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Cylinder lock as well as flat key

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(71) Applicant(s)
EVVA-WERK Spezialerzeugung von Zylinder- und Sicherheitsschlossern Gesellschaft m.b.H & Co. Kommanditgesellschaft

(72) Inventor(s)
Baumhauer, Walter

(74) Agent / Attorney
FB Rice, Level 23 44 Market Street, Sydney, NSW, 2000

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Abstract

The invention relates to a cylinder lock with cylinder core (10) and housing, in which spring-tensioned tumbler pins, comprising housing pins and cylinder
5 core pins (7), are provided for probing ward cuts (6) on the key (1), wherein the cylinder core pins (7) are designed as probing extensions (9) arranged on the end protruding into the keyway, which are narrower than the diameter of the cylinder core pin (7) and aligned in the longitudinal direction of the keyway, and wherein at least two cylinder core pins (7) have probing extensions (9)
10 arranged differently from each other, either centrally along the longitudinal central plane of the keyway or offset on the left or right parallel thereto. In addition the invention relates to a flat key (1) for the afore-mentioned cylinder lock.

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Figure 2

Fig. 4

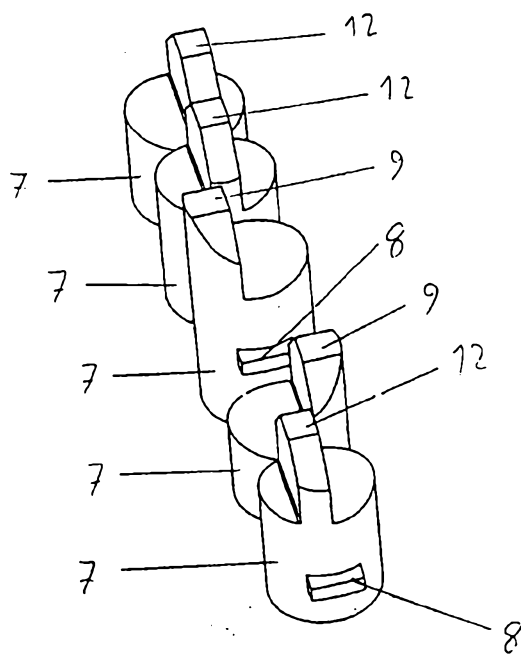


Fig. 5

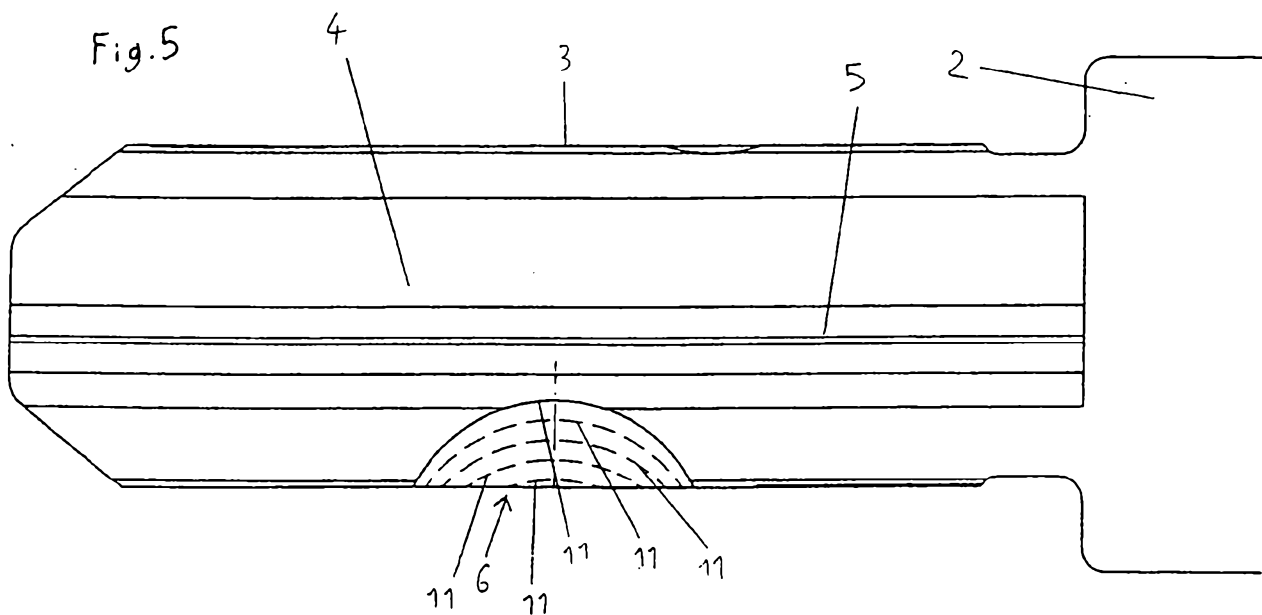
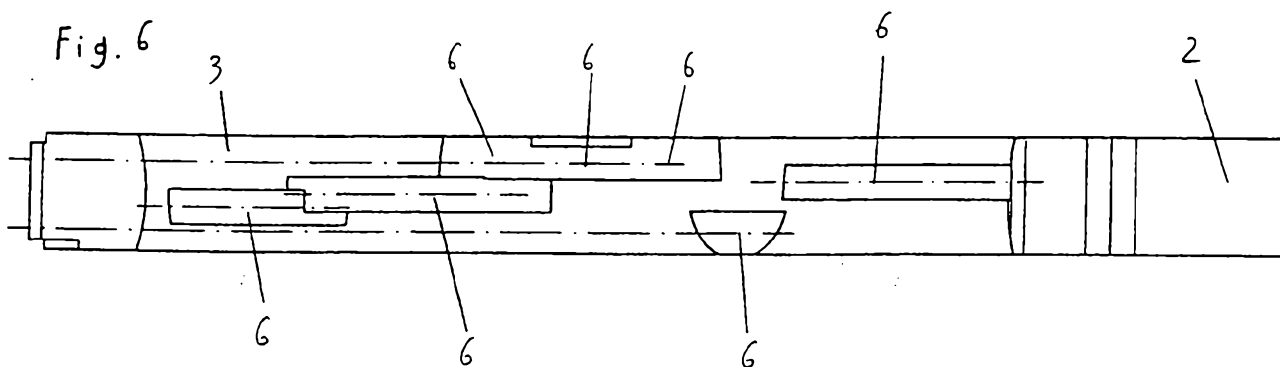


Fig. 6



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SICHERHEITSSCHLÖSSERN GESELLSCHAFT M.B.H. & CO.
KOMMANDITGESELLSCHAFT**

**COMPLETE SPECIFICATION
STANDARD PATENT**

Invention Title:

Cylinder lock as well as flat key

The following statement is a full description of this invention including the best method of performing it known to us:-

The invention relates to a cylinder lock with cylinder core and housing, in which spring-tensioned tumbler pins, comprising housing pins and cylinder core pins, are provided for probing ward cuts on the key. In addition the invention relates to a flat key for a cylinder lock, wherein the flat key is preferably designed as a reversible key with two flat sides and two narrow sides of the key, and wherein the flat key has varying deep ward cuts on at least one narrow side, preferably on two narrow sides of the key and possibly further control surfaces, notches or control paths on the flat sides of the key.

Cylinder locks which probe different ward cuts or profile grooves are well-known. An increase in the variation options of the ward cuts or profile grooves on the key, however, normally means that the design of the locks becomes more and more complex, which is both disadvantageous for the functional reliability of the locks and leads to higher production costs.

Also, with the keys the increase in the variation options usually presents disadvantages, as for example, higher production costs through the use of various milling machines or the cutting of the blank in several stages on different machines, as a result of which a substantially higher cost of the individual key also ensues here.

Any discussion of documents, acts, materials, devices, articles or the like which has been included in the present specification is not to be taken as an admission that any or all of these matters form part of the prior art base or were common general knowledge in the field relevant to the present invention as it existed before the priority date of each claim of this application.

Throughout this specification the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated element, integer or step, or group of elements, integers or steps,

but not the exclusion of any other element, integer or step, or group of elements, integers or steps.

In a first aspect of the present invention, there is provided a cylinder lock with cylinder core and housing, in which spring-tensioned tumbler pins, comprising housing pins and cylinder core pins, are provided for probing ward cuts on a narrow side of the key, wherein the cylinder core pins are designed as probing extensions, arranged on the end protruding into the keyway, which are narrower than the diameter of the cylinder core pin and aligned in the longitudinal direction of the keyway, wherein at least two cylinder core pins each comprising at least one probing extension, said probing extensions being arranged such that at least one probing extension is positioned in a different plane to the plane of at least one probing extension, wherein all planes of the probing extensions are parallel to the longitudinal central plane of the keyway, wherein the probing extensions are designed as noses, which can be arranged at a different normal distance, parallel to the longitudinal central plane or centrally along the longitudinal central plane.

A related aspect provides flat key for a cylinder lock according to the first aspect, wherein the flat key is preferably designed as a reversible key with two flat sides and two narrow sides of the key, the flat key having varyingly deep ward cuts on at least one narrow side, and wherein the ward cuts are arranged such that at least one ward cut is positioned in a different plane to the plane of at least one other ward cut, wherein all planes of the ward cuts are parallel to the longitudinal central plane of the key.

In an advantageous aspect, the invention may provide a lock, which permits more variation options for encoding the keys, wherein the design of the lock is kept simple at the same time, as a result of which increased functional reliability is assured as well as the production costs being kept to a minimum. Additionally the invention may create a key, which also offers more variation

options but which at the same time is simple and cheap to produce and has good locking reliability.

The probing extension can be designed as noses, which can be arranged at a different normal distance, parallel to the longitudinal central plane or centrally along the longitudinal central plane. As a result of the varying arrangement of the probing extensions, the variation options of the lock are substantially increased, since not only varying deep ward cuts can be probed, but also several varying normal distances to the longitudinal central plane are possible. The design of the lock still remains simple, since compared to a conventional cylinder lock with split tumbler pins only the cylinder core pins are modified.

A further feature of the invention is that the probing extensions have the same width or different widths. The number of possible variations of the cylinder lock can be further increased by varying the width.

Furthermore, it is a feature of the invention that the cylinder core pins have lateral extensions, which are arranged in corresponding grooves in the cylinder core, as a result of which the cylinder core pins are prevented from rotating.

Furthermore, the object of an inventive flat key is achieved in that the ward cuts on the flat key are narrower than the narrow side of the key, and that at least two ward cuts are arranged differently from each other, either centrally along the longitudinal central plane of the key or offset on the left or right parallel thereto.

At least one of the ward cuts can be laterally obscured by two ribs of residual key material, which makes it difficult to copy the key. Furthermore it is a feature that at least one ward cut is arranged on a flank of the narrow side of the key.

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In order to ensure a high number of variations as well as good locking reliability it is a further feature that at least three, preferably five ward cuts, possibly overlapping and different from each other as regards their normal distance to the longitudinal central plane, are provided.

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The ward cuts can have a control surface in the form of an arc segment, whereby it can be a further feature that the arc segments of the wards cut all possess the same radius. It is thus feasible to produce the key as fast and economically as possible, using a round cutter with a constant milling radius.

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In addition, longitudinal profile grooves can be provided along the flat sides of the key, whereby as a further feature at least two of the longitudinal profile grooves on the opposite flat sides of the key can be arranged so as to overlap. This means that the longitudinal profile grooves extend in depth up to at least the longitudinal central plane of the key or even exceed this.

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Further features will be evident from the claims, description as well as the appended drawings.

25 Fig. 1 shows a side view of a key according to the invention with cylinder core pins arranged thereon. Fig. 2 shows a schematic detailed cross section through a cylinder core with key inserted. Fig. 3 shows a plan view onto possible embodiments of cylinder core pins of a cylinder lock according to the invention. Fig. 4 shows a perspective view of the cylinder core pins from Fig. 3. Fig. 5
30 shows a detailed profile of a flat key according to the invention in a side view. Fig. 6 shows a detailed profile of the key from Fig. 5 in a plan view.

The flat key 1 shown in Fig. 1 possesses a key bow 2 as well as a key shank with two flat sides 4 and two narrow sides 3 of the key. Cylinder core pins 7 of the cylinder lock, which with their probing extensions 9 probe the ward cuts 6 on the narrow side 3 of the key, are shown arranged on the key 1. For the sake of simplicity the remaining lock parts, such as housing, cylinder core with keyway and core drillings, as well as the housing pins and springs are not shown. So that the probing extensions 9 of the cylinder core pins 7, aligned parallel to the longitudinal direction, cannot be rotated in the corresponding core drillings, lateral extensions 8 which are arranged in corresponding grooves in the cylinder core 10 are provided.

Fig. 2 shows a cross section through a flat key 1 according to the invention as well as a schematic detailed cross section through a cylinder 10 of a cylinder lock according to the invention. The surrounding housing is not shown for simpler illustration. The ward cuts 6 arranged on the narrow sides 3 of the key comprise arc-shaped control surfaces 11. Longitudinal profile grooves 5, at least two of which as shown in Fig. 2 are arranged so as to overlap, are arranged on the flat sides 4 of the key.

Fig. 3 shows possible embodiments for cylinder core pins 7 of a cylinder lock according to the invention in a plan view. As shown in this figure the probing extensions 9 can also be designed as noses 12 with the same or different width. The probing extensions designed as noses 12 here all have the same width, the flank-side probing extensions 9 being configured wider in this exemplary embodiment. The lateral extensions 8, which are arranged in the cylinder core in corresponding grooves, prevent the cylinder core pins 7 from being able to rotate in the corresponding core drillings. In the example shown three different cylinder core pins 7 are used. They either have a nose 12 arranged centrally along the longitudinal central plane, a nose laterally offset at a first normal distance to the longitudinal central plane or a probing extension 9 arranged on the flank side. The pins with nose 12 laterally offset or with probing extension 9 arranged on the flank side in two different directions can

be brought into the cylinder core drillings, as a result of which five different options for probing laterally offset ward cuts are possible.

5 The width of the noses 12 or the probing extensions 9 can also be selected to a varying degree, as a result of which a further increase in the number of variations is possible. In the embodiments shown in Figs. 3 and 4 the flank side probing extension 9 is configured wider than the noses 12, which, however, in this case plays no role as regards the corresponding width of the ward cut 6, since the corresponding ward cuts 6 are likewise arranged on the flank of the flat side 3 of the key and are thus open towards the respective flat side 4 of the key.

15 Figs. 5 and 6 show a detailed illustration of a flat key according to the invention in a side view and a plan view. As illustrated in Fig. 5 the ward cuts 6 have an arc-shaped control surface 11. Other possible control surfaces 11 for the different depths of the ward cuts 6 are shown with broken lines. All these control surfaces 11 possess the same radius, as a result of which they can be simply produced with the same round cutter.

20 Fig. 6 shows the key from Fig. 5 in a plan view, the different lateral arrangements of the ward cuts 6 being evident. The ward cuts 6 can either be obscured on both sides by noses from residual key material, which makes it difficult to copy the key and reduces sharp edges on the narrow sides of the key, which could lead to injuries, or can be arranged on the flank of a narrow side of the key. In addition, individual ward cuts 6 can overlap at those positions not sensed by the probing extensions 9, which likewise makes it difficult to copy the key.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Cylinder lock with cylinder core and housing, in which spring-tensioned tumbler pins, comprising housing pins and cylinder core pins, are provided for probing ward cuts on a narrow side of the key, wherein the cylinder core pins are designed as probing extensions, arranged on the end protruding into the keyway, which are narrower than the diameter of the cylinder core pin and aligned in the longitudinal direction of the keyway, wherein at least two cylinder core pins each comprising at least one probing extension, said probing extensions being arranged such that at least one probing extension is positioned in a different plane to the plane of at least one probing extension, wherein all planes of the probing extensions are parallel to the longitudinal central plane of the keyway, wherein the probing extensions are designed as noses, which are arranged at a different normal distance, parallel to the longitudinal central plane or centrally along the longitudinal central plane.
2. Cylinder lock according to Claim 1, wherein the probing extensions have the same width..
3. Cylinder lock according to Claim 1 wherein the probing extensions have different widths.
4. Cylinder lock according to any one of Claims 1 or 3, wherein the cylinder core pins have lateral extensions which are arranged in corresponding grooves in the cylinder core, as a result of which the cylinder core pins are prevented from rotating.
5. Flat key for a cylinder lock according to any one of Claims 1 to 4, wherein the flat key is designed as a reversible key with two flat sides and two narrow sides of the key, the flat key having varyingly deep ward cuts on at least one narrow side, and wherein the ward cuts are narrower than the narrow side

of the key and the ward cuts are arranged such that at least one ward cut is positioned in a different plane to the plane of at least one other ward cut, wherein all planes of the ward cuts are parallel to the longitudinal central plane of the key.

6. Flat key according to Claim 5, wherein at least one ward cut is laterally obscured by two ribs of residual key material.

7. Flat key according to Claim 5 or 6, wherein at least one ward cut is arranged on a flank of the narrow side of the key.

8. Flat key according to any one of Claims 5 to 7, wherein at least three, ward cuts different from each other as regards their normal distance to the longitudinal central plane are provided.

9. Flat key according to any one of Claims 5 to 9, wherein the ward cuts have a control surface in the form of an arc segment.

10. Flat key according to Claim 9, wherein the arc segments of the ward cuts all possess the same radius.

11. Flat key according to any one of Claims 5 to 10, wherein longitudinal profile grooves are provided along the flat sides of the key.

12. Flat key according to Claim 11, wherein at least two of the longitudinal profile grooves on the opposite flat sides of the key are arranged so as to overlap.

13. Flat key according to any one of Claims 5 to 12, wherein the varying deep ward cuts are provided on two narrow sides of the keys.

14. Flat key according to any one of Claims 5 to 13, wherein further control surfaces, notches or control paths are provided on the flat sides of the key.

15. Flat key according to any one of Claims 8 to 14, in which at least five ward cuts are provided.

16. Flat key according to any one of Claims 8 to 15, in which at least some of the ward cuts are overlapping.

17. A cylinder lock substantially as hereinbefore described with reference to the accompanying drawings.

18. A flat key for a cylinder lock substantially as hereinbefore described with reference to the accompanying drawings.

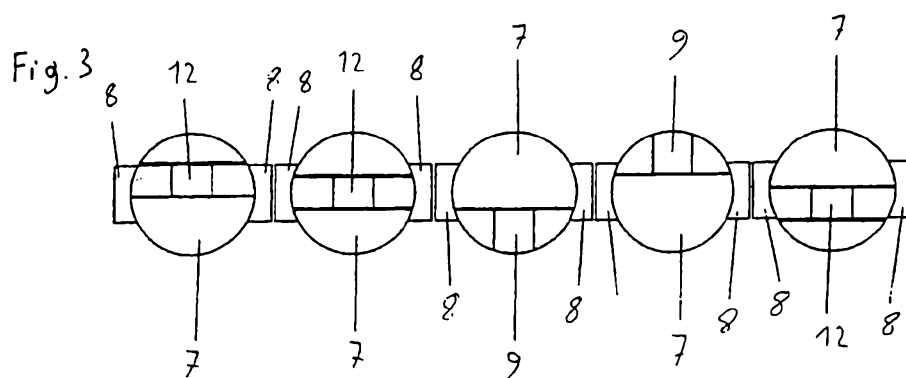
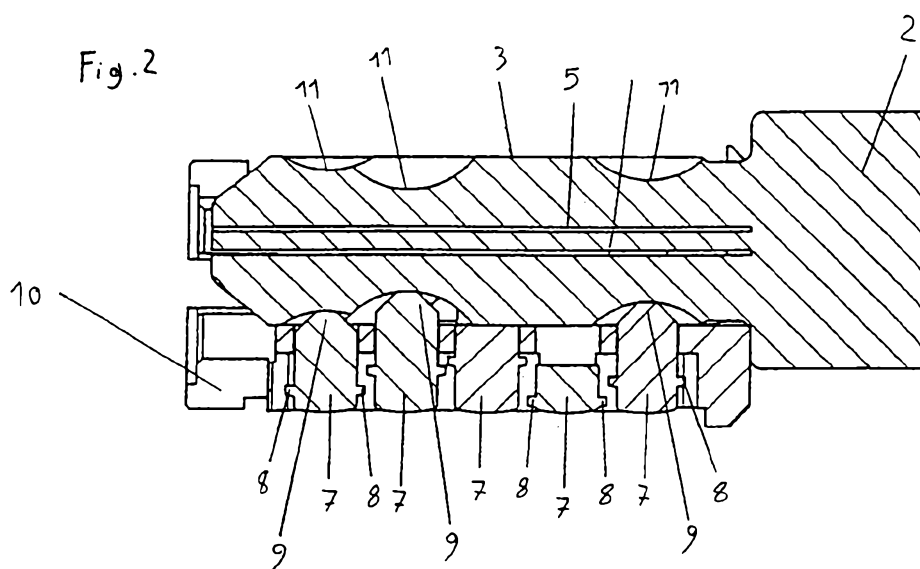
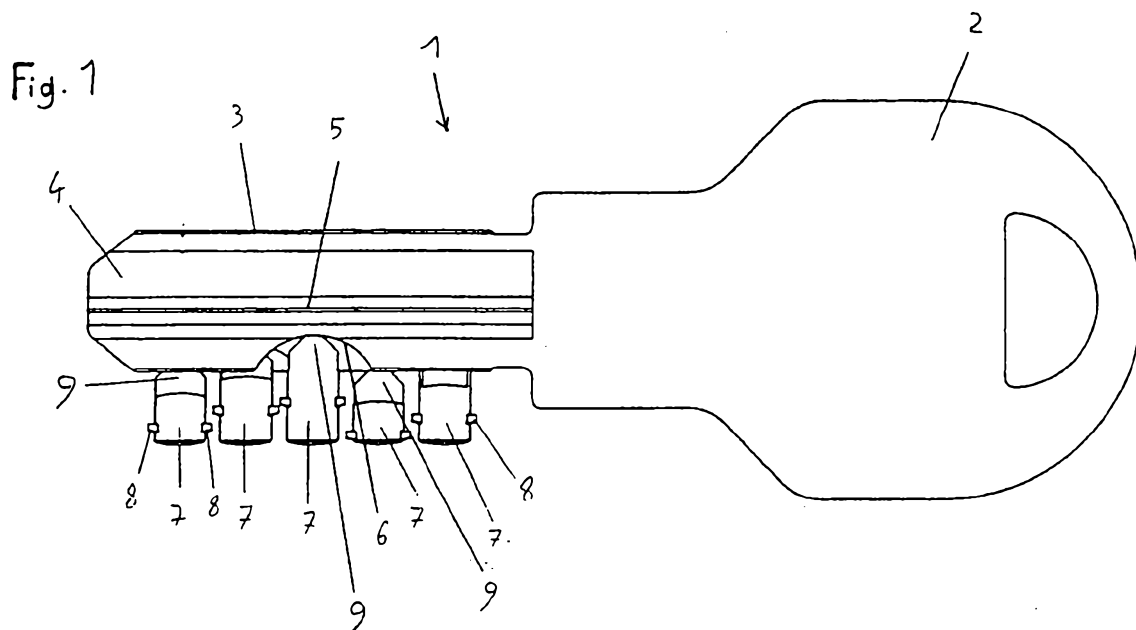


Fig. 4

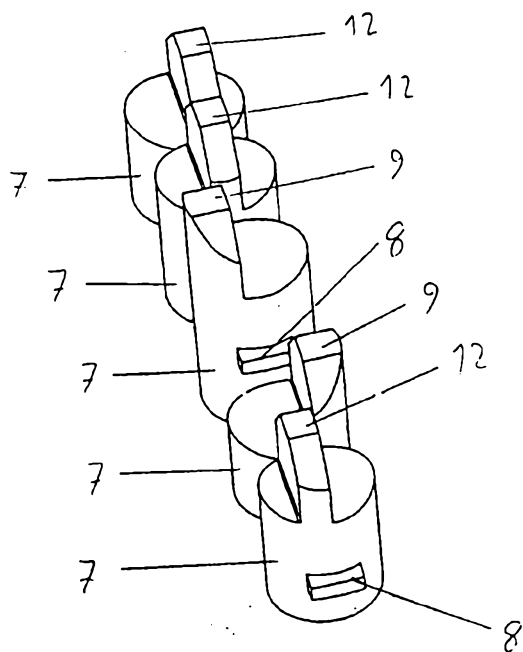


Fig. 5

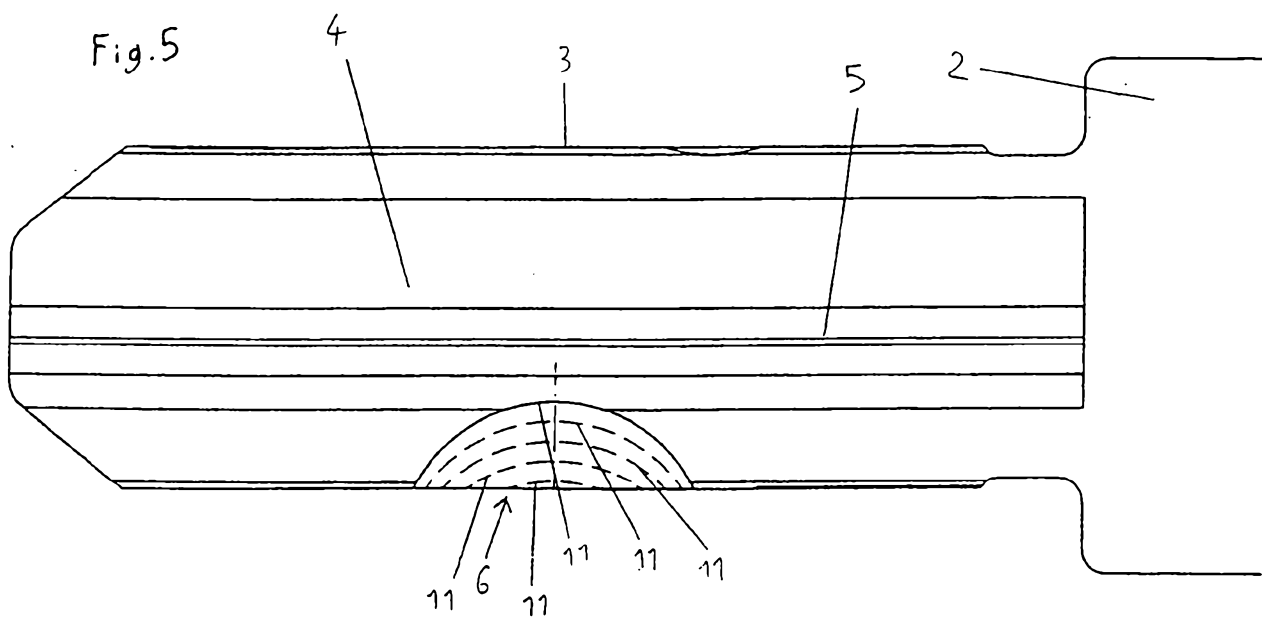


Fig. 6

