon a workpiece;
- Figure 3 is a front view of the indexable insert of Figure 1;
- Figure 4 is a side view of the indexable insert of Figure 3; and
- Figure 5 is an enlarged view of the detail V of Figure 3.

The figures show an indexable insert 10 composed of two partial bodies 12, 14. Each partial body 12, 14 has a square base 16 and in general the shape of a truncated pyramid. The two partial bodies 12, 14 are put together at the top surfaces of the truncated pyramids, i.e. at the smaller surfaces opposite the bases 16.

Each partial body 12, 14 has four side faces 18, 20, 22, 24, extending from the respective base 16 up to the other partial body. Each side face can be composed of several smaller partial surfaces.

It should be mentioned that the term "truncated pyramid" is not to be understood here in the mathematical sense, but just indicates that the side faces 18, 20, 22, 24 slightly converge. In other words, the indexable insert is somewhat contracted in the middle between the two bases 16. It should also be mentioned that the two partial bodies 12, 14 do not necessarily merge into one another by means of a defined edge, but that a transition section can be provided between the two partial bodies, for example in the manner of a groove.

An opening 26 extends centrically through the indexable insert, the center line of said opening 26 being perpendicular to the bases 16 of the indexable insert. A fastening element can be passed through the opening 26 to fasten the indexable insert on a holder, such as a milling cutter 28 (see Figure 2).

It is an essential feature of the indexable insert that the two partial bodies 12, 14 are rotated toward one another, namely about an axis extending perpendicularly to the bases 16 and centrally through the two partial bodies 12, 14. In the exemplary embodiment illustrated, this axis coincides with the center line of the opening 26. In the exemplary embodiment illustrated, the partial body 12 is rotated clockwise relative to the partial body 14, so that, with reference to Figure 1, the "front bottom" corner of the partial body 12 is situated lower than the "front bottom" corner of the partial body 14.

On one of the partial bodies, in this case on the partial body 14, four roughing edges 30 are formed and on the other partial body, in this case on the partial body 12, four finishing edges 32 are formed.

Each roughing edge 30 is formed by the edge between the base 16 of the partial body 14 and one of the side faces 18, 20, 22, 24. As can be seen in Figures 3 and 5, the touching edge between two side faces can be designed in such a manner that it acts as the continuation of the corresponding roughing edge 30. This continuation of the roughing edge 30 can be designed as a corner radius or single or double corner chamfer 32 or also as a combination thereof.

Each finishing edge 32 is formed at the intersection between two of the side faces 18, 20, 22, 24 of the partial body 12, so that the finishing edges extend approximately perpendicularly to the roughing edges.

It is an essential feature that due to the rotation of the two partial bodies 12, 14 relative to one another, one of the two cutting edges, i.e. a roughing edge 30, 31 and a finishing edge 32, which are active at a given orientation of the indexable insert, protrudes farther toward the workpiece than the other. As can be seen in particular in Figures 1 and 5, the finishing edge 32 protrudes farther toward the workpiece than roughing edge 30, 31. This difference x preferably lies in the range of 0.01 to 0.1 mm, preferably 0.02 to 0.04 mm. In this way, it is guaranteed that the roughing edge 30, 31 is responsible for the largest part of material removal, while the fine machining is carried out by the finishing edge 32, which has to remove a correspondingly small amount of material.

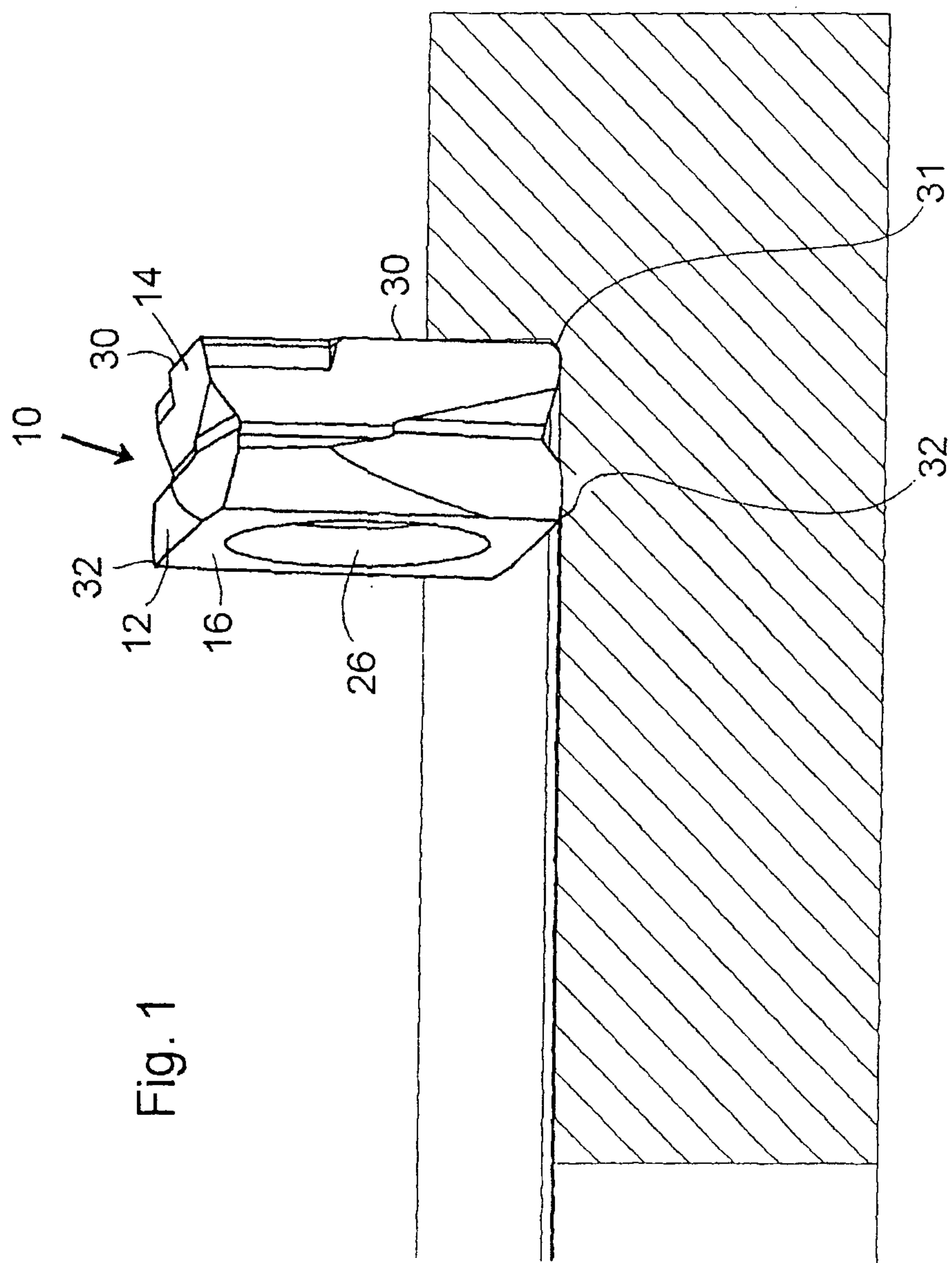
Patent Claims

1. Indexable insert (10) with two partial bodies (12, 14), which merge into one another and which have a polygonal base, but are rotated toward one another, characterized in that one partial body (14) has a number of roughing edges (30, 31) and the other partial body (12), a number of finishing edges (32), which are arranged in such a manner that a roughing edge (30, 31) of a partial body (14) and a finishing edge (32) of the other partial body (12) can simultaneously act upon a workpiece.
2. Indexable insert according to claim 1, characterized in that the base (16) is an n-angled surface.
3. Indexable insert according to claim 2, characterized in that the base (16) is square.
4. Indexable insert according to any of the preceding claims, characterized in that each partial body (12, 14) has in general the shape of a truncated pyramid, the two truncated pyramids merging into one another at their top surfaces.
5. Indexable insert according to any of the preceding claims, characterized in that the roughing edges (30, 31) are formed by the intersection line between a base (16) of a partial body (12, 14) and a side face (18, 20, 22, 24).

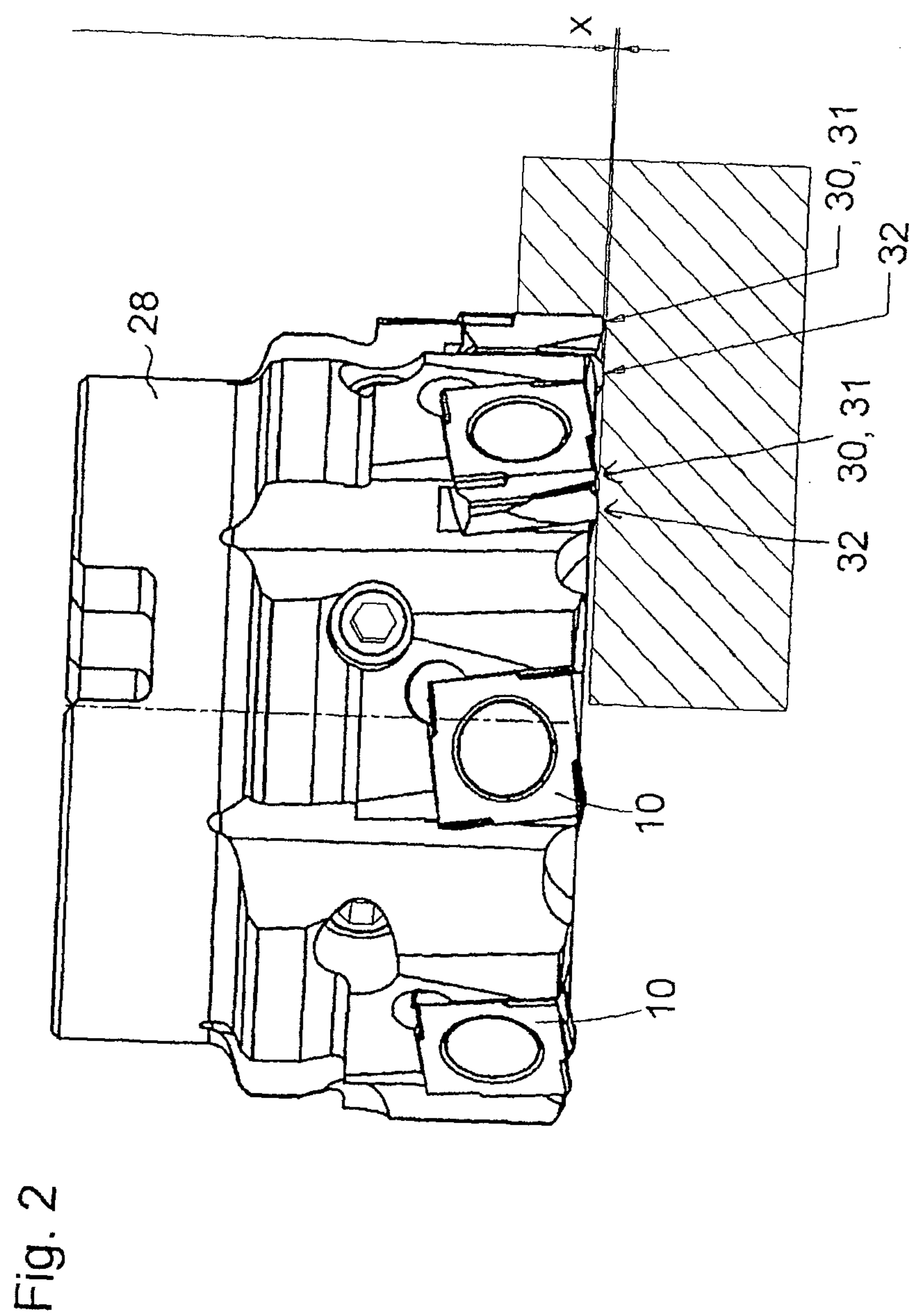
6. Indexable insert according to claim 5, characterized in that the roughing edges are extended by the intersection line (31) between two adjacent side faces (18, 20, 22, 24).
7. Indexable insert according to claim 6, characterized in that the intersection line (31) between two adjacent side faces acting as a roughing edge is designed as a corner radius (31), single corner chamfer (31) or double corner chamfer.
8. Indexable insert according to claim 7, characterized in that the intersection line (31) between two adjacent side faces acting as a roughing edge is designed as a combination of corner radius (31), single corner chamfer (31) and/or double corner chamfer.
9. Indexable insert according to any of the preceding claims, characterized in that the finishing edge (32) is curved.
10. Indexable insert according to any of claims 1 to 8, characterized in that the finishing edge (32) is straight.
11. Indexable insert according to any of the preceding claims, characterized in that in the working position of the indexable insert (10), the finishing edge (32) protrudes outwards over the roughing edge (30, 31) by 0.01 to 0.1 mm.

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Fig. 4

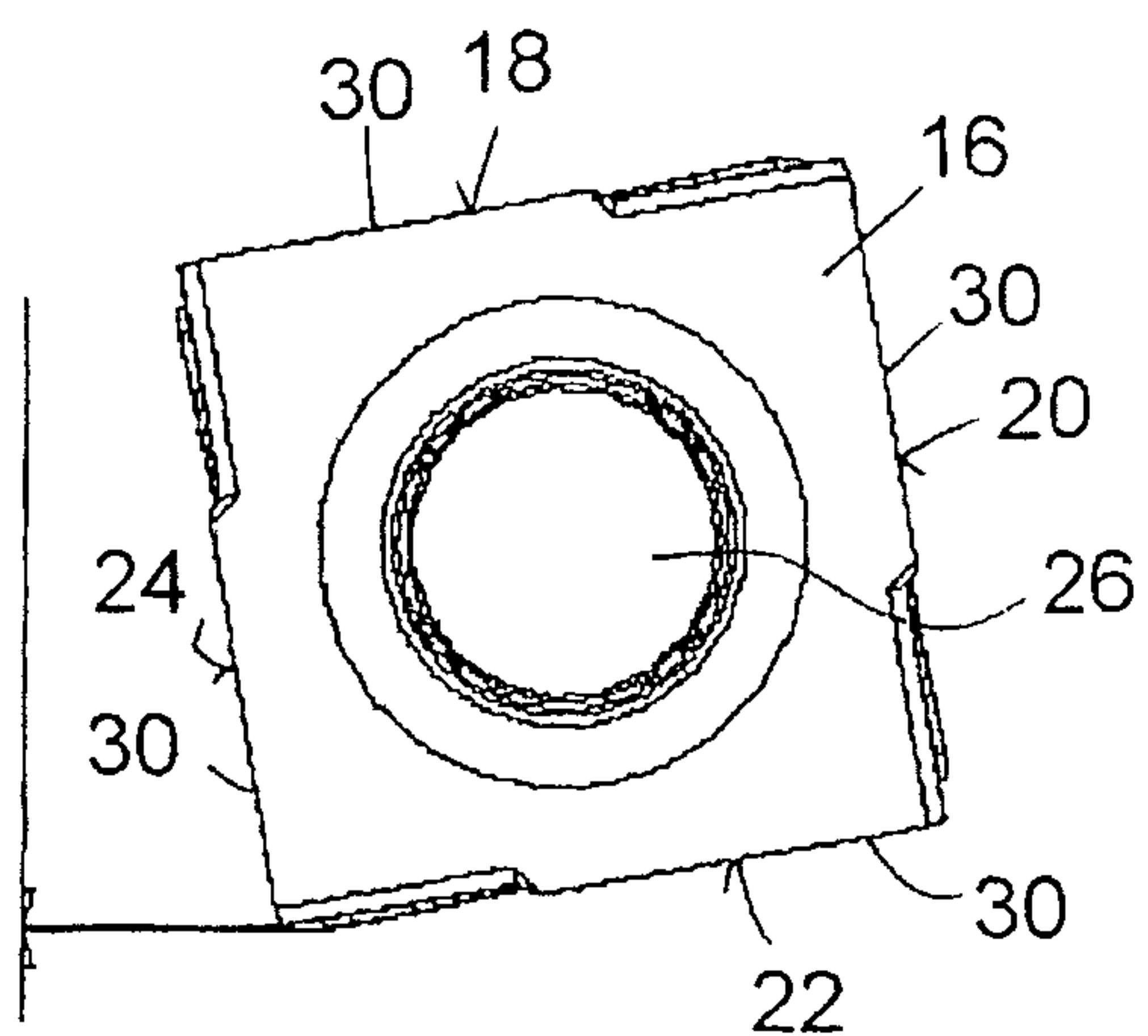


Fig. 3

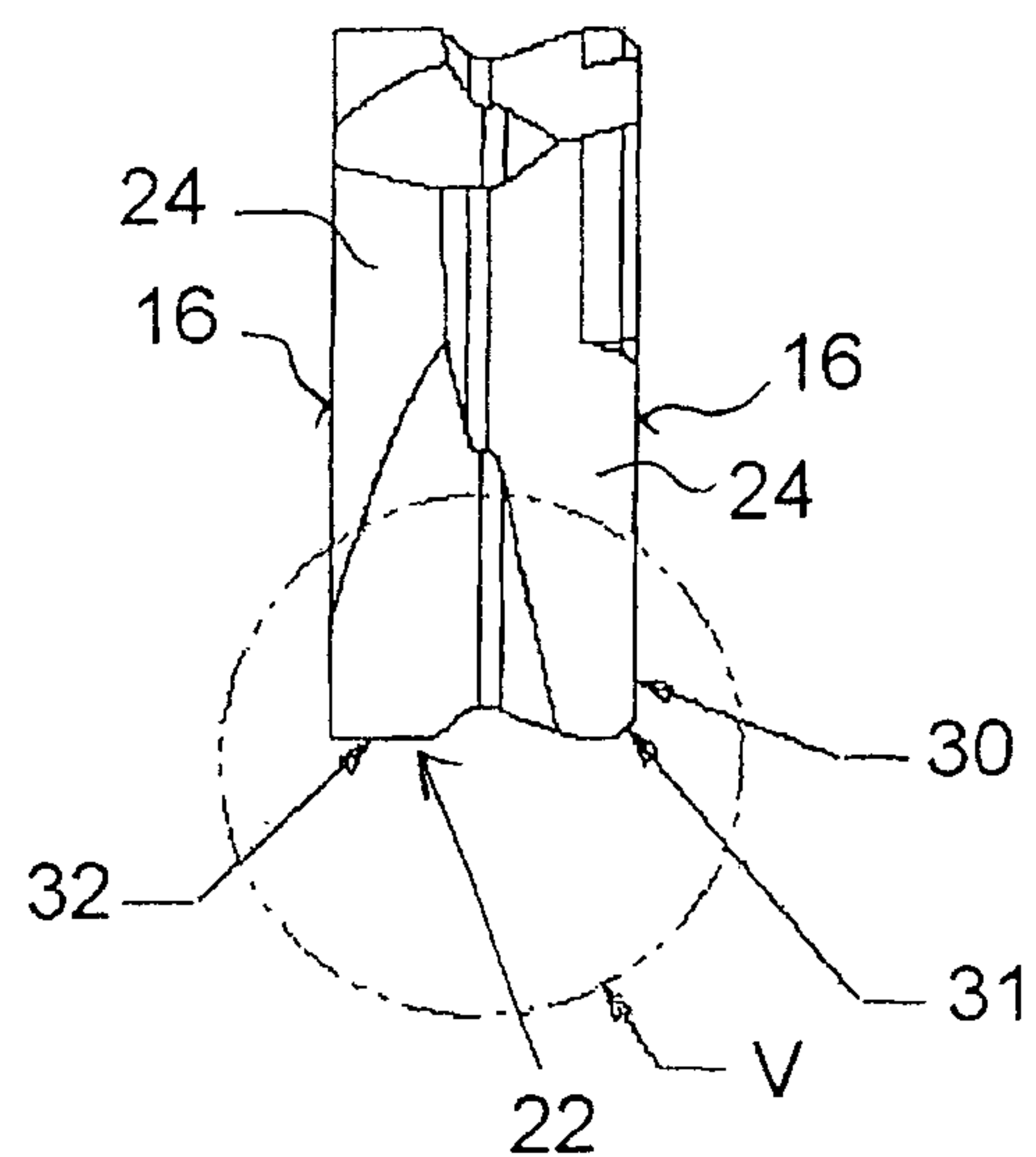


Fig. 5

