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(54) Flat key for a cylindrical lock

(57) The present invention refers to a flat key for a cylindrical lock, of the kind with a rotor rotating within a stator, comprising at least first and second means of engagement lined up between themselves and lined up with at least a first and/or second interference organ, also lined up between themselves, in order to activate them in a suitable manner to allow for the rotation of said rotor within said stator, said first means of engagement being defined by crests which protrude by at least one face of said key or which coincide with said face and said second means of commitment being defined by indentations placed below said face and extracted from the structure of said key, characterised in that it includes at least third means of commitment aimed at activating only at least one third interference organ, lined up with said first and second interference means, and cooperating with the latter to allow for rotation of said rotor within said stator.

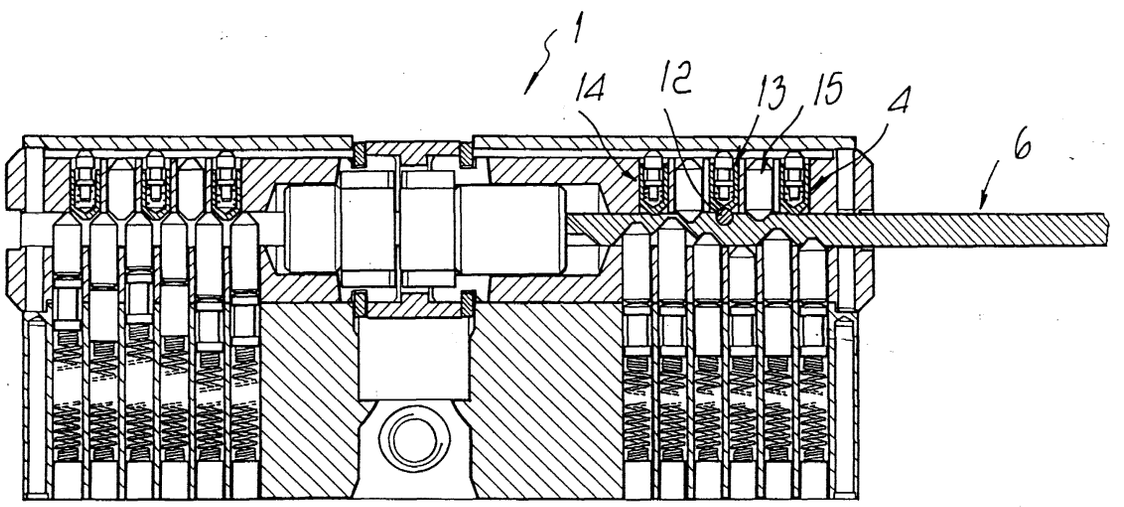

FIG. 1

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Description

[0001] The present invention refers to a flat key for a cylindrical lock.

[0002] As is known, flat keys, for cylindrical locks currently available on the market, include means of engagement with one or more of the interference organs provided in the stator and the rotor of the lock in order to prevent the rotation of the latter.

[0003] Normally the interference organs are defined by a certain number of pins, some of which operate as small pistons as they are made up of a pin, a counterpin and suitable springs.

[0004] As soon as a flat key is inserted into the lock the pins move into a position which allows for the unblocking of the rotor which may therefore rotate with regards to the stator or the cylinder controlling the movement of the latch.

[0005] Normally, in flat types of keys, currently on sale, the means of engagement are defined by indentations, interacting with one or more small piston, which are for example formedunder the plane defined by the lateral side of the key and which, consequently, develops below the same towards the key axle.

[0006] It shall be added that in a flat key for a cylindrical traditional type of lock the maximum thickness of the same is defined by two planes passing through the crest (s) or the surface(s) with the maximum distance from the key axle.

[0007] These planes are those from which, as mentioned above, the indentations to be found in the face(s) of the key are made.

[0008] Obviously, as can be easily perceived, the need to create locks of a remarkable resistance without excessively weakening the surface of the rotor or the stator and with an extremely high number of cipherings, implicates the creation of suitable keys with the possibility of satisfying the high number of cipherings of the lock.

[0009] The creation of a high number of cipherings implicates the execution of various modifications to the structure of the rotor and consequently a remarkable increase in the cost of the lock.

[0010] However, the more cipherings the lock has and the more incisions or crests there are, or be it height imbalances to found in the relative key, and the more the structure is weakened due to encumbrance with the keys with a limited number of cipherings.

[0011] In this situation the technical task at the basis of this invention is that of rectifying the above-mentioned drawbacks of the prior art .

[0012] In this assignment an object of the present invention is that of creating a key which provides a high number of cipherings without any modification to the structure of the rotor and which number of cipherings, being the same allows for the creation of a lock at a lower cost.

[0013] Another object of the present invention is that of creating a flat key for a cylindrical lock which allows for a number of combinations higher than that of the flat keys currently on sale of the same kind.

[0014] Furthermore another object of the present invention is that of creating a flat key which, with the same sizes and mechanical resistance of a traditional key, has a remarkably higher number of cipherings.

[0015] This task as well as the above-mentioned objectives are substantially achieved thanks to a flat key for a cylindrical lock type with a rotor which rotates within a stator, comprising at least first and second means of commitment lined up between themselves and aligned with at least a first and/or second interference organ, also lined up between themselves, in order to activate them in a suitable manner and to allow for rotation of said rotor in said stator, said first means of engagement being defined by crests that rise from at least one side of said key or which coincide with said face and said second means of engagement being defined by indentations placed below said face and extracted from the body of said key, characterised in that it includes at least third engagement means aimed at activating only at least one third interference organ, lined up with said first and second interference means, and cooperating with the latter to allow for the rotation of the said rotor in said stator.

[0016] Further features and advantages of the invention will be better clear in the description of a preferred, but not exclusive, embodiment of the flat key for a cylindrical lock, illustrated as an exemplificative and not limitative example in the drawings attached, in which:

- figure1 is a side view of a cylindrical lock according to the finding;
- figure2 is a front view of the lock including the rotor, stator and pin according to the finding;
- figure 3 is a sectionviewof the key according to the finding, in the presence of an elevation;
- figure 4 is a section view of the key according to the finding, in the presence of an insert;
- figure5 is a front section view of the lock with a pin with a truncated base and key inserted, according to the finding;
- figure 6 is a front section view of the lock with a pin with a conical base and with a key inserted, according to the finding;
- figure 7 is a front section view of the lock with pin made from a single structure and a key inserted, according to the finding;
- figure 8 is a front section view of the lock with pin in a blocking position to be rotated.

[0017] With particular reference to the drawings indicated the flat key, generally indicated with the reference numeral 6, is adapted for being used in cylindrical type of locks with a rotating rotor 2 in a stator 3.

[0018] The flat key 6 has first and second means of engagement 5 and 7 which are lined up between them-

selves and lined up with at least a first and/or second interference organ 4 and 15, also lined up between themselves, in order to activate them so as to allow for rotation of the rotor 2 in the stator 3.

[0019] In particular, the first means of engagement is defined by crests 30 which protrude from the plane 8 defined by at least one side face of the key 6 or which coincide with the plane 8 of one of the two side faces of the key 6.

[0020] The second means of engagement 7 are, however, placed under the above-mentioned plane 8 and are defined by indentations 7, which extend towards the central axle of the key 6 included between the two side faces defined by the two planes 8, extracted from the structure of the key 6.

[0021] Advantageously, the key 6 has, furthermore, third means of engagement, indicated as a whole with 9, adapted for activating only at least one third interference organ, generally indicated by 13, which is lined up with the first and second interference means 4 and 15 and cooperates with the latter to allow for the rotation of the rotor 2 within the stator 3.

[0022] In particular, the third means of engagement 9 comprises at least one elevation 9 located on the face of the key sideways in alignment with the first, the second and the third interference organs.

[0023] The elevation 9 has a first surface 10 which is substantially parallel to the face 8 of the key and at least a second inclined junction surface 11 of the first surface 10 with the face 8 of the key.

[0024] The first surface 10, as indicated, only activates the third interference organ 13 to allow for rotation of the rotor 2 in the stator 3 of the lock.

[0025] The elevation 9 may extend partially or along the entire length of the key.

[0026] In a different embodiment, the elevation 9 includes at least one insert 12 with a configuration object substantially tapered, and in particular preferably of a conical configuration, adapted for engaging with the third interference organ 13 again to allow for rotation of the rotor 2 in the stator 3.

[0027] In particular, the third interference organ 13 comprises a hollow glass 19 sutably with a truncated base 23, of a substantially truncated-conical configuration.

[0028] Within the hollow glass 19, there is a mobile element 20 aimed at moving in contrast with and activated by elastic means and in particular by a spring 25.

[0029] The mobile element 20 has a lowered ring area 21 which allows for the wedging impaction of the mobile element with the edge of the glass 19, as illustrated for example in drawing 8.

[0030] Furthermore, the mobile element 20 has a shaft 22 of a predefined length which extends from the lower area 21 towards the bottom of the glass 19.

[0031] The first interference organ 4, unlike the third interference organ 13, comprises a hollow glass 19 with a conical base 24.

[0032] Even in this case, inside the glass 19 there is a mobile element 20 which is identical to the mobile element 20 of the third interference organ 13 which moves internally within the hollow cable in contrast with or activated by elastic means in particular, a spring 25.

[0033] Even in this case the mobile element 20 has a lowered ring area 21 aimed at its wedging with the edge of the glass 19 and a shaft of a predefined length 22 which extends from the lowered area 21 towards the bottom of the glass.

[0034] In other words, the first interference organ, with regards to the third interference organ 13, is different due to its conical base 24 instead of the truncated-conical base 23 of the third interference organ 13.

[0035] The second interference organ 15 is however defined by a single structure 16, of a substantially cylindrical configuration, with its two opposing ends 17 of a substantially conical configuration.

[0036] Advantageously, the first, the second and the third interference organs are placed in dedicated seats 18, all of which are the same, extracted from the rotor 2 in order to be placed in any position whatsoever in the seats 18.

[0037] When the elevation 9, defined as seen by the insert 12 or by the surface 10 or 11, engaged with the glass 19 with a truncated base 23 of the third interference organ 13 (drawing 5), it leads to a partial lifting of the glass 19 so that the edge of the latter is partially superimposed with that of the shaped head 26 of the mobile element, in order to allow for the transfer of the latter, in contrast with or activated by the spring 25, within the glass allowing for the disengagement of the head 26 from the ppocket 40 and the retraction of the mobile element in the rotor profile, therefore allowing for the rotation of the latter with regards to the stator.

[0038] When, however, the elevation 9 and, therefore the insert 12 or the wall 10 with the wall 11, engage with the glass 19 with a conical base 24, the glass will lift and abut against the shaft 22 of the mobile element.

[0039] In this case the mobile element will remain blocked between the bottom of the glass and the pocket 40 in which its head 26 is located, preventing rotation of the rotor with regards to the stator.

[0040] In particular, thanks to the presence of the elevation 9 and consequently the provision of the glass with a truncated base 23, or with a conical base 24, it is possible to increase remarkably the cipherings of the lock, obtaining a number of cipherings much higher than that achieved with traditional locks and keys.

[0041] In particular, as can be seen from drawings 5, 6 and 7, when the key is put into the lock the elevation 9 (in this case defined by the insert 12) is committed with the glass 19 allowing or not, according to the type of glass base, the rotation of the rotor 2 with regards to the stator.

[0042] We can see from drawing 2 that when the truncated base 23 of the glass 19 is not affected by the elevation 9 present on the key 6, the shaft 22 of the inter-

ference organ or pin 13 is at a distance from the bottom 23 of the glass 19 and the annular area 21 is partially external to the glass 19.

[0043] In this situation the pin 13 tends to slope with regards to its axle (as illustrated in drawing 8) and wedging itself between the stator 3 and the rotor 2 by blocking the rotation of the latter with regards to the first and not allowing for the opening of the lock.

[0044] When, however, the pin 13 engages with the elevation 9 (drawing 5), the shaft 22 is still slightly set apart from the bottom of the glass 19 and the annular area 21 is within the glass 19.

[0045] In this position the annular area 21 of the pin can slide through the glass in contrast with or activated by the elastic means 25, thanks to the presence of the head 26 which the mobile element 20 is equipped with, therefore allowing for the rotation of the rotor 2.

[0046] In figure 6 the operation of the second interference organ or pin 14, when it is committed with the elevation 9 (defined by insert 12).

[0047] In this case the shaft 22 is in contact with the conical base 24 of the glass 19 and the annular area 21 is within the glass 19.

[0048] Even though the annular area 21 is within the glass 19, the wedging of the head 26 in the pockets 40 present in the stator 3 arises, as the second mobile element 20, due to the presence of the shaft 22, cannot slide inside the glass 19 and therefore blocks the rotation of the rotor 2.

[0049] If we look carefully at figure 7, when the base of the third interference organ or pin 15 is in contact with the elevation 9, the pin 15 is blocked between the elevation 9 and the grooves or pockets 40 present within the stator 3 not allowing for the rotation of said rotor 2.

[0050] When, however, the conical base of the pin 15 engages with its own indentation 7, the pin 15 is completely inside the rotor 2, allowing for rotation.

[0051] As can be understood from the above-mentioned, the positions of the pin that provoke the opening or not of the lock can be seen from the combination of the features of the key and those related to the various pins.

[0052] The invention reaches the objects proposed and achieves important and numerous advantages.

[0053] Infact, a flat key for cylindrical locks has been invented. which allows for the achievement of a remarkably high number of cipherings without any modifications made to the thickness, width or length of the key and in particular without any modifications made to the structure of the rotor.

[0054] Furthermore, we must observe that with the same number of cipherings the key allows for the creation of a cheaper lock and therefore at the same cost a remarkably higher number of cipherings can be achieved. This number of cipherings is substantially higher than the number of cipherings achieved with current techniques.

[0055] Furthermore, the mechanical resistance of the key does not vary as the number of grooves which would weaken the key is not increased, but work is carried out beyond the plane defined, from at least one face of the key.

[0056] The invention conceived in this way is liable to various modifications and variations, all of which fall within the scopeof the inventive concept, and furthermore all of the details can be replaced with technically equivalent elements.

[0057] In practice, the materials used as well as the sizes can be any whatsoever according to demands and the state of the art.

[0058] The above as substantially described, illustrated, claimed and for the specified purposes.

Claims

1. A flat key for a cylindrical lock, of the kind with a rotor rotating within a stator, comprising at least first and second means of engagement lined up between themselves and lined up with at least a first and/or second interference organ, also lined up between themselves, in order to activate them in a suitable manner to allow for the rotation of said rotor within said stator, said first means of engagement being defined by crests which protrude by at least one face of said key or which coincide with said face and said second means of commitment being defined by indentations placed below said face and extracted from the structure of said key, characterised in that it includes at least third means of commitment aimed at activating only at least one third interference organ, lined up with said first and second interference means, and cooperating with the latter to allow for rotation of said rotor within said stator.

2. A key, according to claim 1, characterised in that e said third means of engagements comprises at least one elevation placed on said facesideways to the alignment of said first, second and third interference organs.

3. A key, according to one or more of the previous claims, characterised in that said elevation has a first surface which is substantially parallel to the face of said key and at least a second inclined junction surface of said surface with said face.

4. A key, according to one or more of the previous claims, characterised in that said first plane only activates said third interference organ to allow for the rotation of said rotor in said stator.

5. A key, according to one or more of the previous claims, characterised in that said elevation extends develops along the entire length of said key.

6. A key, according to one or more of the previous claims, characterised in that said elevation comprises at least one insert with a substantially tapered and preferably conical protrusion adapted for engaging with said third interference organ.

7. A key, according to one or more of the previous claims, characterised in that said third interference organ comprises a hollow glass with a truncated base, of a substantially truncated-conical configuration, within which a mobile element is placed within said hollow glass in contrast with and activated by elastic means, said mobile element having a lower annular area adapted for wedging with the edge of said glass and with a shaft of a predefined length which extends from said lowered area towards the bottom of said glass.

8. A key, according to one or more of the previous claims, characterised in that said first interference organ comprises a hollow glass with a conical base within which a mobile element is placed within said hollow glass in contrast with and activated by elastic means, said mobile element having a lower annular area adapted for wedging with the edge of said glass and a shaft of a predefined length which extends from said lowered area towards the bottom of said glass.

9. A key, according to one or more of the previous claims, characterised in that said second interference organ has a body made from a single piece with two opposing extremities of a substantially conical configuration.

10. A key, according to one or more of the previous claims, characterised in that said elevation engages with said glass with a truncated base of said third interference organ in a way suitable for its positioning with regards to the said mobile element to allow for its displacement within said glass for the rotation of said rotor with regards to said stator.

11. A key, according to one or more of the previous claims, characterised in that said elevation engages with said glass with a conical base of said first interference organ in a way suitable for its positioning with regards to the said mobile element to prevent displacement of said mobile element within said glass due to the presence of said shaft in abutment with the bottom of said glass to prevent the rotation of said rotor with regards to said stator through the wedging of said mobile element with the edge of said glass.

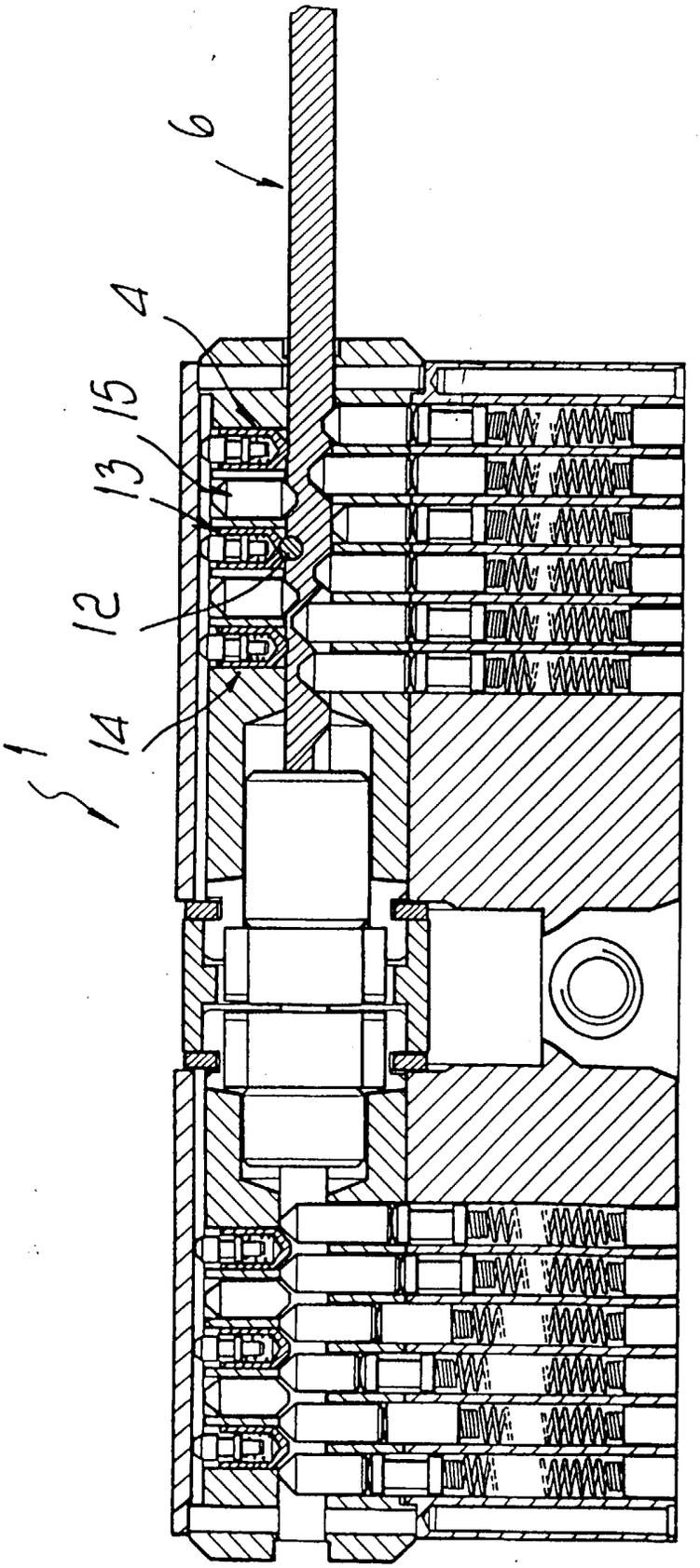

FIG. 1

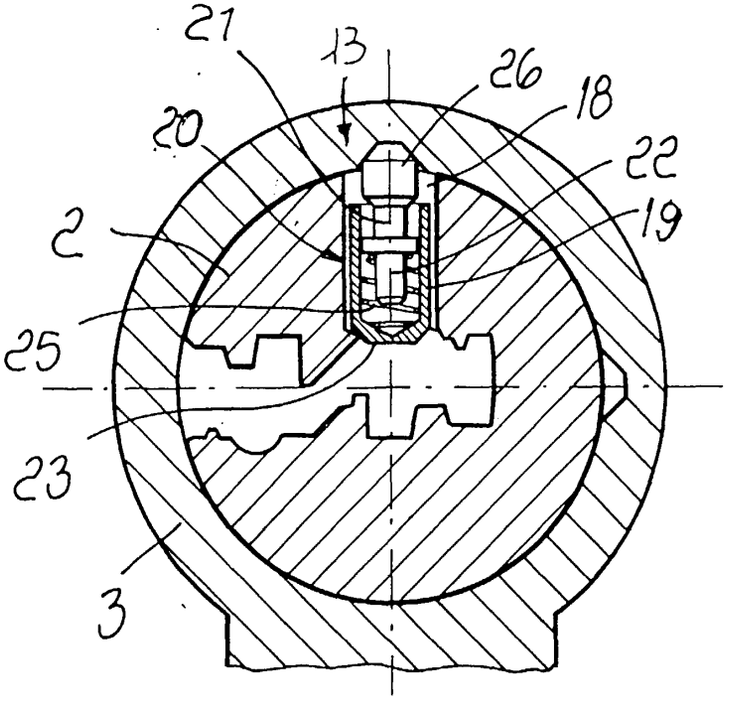

FIG. 2

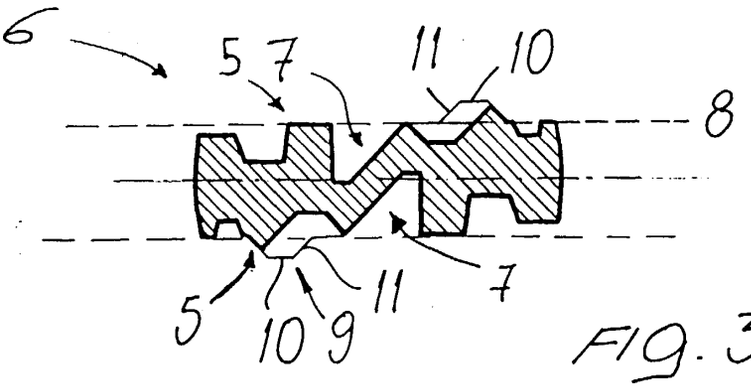

FIG. 3

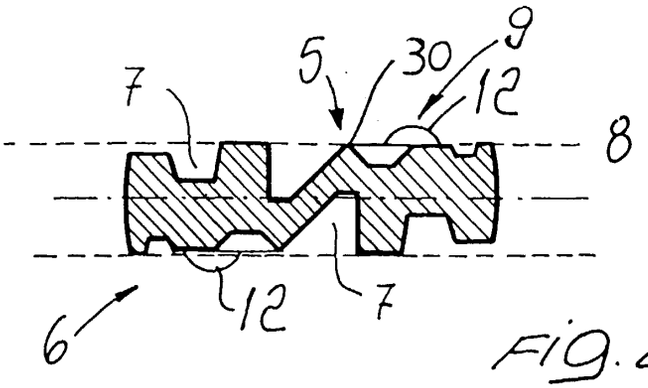

FIG. 4

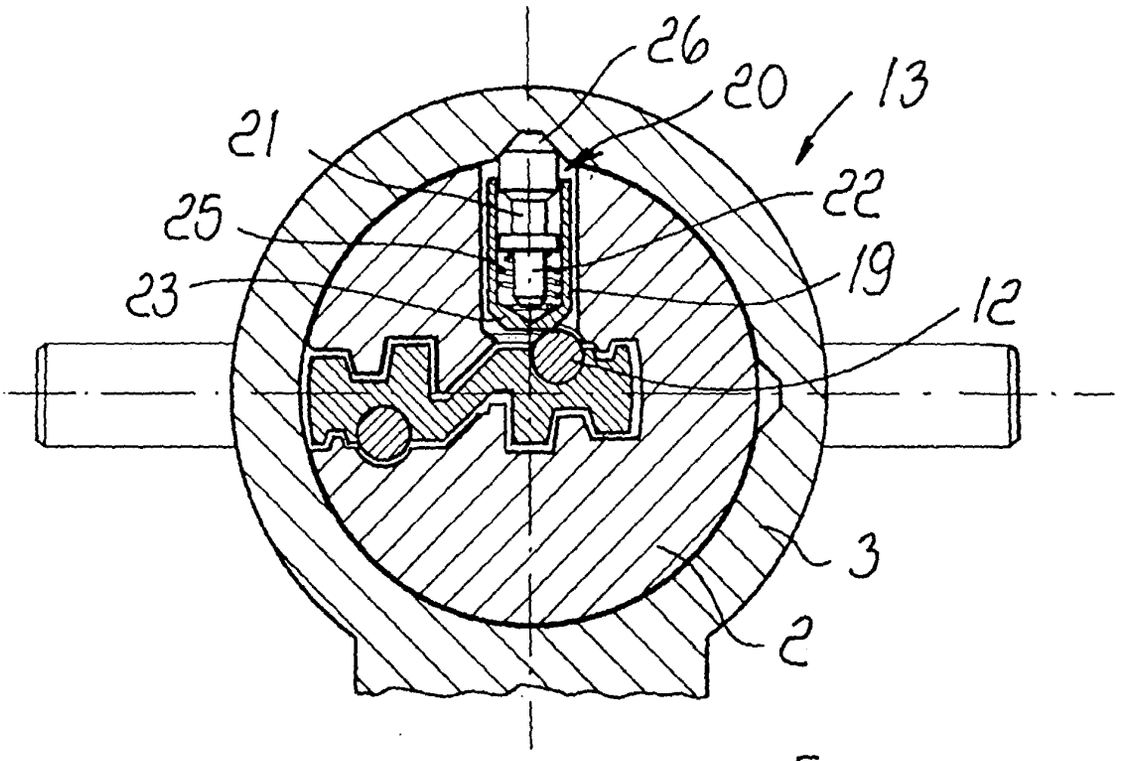

FIG. 5

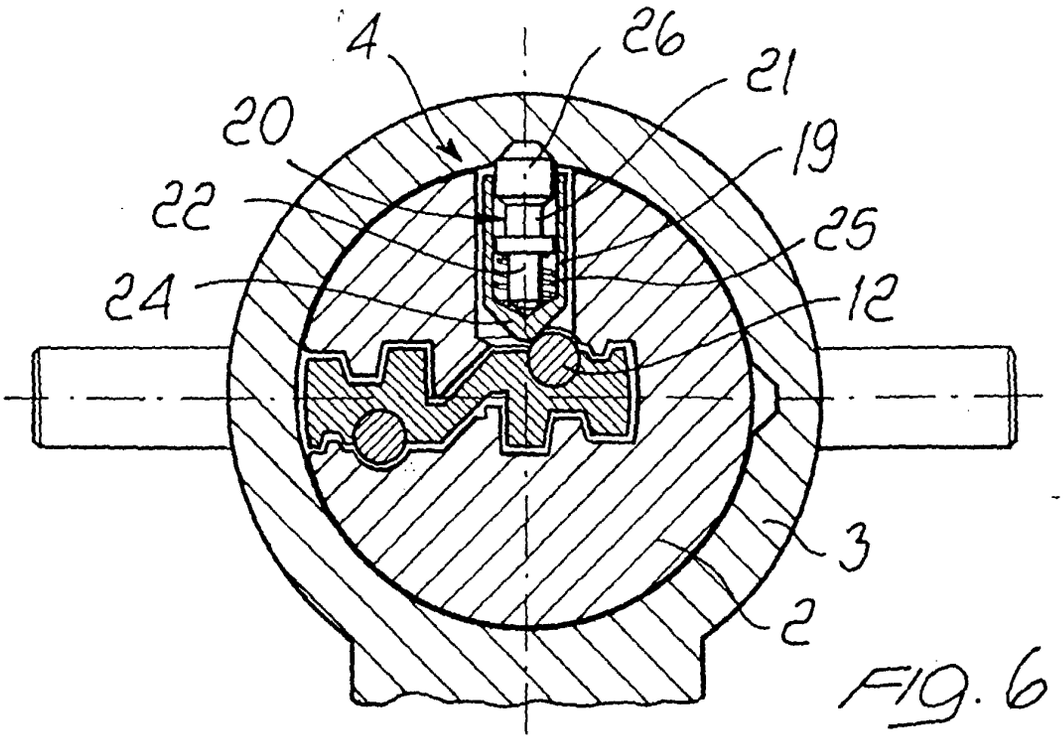

FIG. 6

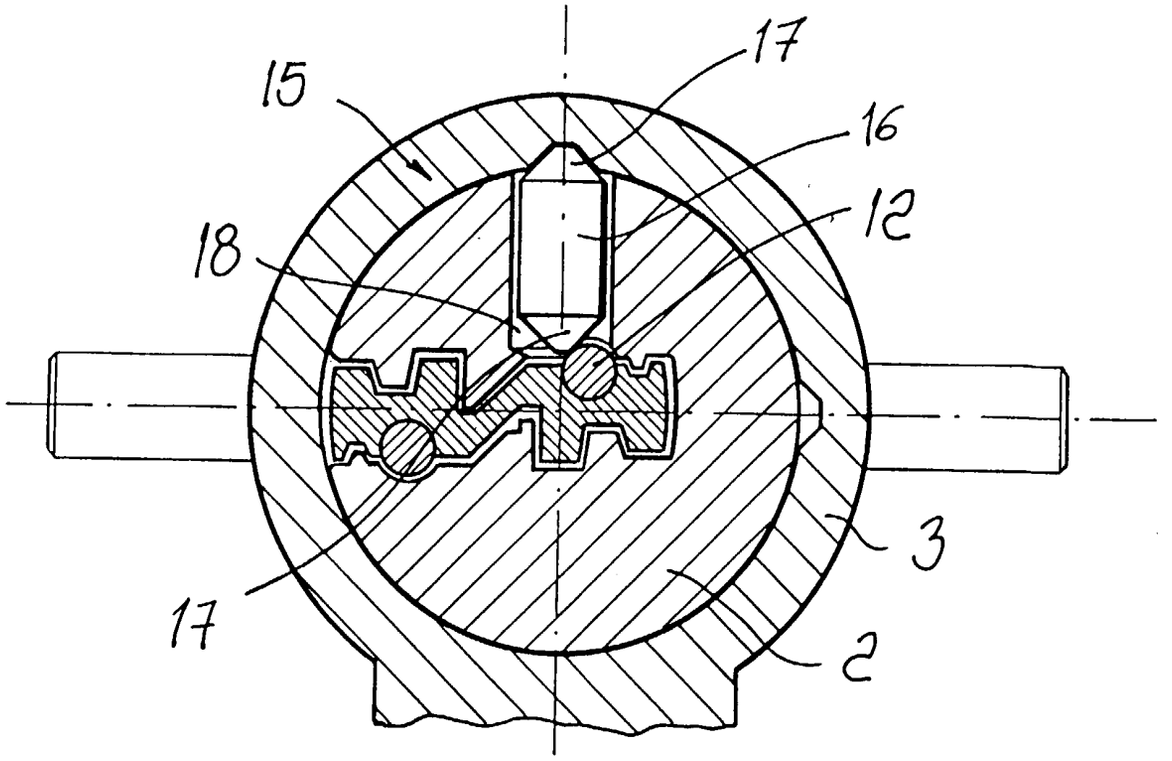

FIG. 7

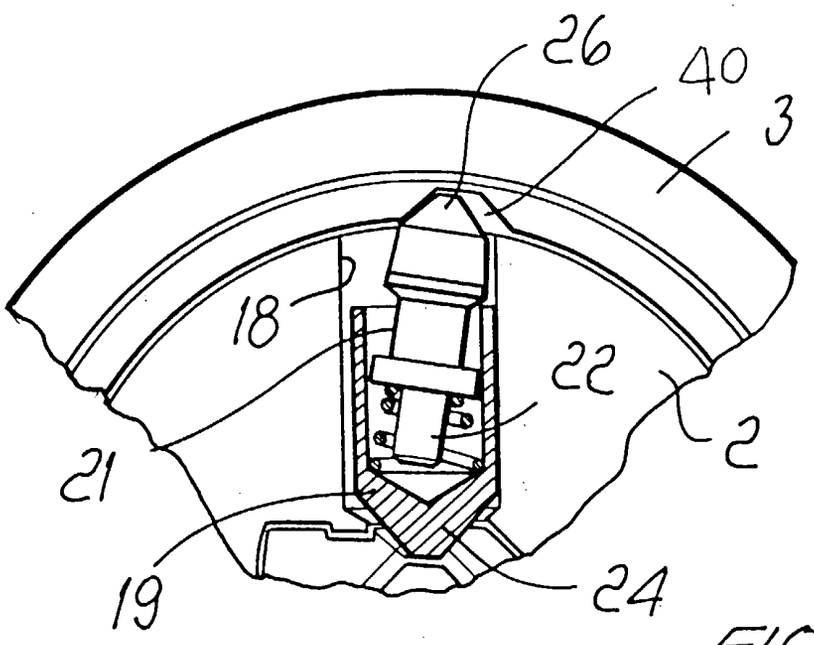

FIG. 8