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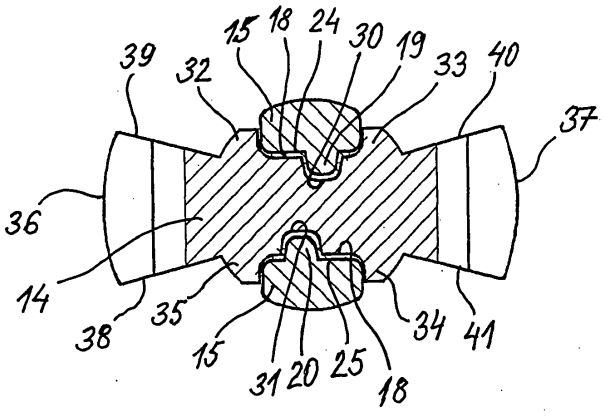
(54) **Coding mechanism for cylinder lock with a rotatable key and key blank**

(57) A coding mechanism for a cylinder lock with a rotatable key consists of a guiding element (13) for aligning the shank (14) of the rotatable key (12) inside the cylinder lock and of the rotatable key (12) itself, wherein the guiding element (13) comprises two mutually parallel and spaced apart guide rails (15), which have their ends interconnected by an abutment bridge (16) and which are provided with guiding surfaces (18) extending along their entire lengths, the shank (14) of the rotatable key (12) being provided with usual coding projections (21) adapted for interaction with usual catchers arranged inside the respective cylinder lock and having its entire cross-section continuously increasing from its intermediate portion towards at least one of its longitudinal edges (36, 37), at least one of the two pairs of the functional surfaces (38, 39 and 40, 41) of said shank having an open V-shape and the intermediate portion of the cross-section of the same being provided with a pair of corresponding longitudinal notches (22, 23). The longitudinal notches (22, 23) have flat bottom portions (24, 25), the guiding surface (18) of at least one guide rail (15) and the corresponding flat bottom portion (24, 25) of the respective longitudinal notch (22, 23) formed in the shank (14) of the rotatable key (12) having their shapes adapted for generating a locking code of the cylinder lock.

Fig. 9



EP 2 458 115 A2

Description

Field of the invention

[0001] The invention relates to the coding mechanism for a cylinder lock with a rotatable key, said mechanism consisting of a guiding element for aligning the shank of the rotatable key inside the cylinder lock and of the rotatable key itself, wherein said guiding element comprises two parallel and mutually offset guide rails, which have their ends interconnected with an abutment bridge and are provided with guiding surfaces extending along their entire lengths, the shank of the rotatable key being provided with known coding projections adapted for interaction with known catchers arranged inside the respective cylinder lock and having its entire cross-section continuously increasing from its intermediate portion towards at least one of its longitudinal edges, at least one of the two pairs of the functional surfaces of said shank having an open V-shape and the intermediate portion of the cross-section of the same being provided with a pair of corresponding longitudinal notches.

Background of the invention

[0002] With respect to the down-to-date cylinder locks, it is desirable to enable as many locking combinations as possible to be achieved with a particular type and size of a lock.

[0003] The number of locking combinations of a particular cylinder lock, which is actuated by a respective rotatable key, hereinafter shortly referred to as key, is usually defined partly by the number of possible combinations of catchers, and hence by the number of possible combinations of the elements formed on the shank of the key for co-operation with said catchers, and partly by the number of possible cross-sectional shapes of the shank of the key.

[0004] A special subgroup of cylinder locks actuated by matching keys comprises the so called cylinder locks with rotatable keys actuating lamellar catchers, which are arranged perpendicularly to the respective key, said lamellar catchers consisting of rotatable discs. An example of such a cylinder lock assembly is disclosed in the patent document CZ 293659. As far as the above type of cylinder locks is concerned, the number of possible cross-sectional shapes of the shank of the respective key is considerably limited in that a certain portion of the shank has to be adapted for co-operation with a guiding element which is intended for guiding the shank of the key inside the cylinder lock, thus preventing any undesirable contact between the key and the catchers, or the remaining discs, during the advancing motion of the shank of the key inside the cylinder lock.

[0005] According to the above patent document, the guiding element 1 (Fig. 1) comprises two parallel and mutually offset guide rails 2, which have their ends interconnected with an abutment bridge 3. The guiding element 1 is rigidly interconnected with the adjusting cylinder 4, the guide rails 2 being arranged along the through hole 5 for the insertion of the key 6. The guide rails 2 are further provided with guiding surfaces 7.

[0006] According to the prior art, the guiding elements 1 are manufactured in the form of thin bent parts and that is why they usually have rectangular cross-sections with smooth guiding surfaces 7 (Fig. 2).

[0007] Although a guiding element with smooth guiding surfaces, as described in the above mentioned patent document, might partly influence the profile of the key, which is compatible with the respective lock, the practical employment of the same for generating combination series for one specific type of the lock would be very difficult. This is due to the fact that the profile of the key is affected by the distance, width and shape of the lateral surfaces of the guide rails and, with respect to the specific size of the lock, these parameters can only be varied with considerable limitations related to the strength of the individual parts. The scope of the above mentioned type of coding is also considerably limited by the fact that the smaller profiles of the guide rails can easily fit in the larger notches formed in keys and a narrower key can easily pass through a larger gap between the rails.

[0008] According to the prior art, the shank of the key is usually adapted for the interaction with the guiding element by being provided with two opposite grooves 8 in the intermediate cross-sectional portion of the shank 9 of the key 6, said grooves matching with the respective profiles formed on the guide rails, thus having substantially flat bottom portions 10 without any additional shaped elements contributing to the generation of locking combinations for the respective cylinder lock (Fig. 2). In case that the flat bottom portions 10 are also provided with two additional notches 11, the latter only facilitate the manufacture of the key but do not contribute to the generation of locking combinations.

[0009] In the prior art, neither the guiding surfaces 7 formed on the guiding element 1 nor the flat bottom portions 10 of the corresponding grooves 8 formed on the key 6 are utilized for generating of locking combinations which results in a considerable limitation with respect to the possible increase of locking combinations for a particular type of a cylinder lock.

[0010] For other types of cylinder locks, modified keys have already been developed. The cross-sections of such keys are adapted to include opposite grooves with additional shaped elements formed in the bottom portions of said grooves. Such keys, however, are not suitable for being used in the above mentioned type of the cylinder lock.

[0011] An exemplary version of such modified key is describer in the prior-art section of the patent document EP 0123192. In that version, the key is provided with two opposite groves formed in the intermediate portion of the same, the bottom surfaces of said grooves being circularly concentric with the centreline extending through the cross-section of the shank of the key and the walls of

said grooves being formed by the surfaces that spokewise extend from said centreline. The above mentioned version of the key according to EP 0123192 would be completely unsuitable for the present type of cylinder lock since the circularly convex shaped bottom surfaces of the grooves would require the guide rails to be provided with matching circularly concave shaped surfaces which would lead to an undesirable reduction of the cross-sections of the guide rails.

[0012] In addition, it is necessary to pay regard to the fact that the shape of the remaining cross-sectional portion of the shank of the key must enable the necessary elements for the interaction with the catchers of the present cylinder lock to be formed thereon.

Summary of the invention

[0013] The objective of the present invention is to eliminate the above drawbacks of the existing solutions and to create such a coding mechanism for cylinder locks with rotatable keys, which would enable to increase the possible number of locking combinations of the specific type of cylinder locks.

[0014] Another objective of the present invention is to propose a key blank for manufacturing rotatable keys for cylinder locks provided with the above coding mechanism. The key blank according to the invention should enable the ready-to-use keys to be manufactured in the simplest and most cost-effective manner.

[0015] The above primary objective is fulfilled and the above drawbacks are eliminated by a coding mechanism for a cylinder lock with a rotatable key, said mechanism consisting of a guiding element for aligning the shank of the rotatable key inside the cylinder lock and of the rotatable key itself, wherein the guiding element comprises two mutually parallel and spaced apart guide rails, which have their ends interconnected by an abutment bridge and which are provided with guiding surfaces extending along their entire lengths, the shank of the rotatable key being provided with usual coding projections adapted for interaction with usual catchers arranged inside the respective cylinder lock and having its entire cross-section continuously increasing from its intermediate portion towards at least one of its longitudinal edges, at least one of the two pairs of the functional surfaces of said shank having an open V-shape and the intermediate portion of the cross-section of the same being provided with a pair of corresponding longitudinal notches, wherein according to the invention the longitudinal notches have flat bottom portions, the guiding surface of at least one guide rail and the corresponding flat bottom portion of the respective longitudinal notch formed in the shank of the rotatable key having their shapes adapted for generating a locking code of the cylinder lock.

[0016] Preferably, the guiding surface of at least one guide rail is provided with one longitudinal rib and the corresponding flat bottom portion of the respective longitudinal notch formed in the shank of the rotatable key is provided with one co-operating additional notch.

[0017] It is advantageous, too, when the guiding surface of at least one guide rail has convex shape and the corresponding flat bottom portion of the respective longitudinal notch formed in the shank of the rotatable key has matching concave shape.

[0018] An advantageous key blank for the rotatable key of the coding mechanism according to the invention comprises a shank having its entire cross-section continuously increasing from its intermediate portion towards at least one of its longitudinal edges, at least one of the two pairs of the functional surfaces and of said shank having an open V-shape and the intermediate portion of the cross-section of the same being provided with two opposed longitudinal notches, while according to the invention the longitudinal notches have flat bottom portions, the flat bottom portion of at least one longitudinal notch formed in the shank of the key blank for the rotatable key is provided with an additional notch co-operating with a corresponding longitudinal rib formed on a guiding surface of a guide rail inside the cylinder lock.

[0019] Also preferably, the longitudinal notches may have flat bottom portions, the flat bottom portion of at least one longitudinal notch formed in the shank of the key blank for the rotatable key having a convex shape for an engagement with a matching convex guiding surface of a guide rail inside the cylinder lock.

[0020] An advantage of the invention is, that thanks to the invention it is possible to generate additional locking combinations for cylinder locks with rotatable keys operating segment catchers, the catchers being perpendicular to the rotatable key, so that the chance of unlocking a specific cylinder lock using a key similar to the correct key for that specific lock is lowered.

[0021] The guiding element shaped according to the invention may be relatively easily manufactured in a known manner, namely by casting a steel powder substrate under a temperature that enables the crystals of the metal to be fused together by means of surface stresses, i.e. by means of the so called MIM method.

Brief description of the drawings

[0022] The accompanying drawings show both the known embodiment of the guiding element and rotatable key for cylinder locks with rotatable keys actuating lamellar catchers, which are arranged perpendicularly to the respective key, and the exemplary embodiments of the inventions. In the accompanying drawings, Fig. 1 shows a perspective view of the rotatable key and the guiding element interconnected with the adjusting cylinder according to the prior art, the rotatable key being represented outside the guiding element, Fig. 2 shows a front view of the rotatable key inserted in the guiding element according to the prior art, Fig. 3 shows an enlarged sectional view of the guiding element according to the prior art with the rotatable key inserted therein, the section being led through the plane III - III as indicated in Fig. 2, Fig. 4

shows a side view of the guiding element according to the first exemplary embodiment of the invention, Fig. 5 shows a sectional view of the guiding element according to the first exemplary embodiment of the invention, the section being led through the plane V - V as indicated in Fig. 4, Fig. 6 shows a front view of the rotatable key according to the first exemplary embodiment of the invention, Fig. 7 shows a sectional view of the shank of the rotatable key according to the first exemplary embodiment of the invention, the section being led through the plane VII - VII as indicated in Fig. 6, Fig. 8 shows a front view of the rotatable key inserted in the guiding element according to the first exemplary embodiment of the invention, Fig. 9 shows enlarged the sectional view of the coding mechanism according to the first exemplary embodiment of the invention, the section being led through the plane IX - IX as indicated in Fig. 8, Fig. 10 shows the front view of the rotatable key inserted in the guiding element according to the second exemplary embodiment of the invention, Fig. 11 shows enlarged the sectional view of the coding mechanism according to the second exemplary embodiment of the invention, the section being led through the plane XI - XI as indicated in Fig. 10, Fig. 12 shows the front view of the rotatable key inserted in the guiding element according to the third exemplary embodiment of the invention, Fig. 13 shows enlarged the sectional view of the coding mechanism according to the third exemplary embodiment of the invention, the section being led through the plane XIII - XIII as indicated in Fig. 12, Fig. 14 shows the front view of the key blank for the rotatable key according to the first exemplary embodiment of the invention, Fig. 15 shows the enlarged sectional view of the key blank the rotatable key according to the first exemplary embodiment of the invention, the section being led through the plane XV - XV as indicated in Fig. 14, Fig. 16 shows the front view of the key blank for the rotatable key according to the second exemplary embodiment of the invention, Fig. 17 shows the enlarged sectional view of the key blank the rotatable key according to the second exemplary embodiment of the invention, the section being led through the plane XVII - XVII as indicated in Fig. 16, Fig. 18 shows the front view of the key blank for the rotatable key according to the third exemplary embodiment of the invention and Fig. 19 shows the enlarged sectional view of the key blank the rotatable key according to the third exemplary embodiment of the invention, the section being led through the plane XIX - XIX as indicated in Fig. 18.

Exemplifying embodiments of the invention

[0023] The coding mechanism for the cylinder lock with the rotatable key 12, hereinafter referred to as key 12, according to the first exemplary embodiment of the invention (Fig. 4) comprises the guiding element 13 for guiding the shank 14 of the key 12 inside the cylinder lock and the shank 14 of the key 12 itself, said components being mutually adapted for generating locking combinations of said cylinder lock in the manners described hereinafter with reference to the individual exemplary embodiments.

[0024] The guiding element 13 (Fig. 4) comprises a known arrangement of two parallel and mutually offset guide rails 15, which have their ends interconnected with the abutment bridge 16. The latter provides a reinforcement for the guide rails 15 and simultaneously forms the abutment surface for the tip of the shank 14 of the key 12.

[0025] The guide rails 15 extend perpendicularly to the guiding element and along the normal through hole formed in the adjusting cylinder 17 and serving for the insertion of the key 12. Within the assembly of the cylinder lock, the guiding element 13 and the adjusting cylinder 17 are rigidly interconnected. However, the latter does not constitute a part of the coding mechanism.

[0026] On their inner sides, the guide rails 15 are provided with guiding surfaces 18 (Fig. 5) that align the shank 14 of the key 12 during the insertion of the latter, thus preventing the shank 14 from deviating from the desired direction in the horizontal plane.

[0027] According to the first exemplary embodiment of the invention, the guiding surfaces 18 of the both guide rails 15 are provided with longitudinal ribs 19, 20 that are identical in shape but mirror inverted each to the other and that are equally spaced from the edges of the guiding surfaces 18 (Fig. 5).

[0028] The shank 14 of the rotatable key 12 (Fig. 6) is provided with a set of standard coding projections 21 for the interaction with standard catchers (not shown) arranged inside the cylinder lock with the rotatable key 12.

[0029] Besides that, the shank 14 is provided with usual mirror-symmetrical longitudinal notches 22, 23 on either side in its intermediate portion (Fig. 7) for guide rails 15. Said longitudinal notches 22, 23 are delimited by their flat bottom portions 24, 25 as well as by their lateral walls 26, 27 and 28, 29.

[0030] According to the first exemplary embodiment, the flat bottom portions 24, 25 of the longitudinal notches 22, 23 formed in the shank 14 are provided with corresponding additional grooves 30, 31 that, in regard to their shapes and sizes and position, match with the respective longitudinal ribs 19, 20 formed in the guiding surfaces 18 of the guide rails 15.

[0031] The intermediate portion of the shank 14 is terminated by the lateral lobes 32, 33, 34, 35 that form the aforesaid lateral walls 26, 27 and 28, 29.

[0032] The shank 14 has its entire cross-section continuously increasing from its intermediate portion towards its longitudinal edges 36, 37 so that the functional surfaces 38, 39 and 40, 41 of the same assume an open V-shape. In certain types of cylinders locks, the shank 14 may alternatively have its cross-section continuously increasing from its intermediate portion towards only one of its longitudinal edges, e.g. towards the longitudinal edge 27. In such case, the respective functional surfaces 40, 41 would be parallel.

[0033] The shank 42 of the key blank 43 for the man-

ufacture of the rotatable key 12 (Fig. 14) for the coding mechanism according to the first exemplary embodiment of the invention is provided with elements that are identical to those of the shank 14 of the key 12 according to the first exemplary embodiment. Hence, the former is also provided with the longitudinal notches 22, 23 having flat bottom portions 24, 25 and lateral walls 26, 27 and 28, 29.

[0034] According to the first exemplary embodiment, the flat bottom portions 24, 25 of the longitudinal notches 22, 23 formed in the shank 42 of the key blank 43 are also provided with corresponding additional grooves 30, 31 that, in regard to their shapes and sizes, match with the respective longitudinal ribs 19, 20 formed in the guiding surfaces 18 of the guide rails 15.

[0035] The shank 42 of the key blank 43 for the key 12 according to the first exemplary embodiment is also provided with the lateral lobes 32, 33, 34, 35, the longitudinal edges 36, 37 and the functional surfaces 38, 39 and 40, 41, which are identical to those of the shank 14, and also has, by analogy to the shank 14 of the key 12, its entire cross-section continuously increasing from its intermediate portion towards its longitudinal edges 36, 37 so that its functional surfaces 38, 39 and 40, 41 assume the same open V-shape as those of the shank 14 of the key 12 do.

[0036] In other words, both the shape and the dimensions of the shank 42 of the key blank 43 for the key 12 according to the first exemplary embodiment are fully identical to those of the shank 14 of the key 12 according to the first exemplary embodiment. The only difference between the shanks 42 and 14 of the key blank 43 and the key 12, respectively, consists in that the former does not include the coding projections 21 for the interaction with known matching internal catchers (not shown) of the cylinder lock.

[0037] The shank 42 of the key blank 43 for the key 12 can be used for manufacturing the shank 14 of the key 12 by removing the surplus material in order to form the usual set of coding projections 21.

[0038] The difference between the coding mechanism according to the second exemplary embodiment of the invention (Fig. 11) and that according to the first exemplary embodiment consists merely in that the guiding surfaces 18 of either guide rail 15 are provided with longitudinal ribs 44, 45 that are identical in shape but mirror inverted each to the other and that are located at the edges of the guiding surfaces 18. According to the second exemplary embodiment, the flat bottom portions 24, 25 of the longitudinal notches 22, 23 formed in the shank 14 of the key 12 are provided with corresponding additional notches 46, 47 that, in regard to their shapes and sizes, match with the respective longitudinal ribs 44, 45 formed in the guiding surfaces 18 of the guide rails 15. The flat bottom portions 24, 25 of the longitudinal notches 22, 23 formed in the shank 42 of the key blank 43 for the key 12 for the coding mechanism according to the second exemplary embodiment are also provided with corresponding additional notches 46, 47 that, in regard to their shapes and sizes, match with the respective longitudinal ribs 44, 45 formed in the guiding surfaces 18 of the guide rails 15.

[0039] The difference between the coding mechanism according to the third exemplary embodiment (Fig. 13) and those according to the first and second exemplary embodiments consists merely in that the guiding surfaces 18 of either guide rail 15 have convex shape.

[0040] According to the third exemplary embodiment, the bottom portions 24, 25 of the longitudinal notches 22, 23 formed in the shank 14 of the key 12 are concave in shape, said shape as well as the dimensions thereof matching with the above mentioned convex shape of the guiding surfaces 18 of the two guide rails 15.

[0041] According to the third exemplary embodiment, the bottom portions 24, 25 of the longitudinal notches 22, 23 formed in the shank 42 of the key blank 43 for the manufacture of the key 12 are also concave in shape, said shape as well as the dimensions thereof matching with the above mentioned convex shape of the guiding surfaces 18 of the two guide rails 15 (Fig. 18).

[0042] The functional principle of the coding mechanism according to the invention is as follows: When the shank 14 of the key 12 is being inserted into the cylinder lock, the longitudinal notches 22, 23 formed in the shank 14 of the key 12 come into contact with the corresponding guide rails 15 and, simultaneously, the additional grooves 30, 31 and additional notches 46, 47 formed in the flat bottom portions 24, 25 of the longitudinal notches 22, 23 come into contact with the corresponding longitudinal ribs 19, 20, 44, 45 formed on the guiding surfaces 18 of the guide rails 15 or the concave surfaces of the bottom portions 24, 25 of the longitudinal notches 22, 23 come into contact with the matching convex surfaces of the guiding surfaces 18 of the guide rails 15. If the shank 14 of the key 12 is not provided with a longitudinal notch, which is matching (in regard to the shape, size and location) with the corresponding longitudinal rib formed on the guiding surface 18, that rib will then prevent the shank of the incorrect key from entering into the cylinder lock. Similarly, if the respective bottom portion 24, 25 is not provided with a concave profile, which is matching (in regard to the shape, size and location) with the corresponding convex guiding surface 18, that guiding surface 18 will then prevent the shank of the incorrect key from entering into the cylinder lock.

[0043] It would be possible to eliminate the effect of the above coding mechanism by deepening the longitudinal notches 22, 23. Nevertheless, this would lead, particularly in smaller cylinder locks, to a significant reduction of the cross-section of the shank 14 of the key 12 resulting in that the shank of an incorrect key would be easily broken inside the lock during an attempt to unlock the same. Such reduction would also lead to an entire structural instability of the key.

Industrial applicability

[0044] The coding mechanism for cylinder locks with rotatable keys according to the invention may be utilized for manufacturing cylinder locks with rotatable keys actuating lamellar catchers that are arranged perpendicularly to the respective key. Thus, the coding mechanism according to the invention enables an increased number of locking combination to be achieved. The key blank according to the invention is utilizable for manufacturing ready-to-use rotatable keys for cylinder locks.

List of reference signs

[0045]

1 guiding element
2 guide rail
3 abutment bridge
4 adjusting cylinder
5 through bore
6 key
7 guiding surface
8 groove
9 shank
10 flat bottom portion
11 additional groove
12 rotatable key
13 guiding element
14 shank
15 guide rail
16 abutment bridge
17 adjusting cylinder
18 guiding surface
19 longitudinal rib
20 longitudinal rib
21 coding projection
22 longitudinal notch
23 longitudinal notch
24 flat bottom portion
25 flat bottom portion
26 lateral wall
27 lateral wall
28 lateral wall
29 lateral wall
30 additional groove
31 additional groove
32 lateral lobe
33 lateral lobe
34 lateral lobe
35 lateral lobe
36 longitudinal edge
37 longitudinal edge
38 functional surface
39 functional surface
40 functional surface
41 functional surface
42 shank
43 key blank
44 longitudinal rib
45 longitudinal rib
46 additional notch
47 additional notch

Claims

1. A coding mechanism for a cylinder lock with a rotatable key, said mechanism consisting of a guiding element (13) for aligning the shank (14) of the rotat-

able key (12) inside the cylinder lock and of the rotatable key (12) itself, wherein the guiding element (13) comprises two mutually parallel and spaced apart guide rails (15), which have their ends interconnected by an abutment bridge (16) and which are provided with guiding surfaces (18) extending along their entire lengths, the shank (14) of the rotatable key (12) being provided with usual coding projections (21) adapted for interaction with usual catchers arranged inside the respective cylinder lock and having its entire cross-section continuously increasing from its intermediate portion towards at least one of its longitudinal edges (36, 37), at least one of the two pairs of the functional surfaces (38, 39 and 40, 41) of said shank having an open V-shape and the intermediate portion of the cross-section of the same being provided with a pair of corresponding longitudinal notches (22, 23), **characterized in that** the longitudinal notches (22, 23) have flat bottom portions (24, 25), the guiding surface (18) of at least one guide rail (15) and the corresponding flat bottom portion (24, 25) of the respective longitudinal notch (22, 23) formed in the shank (14) of the rotatable key (12) having their shapes adapted for generating a locking code of the cylinder lock.

2. The coding mechanism according to claim 1, **characterized in that** the guiding surface (18) of at least one guide rail (15) is provided with one longitudinal rib (19, 20) and the corresponding flat bottom portion (24, 25) of the respective longitudinal notch (22, 23) formed in the shank (14) of the rotatable key (12) is provided with one co-operating additional notch (30, 31).

3. The coding mechanism according to claim 1, **characterized in that** the guiding surface (18) of at least one guide rail (15) has convex shape and the corresponding flat bottom portion (24, 25) of the respective longitudinal notch (22, 23) formed in the shank (14) of the rotatable key (12) has matching concave shape.

4. A key blank (43) for the rotatable key (12) of the coding mechanism according to claim 1, comprising a shank (42) having its entire cross-section continuously increasing from its intermediate portion towards at least one of its longitudinal edges (36, 37), at least one of the two pairs of the functional surfaces (38, 39 and 40, 41) of said shank having an open V-shape and the intermediate portion of the cross-section of the same being provided with two opposed longitudinal notches (22, 23), **characterized in that** the longitudinal notches (22, 23) have flat bottom portions (24, 25), the flat bottom portion (24, 25) of at least one longitudinal notch (22, 23) formed in the shank (42) of the key blank (43) for the rotatable key (12) being provided with an additional notch (30, 31) co-operating with a corresponding longitudinal rib (19, 20) formed on a guiding surface (18) of a guide rail (15) inside the cylinder lock.

5. The key blank (43) for the rotatable key (12) of the coding mechanism according to claim 1, comprising a shank (42) having its entire cross-section continuously increasing from its intermediate portion towards at least one of its longitudinal edges (36, 37), at least one of the two pairs of the functional surfaces (38, 39 and 40, 41) of said shank having an open V-shape and the intermediate portion of the cross-section of the same being provided with two opposed longitudinal notches (22, 23), **characterized in that** the longitudinal notches (22, 23) have flat bottom portions (24, 25), the flat bottom portion (24, 25) of at least one longitudinal notch (22, 23) formed in the shank (42) of the key blank (43) for the rotatable key (12) having a convex shape for an engagement with a matching convex guiding surface (18) of a guide rail (15) inside the cylinder lock.

Fig. 1

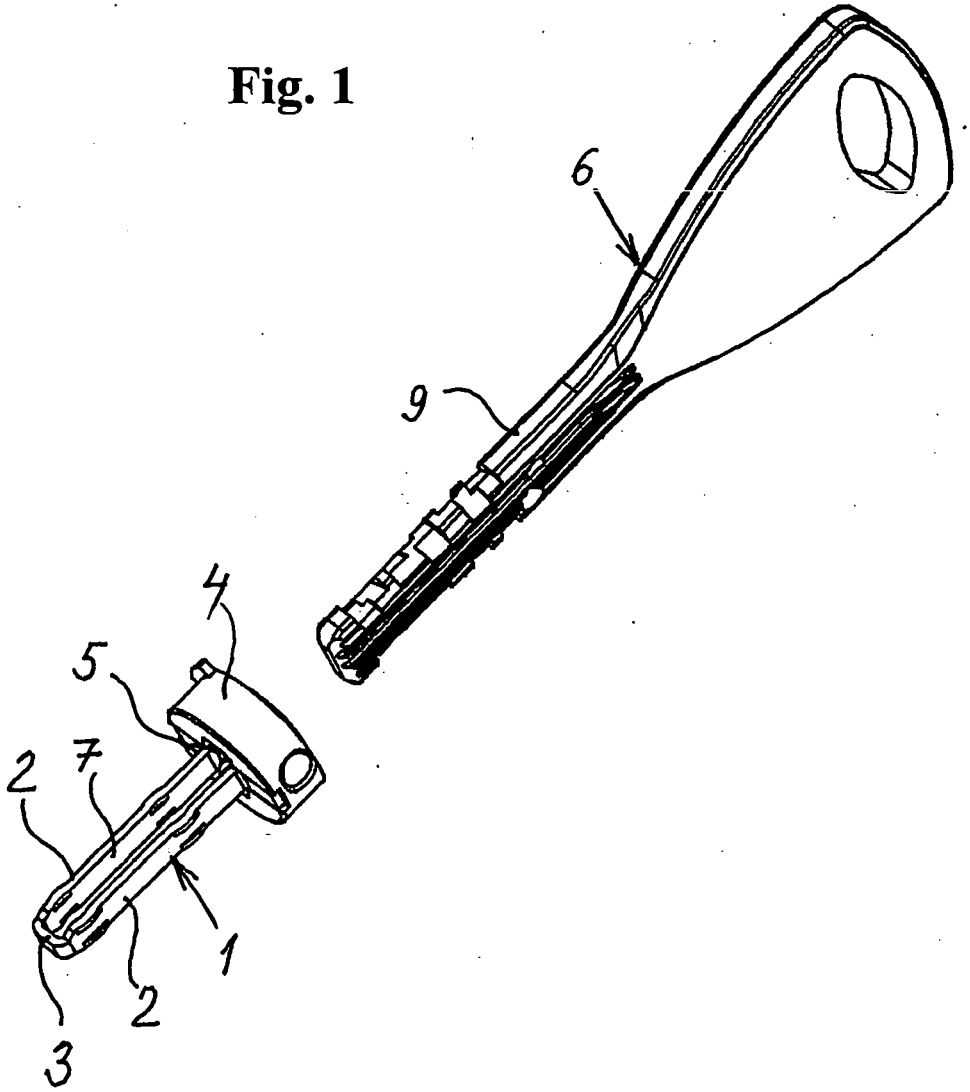


Fig. 2

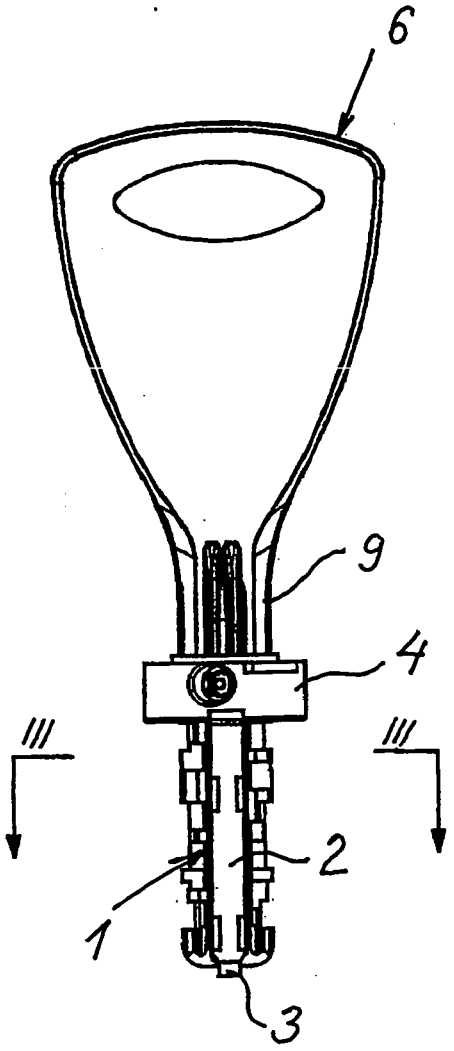


Fig. 3

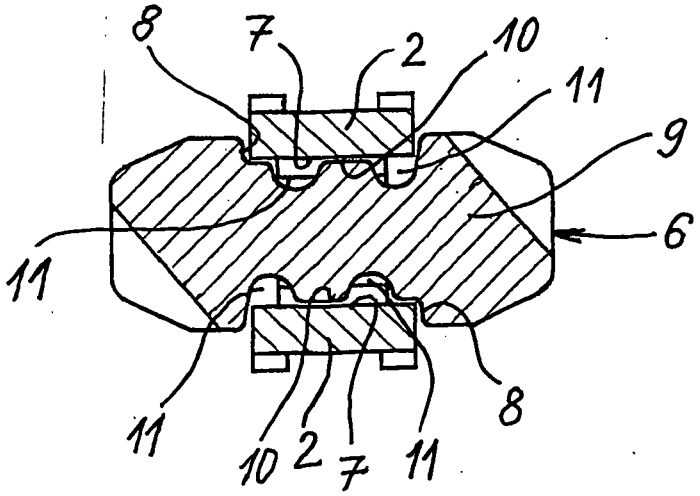


Fig. 4

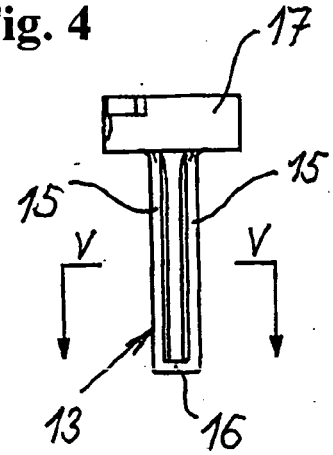


Fig. 5

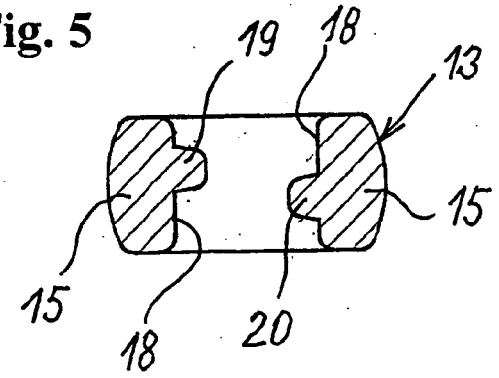


Fig. 6

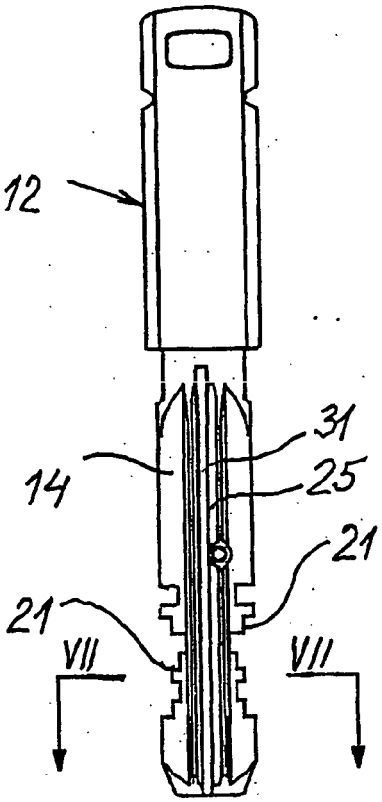


Fig. 7

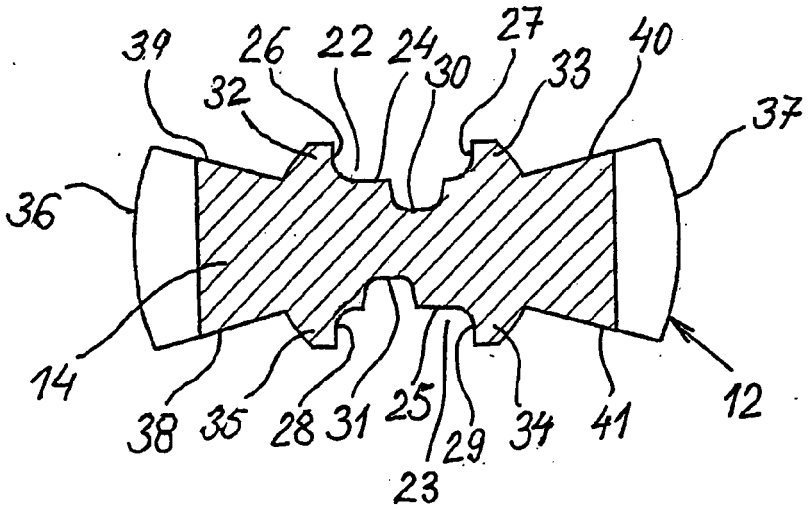


Fig. 8

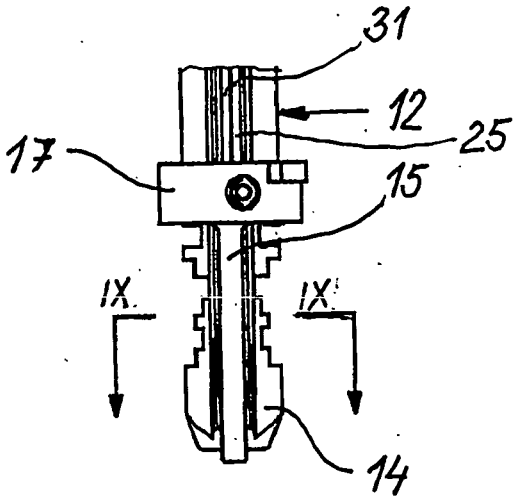

31
12
25
17
15
IX
IX
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Fig. 9

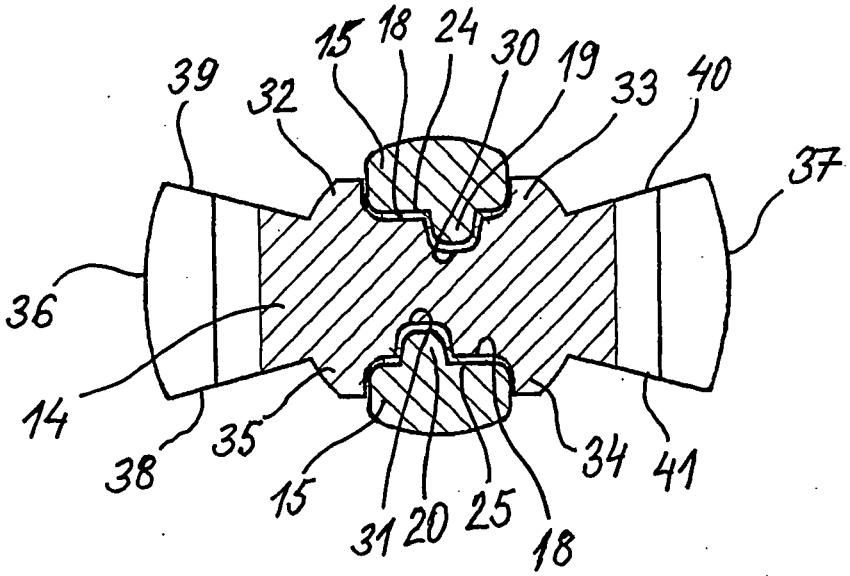
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Fig. 10

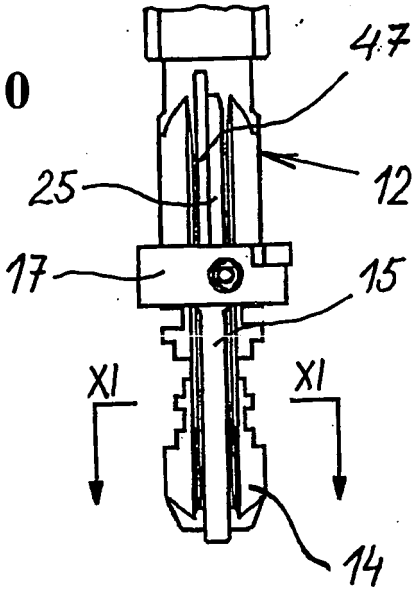
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Fig. 11

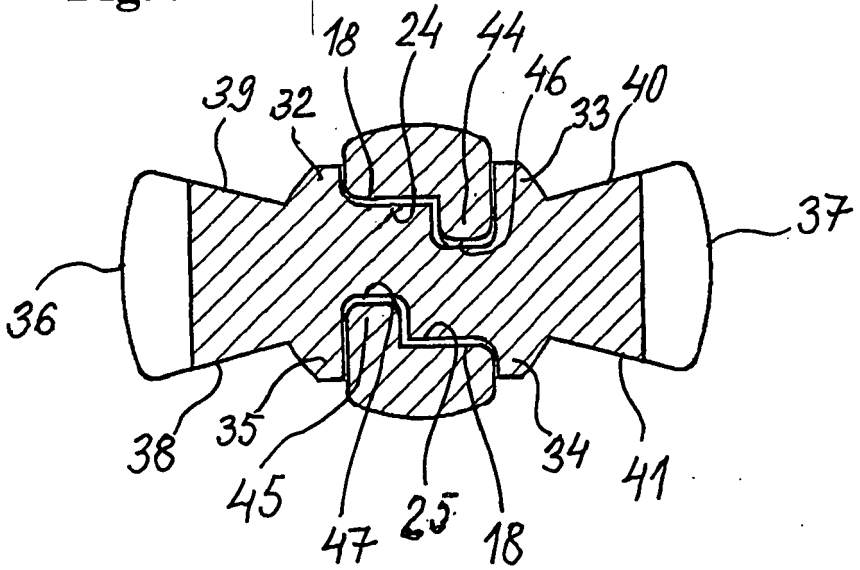
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Fig. 12

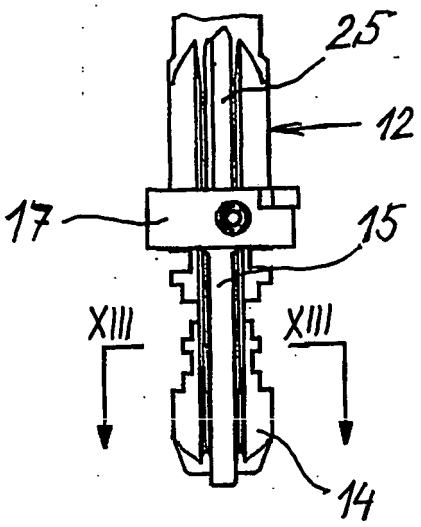
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Fig. 13

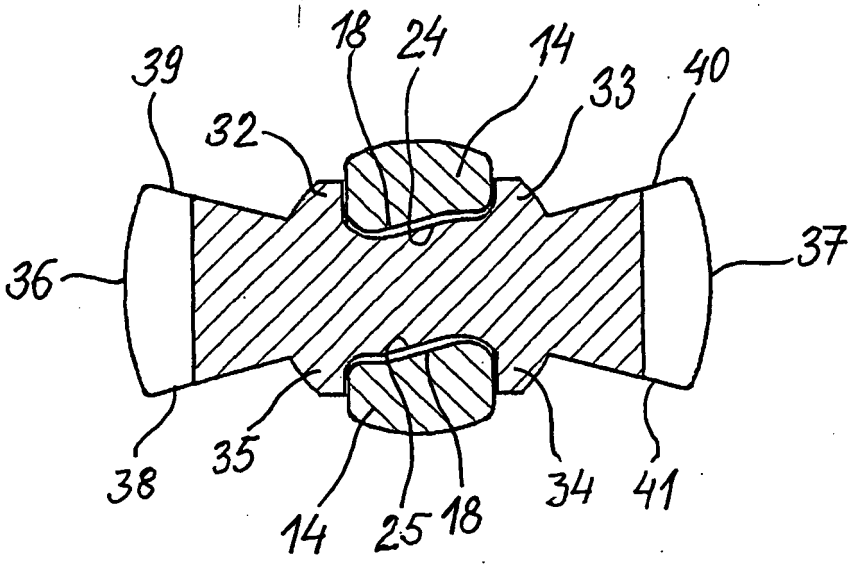
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Fig. 14

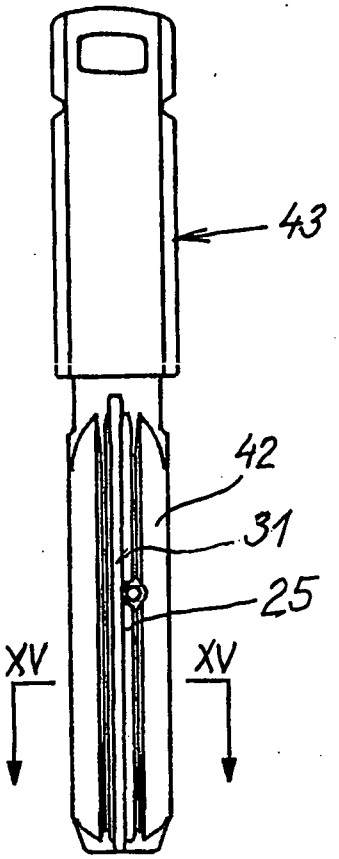
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Fig. 15

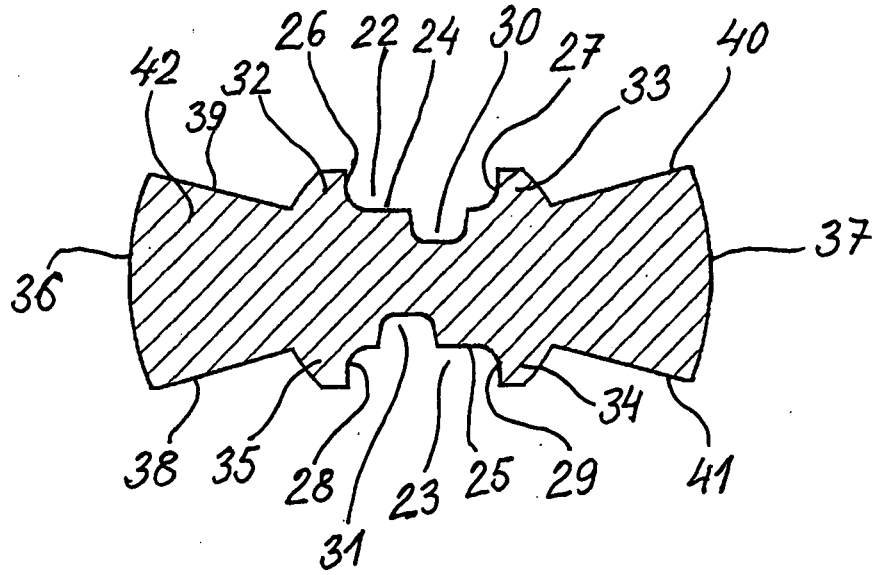
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Fig. 16

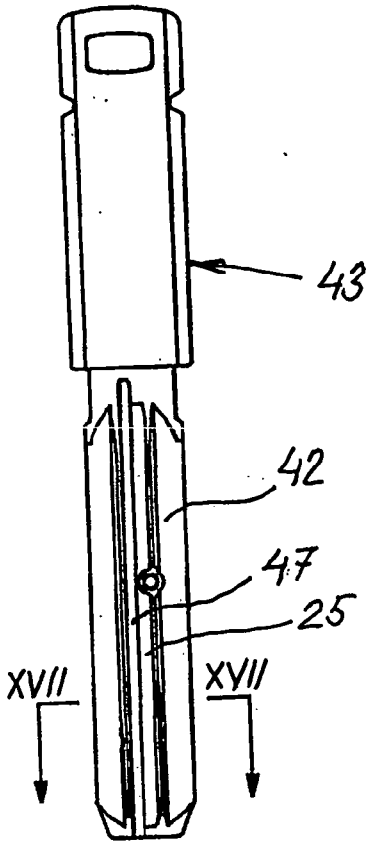
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Fig. 17

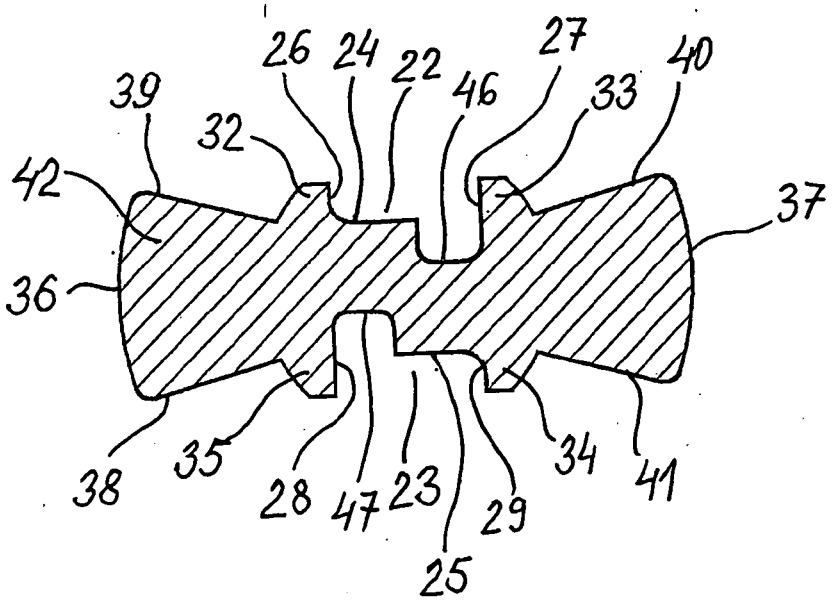
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Fig. 18

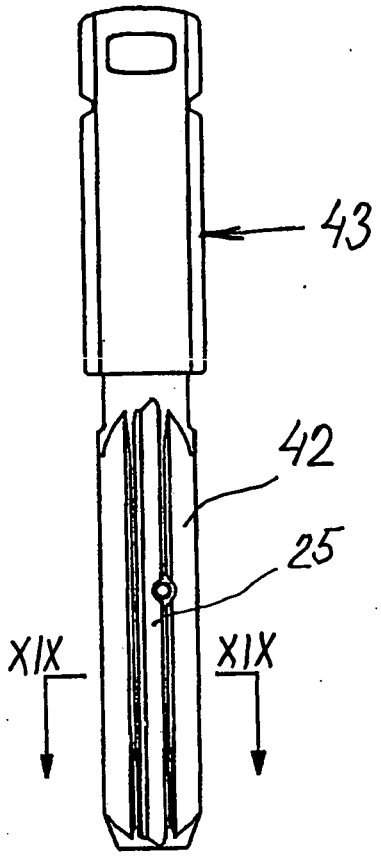
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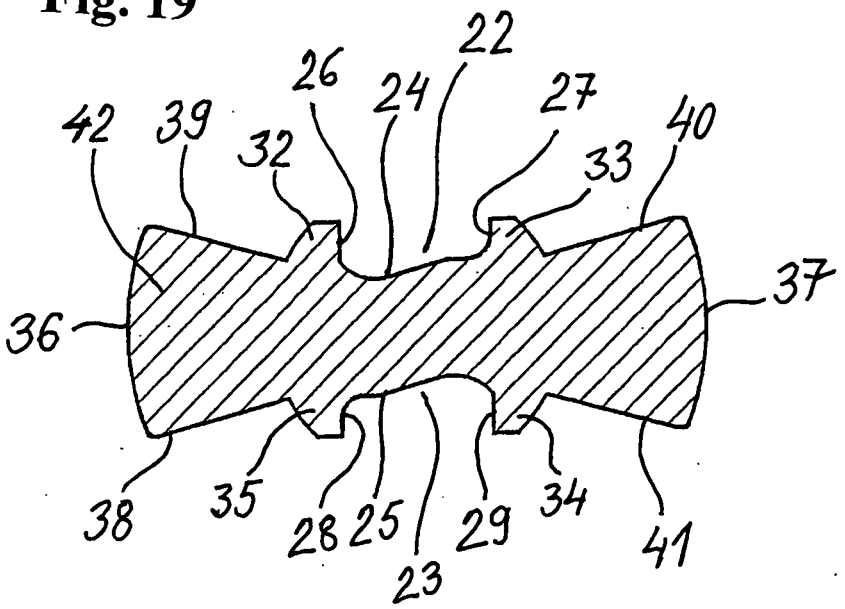
Fig. 19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REFERENCES CITED IN THE DESCRIPTION

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