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(54) **A DUAL CYLINDER LOCK ARRANGEMENT**

(57) A dual lock cylinder arrangement comprising; a housing having a front end and a rear end, said housing being provided with a first cylinder bore (3, 103, 203) and a second cylinder bore (5, 105, 205) each of which cylinder bore exhibits a forwardly open mouth. A single carrier (20, 120, 220) is arranged to engage a follower of a lock mechanism and extends out from the rear end of the housing and is rotatable about a rotational axis which is parallel with the first (3, 103, 203) and second (5, 105,

205)) cylinder bores. A transmission arrangement (10, 110, 210) is received in the housing and arranged to selectively connect a first plug (4a, 104a, 204a) of a first lock cylinder (4, 104, 204) received in the first cylinder bore (3, 103, 203) or a second plug (6a, 206a, 206a) of a second lock cylinder (6, 106, 206) received in the second cylinder bore (5, 105, 205) with the carrier (20, 120, 220).

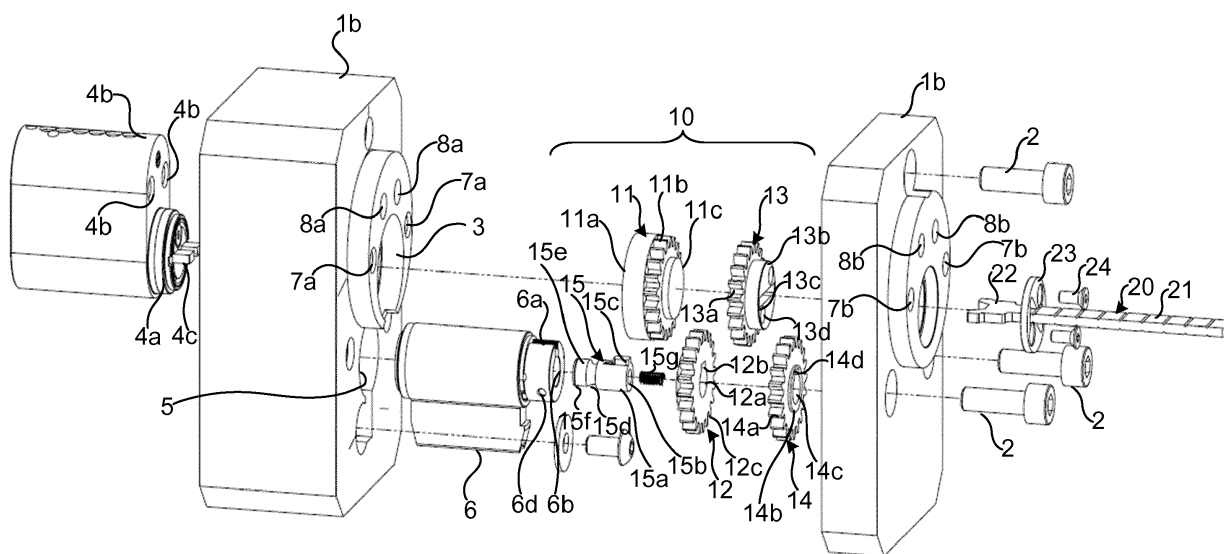


Fig. 1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of lock arrangements and in particular to a dual cylinder lock arrangement.

BACKGROUND

[0002] Dual cylinder lock arrangements are used e.g. at entrance doors to private residences where it is desired that, in addition to persons living in the residence, also service personnel such as home care personnel, paramedics and home delivery personnel should be able to access the residence. Such arrangements typically comprise a first mechanical lock cylinder which is operable by means of the resident's regular key and a second lock cylinder which is operable by a mechanical or electromechanical service key held by such service personnel. Both lock cylinders are connected to the lock casing of the door such that the door may be unlocked by using either the regular key or the service key. At some applications the first and/or the second lock cylinders may be an electromechanical lock cylinder.

[0003] US 2017/0321450 A1 discloses such a dual cylinder lock arrangement which comprises a housing having a mechanical plug received in a first cylinder bore and an electronic plug received in a second cylinder bore. The electric plug is directly connected to a first rotatable cam which is configured to actuate a latch/lock mechanism of a door. The mechanical plug is connected to a second rotatable cam, by means of a drive gear arrangement. The second cam is arranged axially aligned with the first cam and is also configured to actuate the latch/lock mechanism of the door. By this means the first and second cams may be independently maneuvered by the electric plug and the mechanical plug respectively.

[0004] EP 2 927 399 A1 discloses another dual lock cylinder arrangement which comprises a cylinder housing which receives a first and a second lock cylinder arranged in parallel. The first lock cylinder has a first plug which is connected to a driving pin intended to be connected to a lock mechanism for operating a bolt of the lock mechanism. The first lock cylinder is axially displaceable relative to the housing. The driving pin may be rotated by rotating the plug when the first lock cylinder is axially inserted in the housing. When the first lock cylinder has been axially retracted out from the housing, the driving pin may be rotated by rotating the entire first lock cylinder together with the first plug. The second lock cylinder comprises a second plug which is connected to a blocking member which, by rotation of the second plug, selectively allows and prevents axial retraction of the first cylinder lock from the housing.

SUMMARY

[0005] One objective of the present disclosure is to provide an enhanced dual cylinder lock arrangement.

5 [0006] Another object is to provide such a lock arrangement which readily may be retrofitted to existing mortise lock casings.

[0007] A further objective is to provide such a lock arrangement at which an existing lock cylinder already in use at a door may be used as one of the lock cylinders of the lock arrangement.

[0008] Another object is to provide such a lock arrangement which is easy to use.

10 [0009] Yet another objective is to provide such an arrangement which is reliable in use.

[0010] Still another objective is to provide such an arrangement which exhibits a high degree of security.

[0011] Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the element, apparatus, component, means, step, etc." are to be interpreted openly as referring to at least one instance of the element, apparatus, component, means, step, etc., unless explicitly stated otherwise. The steps of any method disclosed herein do not have to be performed in the exact order disclosed, unless explicitly stated.

20 According to a first aspect, the present disclosure makes available a dual lock cylinder arrangement comprising; a housing having a front end and a rear end, said housing being provided with a first cylinder bore and a second cylinder bore, each of which cylinder bore exhibits a forwardly open mouth. A single carrier extends out from the rear end of the housing and is rotatable about a rotational axis which is parallel with the first and second cylinder bores. A transmission is received in the housing and arranged to selectively connect a first plug of a first lock cylinder received in the first cylinder bore or a second plug of a second lock cylinder received in the second cylinder bore with the carrier.

30 [0012] Since the first and second cylinder plugs may be selectively connected to one and the same, single carrier which is arranged to engage a follower of a lock mechanism, the dual lock cylinder arrangement may readily be retrofitted to conventional Scandinavian mortise lock casings having a cylinder follower with a central recess or hole for receiving the tail piece of a conventional lock cylinder. When retrofitting the lock arrangement to such a conventional mortise lock casing, the existing outside lock cylinder is dismantled from the lock casing and may then be used as one of the lock cylinders by fixation in one of the housing's cylinder bores. By this means, the residents of the apartment or the house may keep their original keys while still being able to access the residence by means of the re-used lock cylinder. The second cylinder bore may be provided with a mechanical or an electromechanical second lock cylinder. The second lock cylinder may either be mounted during manufacturing of

the lock arrangement or during installation of the lock arrangement. Service personnel and other persons who should have access to the residence may then be provided with a mechanical or electromechanical master key, by which they are able to operate a plurality of dual cylinder lock arrangements by means of the respective second lock cylinder. Since each cylinder bore exhibits a forwardly open mouth, the first and second cylinders may readily be operated from the outside by means of a mechanical or electromechanical key, an RFID tag or any other authorised device for operating the respective lock cylinder.

[0013] The transmission may comprise a first rotatable drive connectable with the first plug, a second rotatable drive connectable with the second plug and connected to the first rotatable drive, a third rotatable drive connected to the carrier and a fourth rotatable drive which is connected to the third rotatable drive and selectively connectable with the second rotatable drive.

[0014] The fourth rotatable drive may be selectively connectable to the second rotatable drive by means of a displaceable clutch member.

[0015] The displaceable clutch member may be arranged to be axially displaced between a first position at which it operatively engages both the second and the fourth rotatable drive and a second position at which it does not operatively engage the second rotatable drive.

[0016] The clutch member may be biased towards the front end of the housing.

[0017] The clutch member may be arranged to be axially displaced by being contacted by the second plug or by a key inserted in the second plug.

[0018] The clutch member may alternatively or in combination be arranged to be axially displaced by rotation of the second plug.

[0019] The first rotatable drive and the second rotatable drive and/or the third rotatable drive and the fourth rotatable drive (14, 114) may be provided with pairwise cooperating gears.

[0020] The first rotatable drive may mesh with the second rotatable drive and/or the third rotatable drive may mesh with the fourth rotatable drive.

[0021] The first rotatable drive may be connected to the second rotatable drive via an intermediate gear and/or the third rotatable drive may be connected to the fourth rotatable drive via an intermediate gear.

[0022] Alternatively or in combination, the first rotatable drive may be connected to the second rotatable drive by means of a first belt and/or the third rotatable drive may be connected to the fourth rotatable drive by means of a second belt.

[0023] The dual cylinder lock arrangement may comprise a mechanical or electromechanical second cylinder which is received in the second cylinder bore.

[0024] A mechanical or electromechanical first cylinder may be received in the first cylinder bore.

[0025] The housing may preferably comprise means for being retrofitted to a lock case.

[0026] the first cylinder bore (3, 103, 2103) extends in parallel with the second cylinder bore (5, 105, 205).

[0027] Further objectives and advantages will be apparent from the following detailed description of exemplifying embodiments and from the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] Aspects and embodiments are now described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is an exploded perspective view of a dual lock cylinder arrangement according to a first embodiment.

Fig. 2a is a longitudinal section through the lock arrangement shown in fig. 1, when assembled and being operated by the first lock cylinder. Fig. 2b shows a detail thereof in enlarged scale.

Fig. 3a is a longitudinal section corresponding to fig. 2a illustrating the arrangement when being operated by the second lock cylinder. Fig. 3b shows a detail thereof in enlarged scale.

Fig. 4a is a cross section through a dual cylinder lock arrangement according to a second embodiment. Fig. 4b shows a detail thereof in enlarged scale.

Fig. 5a is a longitudinal section through the lock arrangement shown in fig. 4a. Fig. 5b shows a detail thereof in enlarged scale.

Fig. 6a is a cross section corresponding to fig. 4a illustrating the lock arrangement being operated by the second lock cylinder. Fig. 6b shows a detail thereof in enlarged scale.

Fig. 7a is a longitudinal section through the lock arrangement shown in fig. 6a. Fig. 7b shows a detail thereof in enlarged scale.

Fig. 8 is an exploded perspective view of a dual cylinder lock arrangement according to a third embodiment.

DETAILED DESCRIPTION

[0029] The aspects of the present disclosure will now be described more fully hereinafter with reference to the accompanying drawings, in which certain embodiments of the invention are shown.

[0030] These aspects may, however, be embodied in many different forms and should not be construed as limiting; rather, these embodiments are provided by way of example so that this disclosure will be thorough and complete, and to fully convey the scope of all aspects of

invention to those skilled in the art. Like numbers refer to like elements throughout the description.

[0031] Figs. 1 - 3b illustrate a dual cylinder lock arrangement according to a first embodiment. The lock arrangement comprises a housing 1 comprising a front housing part 1a and a rear housing part 1b which are joined by means of a number of bolts 2 inserted from the rear housing part 1b. The housing further comprises means for retrofitting the lock arrangement to a lock casing (not shown). In the shown example these means comprise rearwardly facing treaded holes 7a arranged in the front housing part 1a and corresponding through holes 7b arranged in the rear housing part 1b. The housing may thus be mounted to a lock casing (not shown) by means of mounting bolts (not shown) which are inserted through the lock casing and the rear housing part 1b and threadedly engaged with the front housing part 1a.

[0032] The front housing part 1a exhibits a first cylinder bore 3, which is configured to receive a first lock cylinder 4. In the shown example the first lock cylinder 4 is a Scandinavian oval type of pin tumbler lock cylinder. The front housing part also comprises a second cylinder bore 5 which is configured to receive a second lock cylinder 6. In the shown example, the second lock cylinder 6 is a knob cylinder. Normally, the dual cylinder lock arrangement is sold and delivered with the second lock cylinder 6 mounted but without any first lock cylinder 4 mounted or annexed. The intention being that an existing lock cylinder mounted to the lock casing of a door should be used as the first lock cylinder 4 when the dual cylinder lock arrangement is retrofitted to the door. For this purpose, the front 1a and rear 1b housing parts exhibit fixation holes 8a, 8b. The first lock cylinder 4 may be fixed to the housing by means of fixation bolts (not shown) which are inserted through the rear 1b and front 1a housing part and threadedly engaged with rearwardly facing fixation holes 4b of the first lock cylinder 4.

[0033] The first lock cylinder 4 comprises first lock cylinder tail piece 4c which is fixed to a first rotatable plug 4a. The second lock cylinder 6 comprises a second rotatable plug 6a.

[0034] The dual cylinder lock arrangement further comprises a transmission arrangement 10, which is received in an internal space of the housing. The transmission arrangement 10 comprises a first rotatable drive 11 which is connected to the first cylinder tail piece 4c, when the first cylinder 4 has been mounted to the housing. The first rotatable drive 11 comprises a cylindrical front portion 11a and a circumferentially toothed rear portion 11b, the outer diameter of which is somewhat smaller than the diameter of the front portion 11a. The first rotatable drive 11 is received in a cylindrical rear portion of the first cylinder bore 3, such that the cylindrical front portion 11a is journally received in the rear portion of the first cylinder bore 3. The first rotatable drive 11 further exhibits an internal cylindrical recess (not shown) which receives a cylindrical portion of the first lock cylinder tail piece 4c. A cylindrical protrusion 11c with reduced diameter ex-

tends rearwardly from the rear end of the first rotatable drive 11. An internal rectangular slit (not shown) is arranged as a rearward extension of the internal cylindrical recess. The first lock cylinder tail piece 4c comprises a two axially and rearwardly protruding blades which are received in the rectangular slit. By this means the first rotatable drive 11 is connected to the first cylinder tails piece 4c such that the rotate together when the plug 4a of the first cylinder is rotated by means of an inserted first key 4'.

[0035] The transmission arrangement 10 further comprises a second rotatable drive 12 which is axially aligned with the second plug 6a. The second rotatable drive 12 forms a toothed gear having external teeth 12c and a central generally cylindrical through penetrating bore 12a. The bore 12a exhibits an axially extending radial groove 12b having a rectangular cross section. The second rotatable drive 12 meshes with the toothed rear portion 11b of the first rotatable drive 11.

[0036] The transmission arrangement also comprises a third rotatable drive 13 which is axially aligned with the first rotatable drive 11. The third rotatable drive 13 exhibits a circumferentially toothed front portion 13a and a rearwardly protruding cylindrical rear portion 13b having a smaller diameter than the front portion 13a. It further exhibits an internal cylindrical bore (not shown) which journally receives the cylindrical protrusion 11c of the first rotatable drive 11. The first 11 and third 13 rotatable drives may thus rotate relative to each other. The rear end wall of the third rotatable drive 13 exhibits a rectangular slot 13c and two threaded fixation holes 13d. The cylindrical rear portion is journally received in a cylindrical opening in the rear part 1b of the housing.

[0037] The transmission arrangement further comprises a fourth rotatable drive 14 which comprises a circumferentially toothed front portion 14a and a rearwardly protruding cylindrical ring 14b which is journally received in a cylindrical recess 9 of the rear part 1b of the housing. The fourth rotatable drive 14 is axially aligned with the second rotatable drive 12 and these two drives 12, 14 are arranged to rotate relative each other. The fourth rotatable drive has a central generally cylindrical through penetrating bore 14c. The bore 14c exhibits an axially extending radial groove 14d having a rectangular cross section. The fourth rotatable drive 14 meshes with the toothed front portion 13a of the third rotatable drive 13.

[0038] The transmission arrangement also comprises an axially displaceable clutch member 15. The clutch member 15 is arranged to selectively connect and disconnect the second 12 and fourth 14 rotatable drives with and from each other. The clutch member comprises a cylindrical rear portion 15a having a central rearwardly facing recess 15b and a radially protruding flange 15c. The flange 15c has essentially the same cross sectional dimensions as the radial grooves 12b, 14d of the second 12 and fourth 14 rotatable drives and extends from the rear end of the cylindrical portion 15a. The axial length of the flange 15c is about equal to the axial length of the

fourth rotatable drive's axial groove 14d. The clutch member 15 further comprises an intermediate waist portion 15 with reduced diameter and a semi cylindrical front portion 15e exhibiting cut out forming a flattened segment 15f. The diameters of the rear 15a and front 15e portions are equal to each other and to the inner diameter of a cylindrical opening 6b at the rear end of the second plug 6a. The cylindrical opening 6b extends axially from the rear end of the second plug 6a to a keyway 6c of the second plug 6a. In proximity to the rear end of the second plug 6a, the second plug exhibits a radial bore 6d which extends from the outer envelope surface to the opening 6b. A cylindrical pin 6e is inserted in the bore 6d such that it intersects the cylindrical opening 6b. A compression spring 15g is received in the recess 15b and supported by the rear part 1b of the housing for biasing the clutch member 15 in the forward direction.

[0039] The dual cylinder lock arrangement further comprises a single carrier 20 which is fixed to the third rotatable drive 13. The carrier comprises a plate formed rod 21 which is arranged to be received in a central opening (not shown) of a manoeuvring follower of a mortise lock casing (not shown). The rod 21 extends in parallel and coaxially with the first plug 4a and exhibits a number of axially spaced indentions, for cutting the rod to a suitable length depending on the thickness of the door in which the mortise lock casing is mounted. At its front end, the carrier 20 is provided with a two-legged engagement plate 22 which is received in the rectangular slit 13c of the third rotatable drive 13. A mounting collar 23 exhibiting bolt holes extends radially from the rod 21 a short distance from the plate 22. The carrier 20 is fixed to the third rotatable drive 13 by means of bolts 24 extending through the bolt holes and being threadably engaged with the fixation holes 13d of the third rotatable drive 13. The carrier 20 is thus rotatable together with the third rotatable drive for manoeuvring the follower and the lock mechanism of the lock casing (not shown).

[0040] The functioning of the dual cylinder lock arrangement shown in figs. 1 - 3b will now be described. Figs. 2a-b illustrates how the arrangement functions during operation by means of the first lock cylinder 4. At this operation no key is inserted in the second cylinder 6. For this reason, the clutch member 15 is axially biased to a first forward position shown in fig 2a-b, by means of the compression spring 15g. In this position the engagement flange 15c simultaneously engages the radial groove 12b, 14d of both the second 12 and the fourth 14 rotatable drives. Further the pin 6e is received in the circumferential waist portion 15d of the clutch member such that the clutch member 15 may freely rotate relative to the second plug 6a.

[0041] A correct first key 4' is inserted into the keyway (not shown) of the first plug. In a traditional manner, the key blade interacts with the pin tumblers of the first lock cylinder 4 thereby to release the first plug to rotate within the first cylinder. Rotating the first plug causes rotation of the first cylinder's tail piece 4a and thereby of the first

rotatable drive 11. Since the first rotatable drive 11 meshes with the second rotatable drive 12, also the second rotatable drive then rotates. Since the engagement flange 15c engages both radial grooves 12b, 14d of the second and fourth rotatable drives, these rotatable drives 12, 14 will rotate together with the clutch member 15 as one single piece. Further, since the fourth rotatable drive 14 meshes with the third rotatable drive 13, also the third rotatable drive and the carrier 20 fixed thereto will be caused to rotate. By this means rotation of the first plug 4a will cause the carrier 20 to rotate, thereby allowing manoeuvring of the lock case's follower and lock mechanism (not shown).

[0042] In figs 3a-b it is illustrated how the dual cylinder lock arrangement functions when operated by the second cylinder 6. At full insertion of a second key 6' into the keyway 6c of the second plug 6a, the tip of the key 6' will contact the front end of the clutch member 15 and axially push the clutch member 15, against the force of the biasing spring 15g, to a second, rear position shown in figs. 3a-b. At this position the flange 15c is disengaged from the radial groove 12b of the second rotatable drive 12. However, the flange 15c is still in engagement with the radial groove 14d of the fourth rotatable drive 14. Additionally at this second rear position the pin 6e engages the flattened segment 15f of the clutch member's front portion 15e. By this means the clutch member 15 is prevented from rotating relative to the second plug 6a. When the second key 6' is rotated, the clutch member 15 will thus rotate together with the second plug 6a. This rotation of the clutch member 15 causes rotation of the fourth rotatable drive 14 and since the fourth rotatable drive meshes with the third rotatable drive 13, also the third rotatable drive 13 and the carrier 20 fixed thereto will rotate correspondingly. However, at such operation by means of the second cylinder 6, neither the second 12 nor the first 11 rotatable drive will rotate since the flange 15 of the clutch member has been disengaged from the radial groove 12b of the second rotatable drive 12.

[0043] At the embodiment shown above, rotation of the first plug 4a in one direction will cause the carrier 20 to rotate in a first direction, whereas rotation of the second plug 6a in the same direction as the first plug will cause an opposite rotational direction of the carrier. This may be experienced as counter intuitive. For avoiding this, an intermediate gear (not shown) may be arranged between the first and second rotational drives or between the third and fourth rotational drives.

[0044] At a not shown alternative to the embodiment shown in figs 1-3b, the clutch member may be arranged to be axially displaced to the second rear position by being contacted and pushed by an axially displaceable second plug, rather than by the second key. Such an alternative may be particularly advantageous in cases where the second lock cylinder is an electromechanical cylinder having an axially displaceable plug without any keyway.

[0045] Figs. 4a - 7b illustrate a second embodiment of the dual cylinder lock arrangement at which axial dis-

placement of the clutch member 115 is effected by initial rotation of the second plug 106a instead of by insertion of a second key 6' into the keyway 6c of the second plug 6a, as described above.

[0046] At this embodiment the dual lock cylinder arrangement comprises basically the same components as at the embodiment described above. Thus, it comprises a housing comprising a first front 101a and a second rear 101b housing part. The first housing part 101a exhibits a first cylinder bore 103 for receiving a first lock cylinder 104, which in this case a Scandinavian cylindrical type of lock cylinder and a second cylinder bore 105 for receiving a second lock cylinder 106. As in the previous example both these lock cylinders are conventional mechanical lock cylinders. However, either or both cylinders may alternatively be an electromechanical lock cylinders.

[0047] The dual lock cylinder arrangement further comprises a transmission arrangement 110 arranged to selectively connect a first plug 104a of the first lock cylinder 104 or a second plug 106a of the second lock cylinder 106 with a single carrier 120. The transmission arrangement 110 comprises a first rotatable drive 111 which is connected to the first plug 104a and which meshes with a second rotatable drive 112. A third rotatable drive 113 is arranged axially aligned with and rotatable relative to the first rotatable drive 111. A fourth rotatable drive 114 meshes with the third rotatable drive 113 and is axially aligned with the second rotatable drive 112. The second 112 and the third 113 rotatable drives each exhibits a central bore 112a, 114c with a respective radial groove 112b, 114d. An axially displaceable clutch member 115 is arranged to selectively connect and disconnect the second 112 and fourth 114 rotatable drives with and from each other. The clutch member 115 comprises a rear cylindrical portion 115a with central rearwardly facing recess 115b and a radially protruding flange 115c. A compression spring 115g is received in the recess and biases the clutch member 115 in the forward direction, i.e. towards the second plug 106a.

[0048] The clutch member 115 differs from the clutch member 15 described above in that the waist portion 15d and the flattened segment 15f are replaced by a forwardly tapering chamfered segment 115f. The chamfered segment 115f is arranged diametrically opposite to the flange 115c at the front end of the cylindrical portion 115a.

[0049] The transmission further comprises a ring member 116 which encircles a rear portion of the second plug 106a. The ring member 116 has a generally ring-shaped cross section with a cylindrical inner envelope surface. At a lower segment, the inner envelope surface exhibits a radially outwardly extending recess 116a. The cross section of the recess 116a is preferably generally V-shaped such that the opposing walls tapers in the radially outward direction towards the bottom of the recess 116a.

[0050] The transmission arrangement also comprises a radially displaceable peg 117 having a cylindrical body and a conical tip. The peg is received in a radial cylindrical

through hole 106a' arranged in proximity to the rear end of the second plug 106a.

[0051] The functioning of the dual cylinder lock arrangement according to the second embodiment shown in figs 4a-7b will now be described. Figs. 4a-5b illustrates how the arrangement functions during operation by means of the first lock cylinder 104. At this operation no key is inserted in the second cylinder 106 and the second plug 106a is in its rotational rest position shown in fig. 4b. At this position the peg 117 is aligned with the recess 116a, such that the conical tip of the peg 116 is received in the recess 116a. By this means the opposite end of the peg does not protrude radially inwardly from the through hole 106a' in the second plug 106a. Thereby the clutch member 115 is not hindered by the peg 117. For this reason, the clutch member 115 is axially biased to a first forward position shown in fig. 5a-b, by means of the compression spring 15g. In this position the engagement flange 115c simultaneously engages the radial groove 112b, 114d of both the second 112 and the fourth 114 rotatable drives.

[0052] A correct first key (not shown) may then be inserted into the keyway (not shown) of the first plug. In a traditional manner the key blade interacts with the pin tumblers of the first lock cylinder 104 thereby to release the first plug to rotate within the first cylinder. Rotating the first plug causes rotation of the first cylinder's tail piece 104a and thereby of the first rotatable drive 111. Since the first rotatable drive 111 meshes with the second rotatable drive 112, also the second rotatable drive then rotates. Since the engagement flange 115c engages both radial grooves 112b, 114d of the second 112 and fourth 114 rotatable drives, these rotatable drives 112, 114 will rotate together with the clutch member 115 as one single piece. Further, since the fourth rotatable drive 114 meshes with the third rotatable drive 113, also the third rotatable drive and the driver 120 fixed thereto will be caused to rotate. By this means rotation of the first plug will cause the driver 120 to rotate, thereby allowing manoeuvring of the lock case's follower and lock mechanism (not shown).

[0053] In figs 6a - 7b it is illustrated how this dual cylinder lock arrangement functions when operated by the second cylinder 106. After insertion of a second key 106' the second plug is released for rotation in a traditional manner. During an initial rotation of the second plug 106a as shown in fig. 6b, the tip of the peg 117 will follow a wall of the recess 116a and thereby the peg 116 is pushed radially inwards such that it protrudes inwardly from the inner mouth of the through hole 106a'. The inner end of the peg 116 then contacts the chamfered segment 115f of the clutch member and pushes the clutch member 115 rearwardly, against the biasing force of the spring 115g to a second, rear position shown in figs. 7a-b. At this position the flange 115c is disengaged from the radial groove 112b of the second rotatable drive 112. However, the flange 115c is still in engagement with the radial groove 114d of the fourth rotatable drive 114. Additionally, at this

second rear position, the contact between the peg 117 and the chamfered segment 115f of the clutch member prevents the clutch member 15 from rotating relative to the second plug 106a. When the second key 106' is rotated further, the clutch member 115 will thus rotate together with the second plug 106a. This rotation of the clutch member 115 causes rotation of the fourth rotatable drive 114 and, since the fourth rotatable drive meshes with the third rotatable drive 113, also the third rotatable drive 113 and the driver 120 fixed thereto will rotate correspondingly. However, at such operation by means of the second cylinder, neither the second 112 nor the first 111 rotatable drive will rotate since the flange 115c of the clutch member 115 has been disengaged from the radial groove 112b of the second rotatable drive.

[0054] The second cylinder 106 in the example shown in figs 4a-7b is a mechanical lock cylinder. However, the principle of displacing the clutch member rearwardly to the second position by means of rotating the second plug may be applied also to other types of second cylinders. For example, this principle may advantageously be applied when the second cylinder is an electromechanical cylinder having a rotational plug but no keyway for insertion of a mechanical key.

[0055] In fig. 8 a third embodiment of the dual cylinder lock arrangement is illustrated. This embodiment differs from the embodiment shown in figs. 1- 3b by the way in which the first and second as well as the third and fourth rotatable drives are mutually connected. Also at this embodiment the dual lock cylinder arrangement comprises a housing having two housing parts 201a, 201b with a first 203 and a second 205 cylinder bore for receiving a respective first 204 and second 206 lock cylinder. The transmission arrangement 210 comprises a first 211, a second 212, a third 213 and a fourth 214 rotatable drive. The first rotatable drive is connected to a tail piece 204c of the first cylinder. The third rotatable drive 313 is axially aligned with and rotatable relative to the first rotatable drive 211. The second 212 and third 213 rotatable drives are arranged interconnectable by means of a clutch member 215 in the same manner as described above with reference to figs. 1-3b.

[0056] However, this embodiment differs from the embodiment shown in figs. 1-3b in that the first 211 and second 212 rotatable drives does not mesh with each other. Instead they are connected for simultaneous rotation by means of a belt 220 which incircles respective outer segments of the first 211 and second 212 rotational drives. Correspondingly, the third 213 and the fourth 214 rotatable drives are connected by means of a belt 230 which encircles respective circumferential segments of the third 213 and fourth 214 rotatable drives. In the shown example the belts 220, 230 are toothed belts and the rotatable drives 211, 212, 213, 214 exhibit corresponding peripheral teeth mating with the toothed belts 220, 230. However, the belts and the rotatable drives need not comprise such teeth and the rotatable drives may alternatively be connected by means of respective smooth or plain,

preferably elastic bands or by means of respective chains.

[0057] By connecting the rotatable drives by means of a belt, rotation of the first and second plug in one direction will result in the same rotational direction of the carrier. Thus, unlocking the lock mechanism is caused by rotation of the first and second plug in mutually the same direction. This is intuitively advantageous and facilitates the use of the dual cylinder lock arrangement.

[0058] The aspects of the present disclosure have mainly been described above with reference to a few embodiments and examples thereof. However, as is readily appreciated by a person skilled in the art, other embodiments than the ones disclosed above are equally possible within the scope of the invention, as defined by the appended patent claims.

[0059] Thus, while various aspects and embodiments have been disclosed herein, other aspects and embodiments will be apparent to those skilled in the art. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

[0060] For example, the first and second cylinder bores may be configured to receive other kinds and types of lock cylinders, such as cylindrical mechanical lock cylinders or electromechanical lock cylinders with or without keyways for insertion of a key.

Claims

1. A dual lock cylinder arrangement comprising;

- a housing having a front end and a rear end, said housing being provided with a first cylinder bore (3, 103, 203) and a second cylinder bore (5, 105, 205) each of which cylinder bore exhibits a forwardly open mouth;
- a single carrier (20, 120, 220) arranged to engage a follower of a lock mechanism and extending out from the rear end of the housing and being rotatable about a rotational axis which is parallel with the first (3, 103, 203) and second (5, 105, 205) cylinder bores;
- a transmission arrangement (10, 110, 210) received in the housing and arranged to selectively connect a first plug (4a, 104a, 204a) of a first lock cylinder (4, 104, 204) received in the first cylinder bore (3, 103, 203) or a second plug (6a, 206a, 206a) of a second lock cylinder (6, 106, 206) received in the second cylinder bore (5, 105, 205) with the carrier (20, 120, 220).

2. A dual lock cylinder arrangement according to claim 1, wherein the transmission arrangement (10, 110, 210) comprises a first rotatable drive (11, 111, 211) connectable with the first plug (4a, 104a, 204a), a

- second rotatable drive (12, 112, 212) connectable with the second plug (6a, 106a, 206a) and connected to the first rotatable drive (11, 111, 211), a third rotatable drive (13, 113, 213) connected to the carrier (20, 120, 220) and a fourth rotatable drive (14, 114, 214) which is connected to the third rotatable drive (13, 113, 213) and selectively connectable with the second rotatable drive (12, 112, 212).
3. A dual lock cylinder arrangement according to claim 2, wherein the fourth rotatable drive (14, 114, 214) is selectively connectable to the second rotatable drive (12, 112, 212) by means of a displaceable clutch member (15, 115, 215). 5
 4. A dual lock cylinder arrangement according to claim 3, wherein the displaceable clutch member (15, 115, 215) is arranged to be axially displaced between a first position at which it operatively engages both the second (12, 112, 212) and the fourth (14, 114, 214) rotatable drive and a second position at which it does not operatively engage the second rotatable drive (12, 112, 212). 10
 5. A dual lock cylinder arrangement according to claim 3 or 4, wherein the clutch member (15, 115, 215) is biased towards the front end of the housing. 15
 6. A dual cylinder lock arrangement according to any of claims 3-5, wherein the clutch member (15, 215) is arranged to be axially displaced by being contacted by the second plug or by a key (6') inserted in the second plug (6a, 206a). 20
 7. A dual cylinder lock arrangement according to any of claims 3-5, wherein the clutch member (115) is arranged to be axially displaced by rotation of the second plug (106a). 25
 8. A dual cylinder lock arrangement according to any of claims 2-7, wherein the first rotatable drive (11, 111) and the second rotatable drive (12, 112) and/or the third rotatable drive (13, 113) and the fourth rotatable drive (14, 114) are provided with pairwise co-operating gears (11b, 12c, 13a, 14a). 30
 9. A dual cylinder lock arrangement according to claim 8, wherein the first rotatable drive (11, 111) meshes with the second rotatable drive (12, 112) and/or the third rotatable drive (13, 113) meshes with the fourth rotatable drive (14, 114). 35
 10. A dual cylinder lock arrangement according to claim 8, wherein the first rotatable drive (11, 111) is connected to the second rotatable drive (12, 112) and/or the third rotatable drive (13, 113) is connected to the fourth rotatable drive (14, 114) via a respective intermediate gear. 40
 11. A dual cylinder lock arrangement according to any of claims 2-10, wherein the first rotatable drive (211) is connected to the second rotatable drive (212) by means of a first belt (220) and/or the third rotatable drive (213) is connected to the fourth rotatable drive (214) by means of a second belt (230). 45
 12. A dual cylinder lock arrangement according to any of claims 1-11, wherein a mechanical or electromechanical second cylinder (6, 106, 206) is received in the second cylinder bore (5, 105, 205). 50
 13. A 1 cylinder lock arrangement according to any of claims 1-12, wherein a mechanical or electromechanical first cylinder (4, 104, 204) is received in the first cylinder bore (3, 103, 203). 55
 14. A dual cylinder lock arrangement according to any of claims 1-13, wherein the housing comprises means (7a, 7b) for being retrofitted to a lock case.
 15. A dual cylinder lock arrangement according to any of claims 1-14, wherein the first cylinder bore (3, 103, 2103) extends in parallel with the second cylinder bore (5, 105, 205).

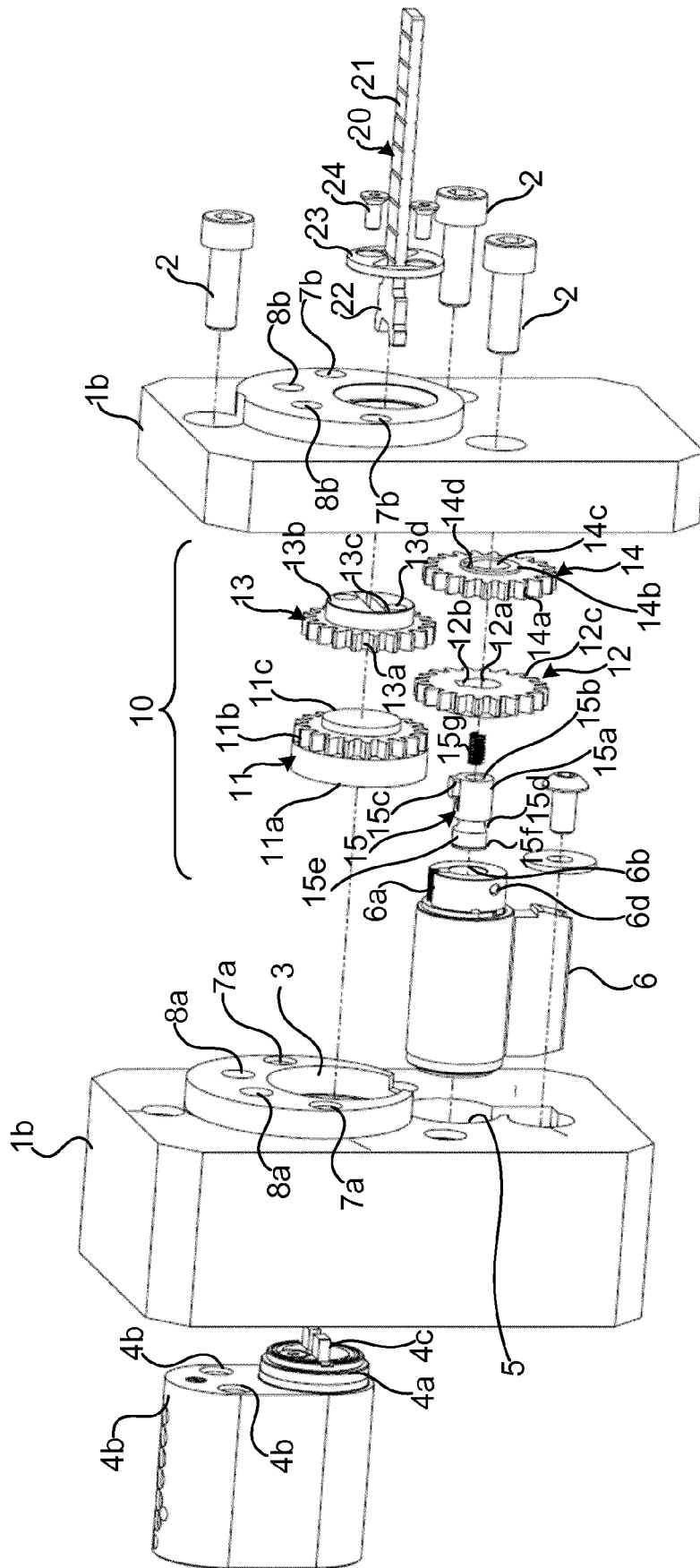


Fig. 1

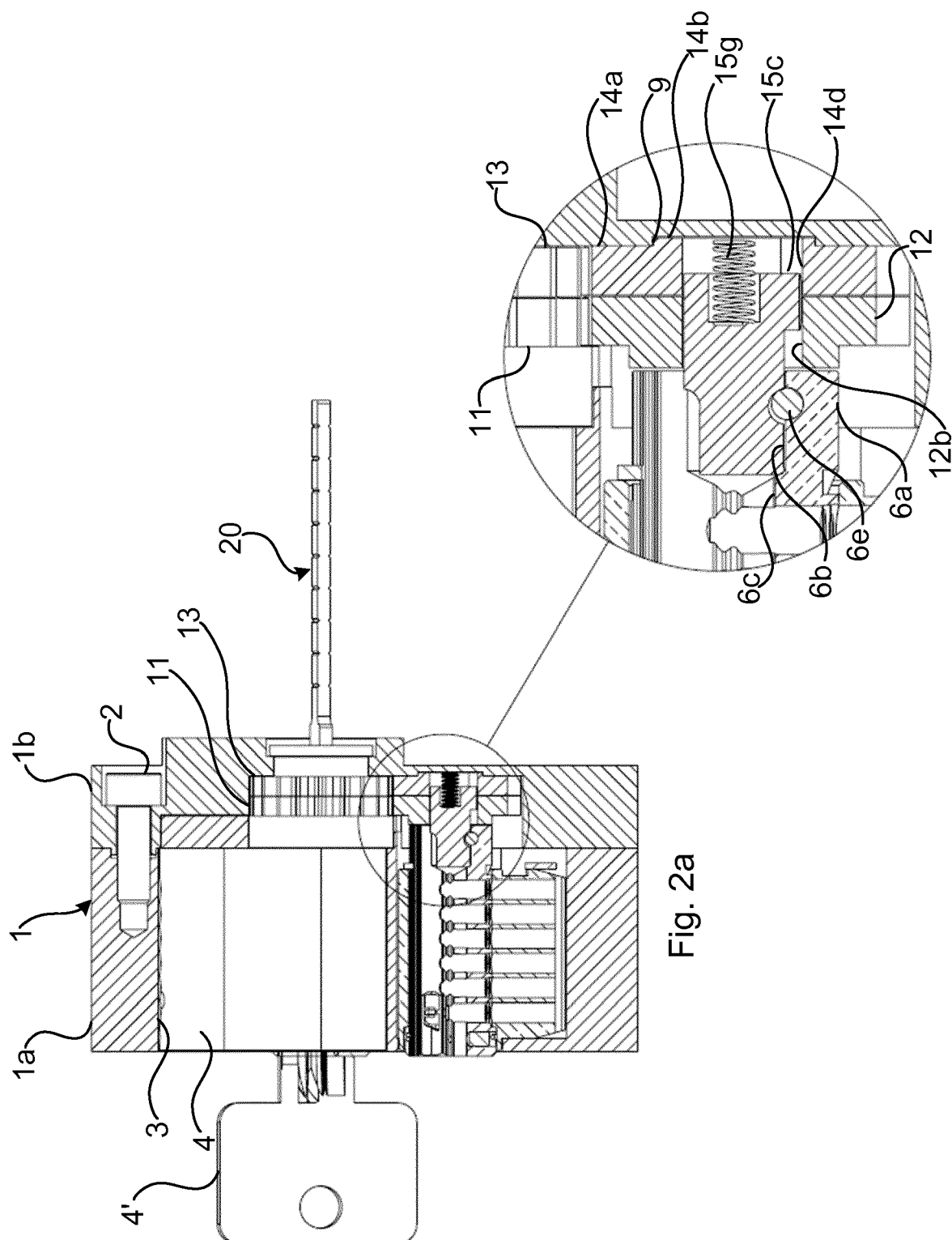


Fig. 2b

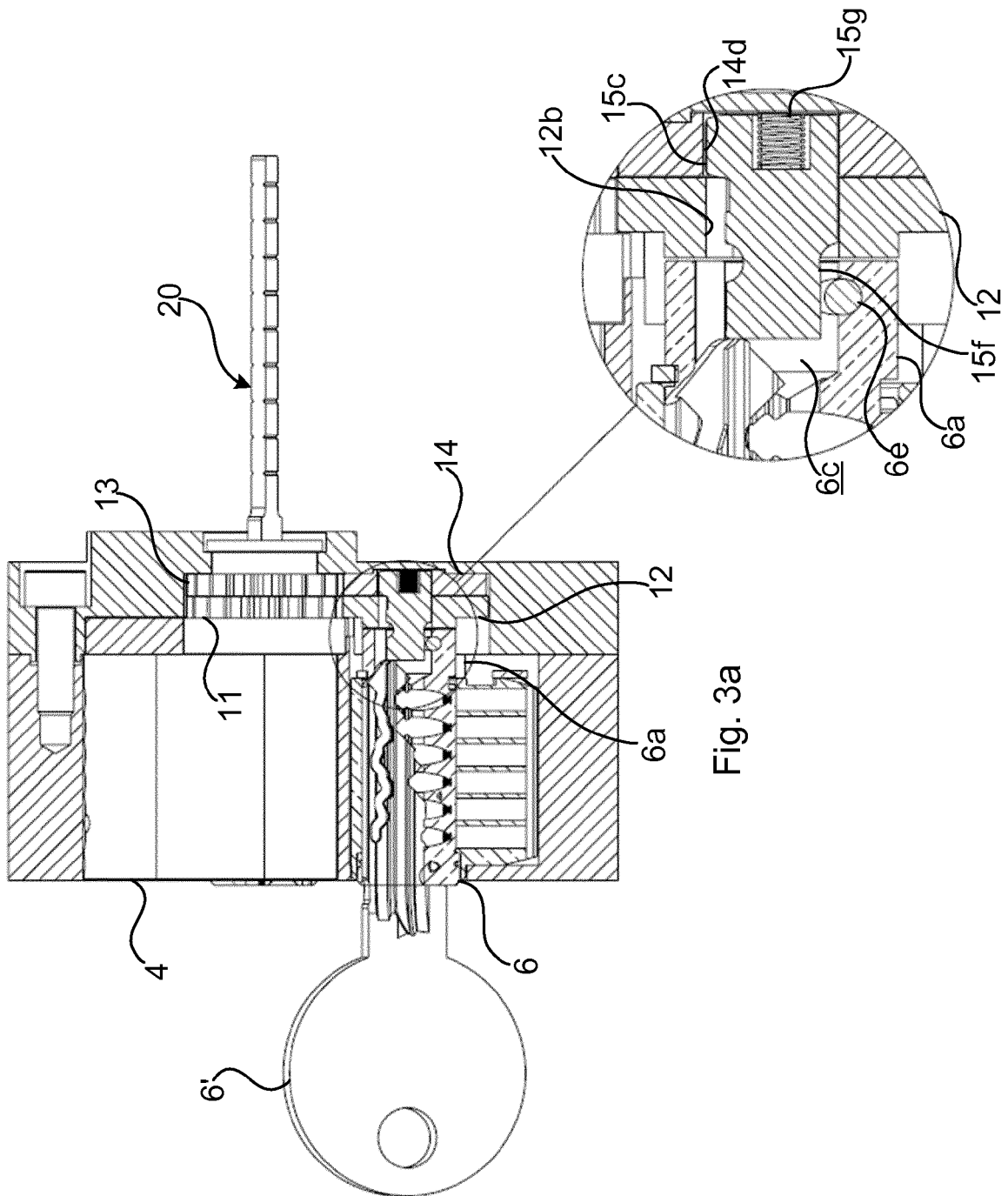


Fig. 3a

Fig. 3b

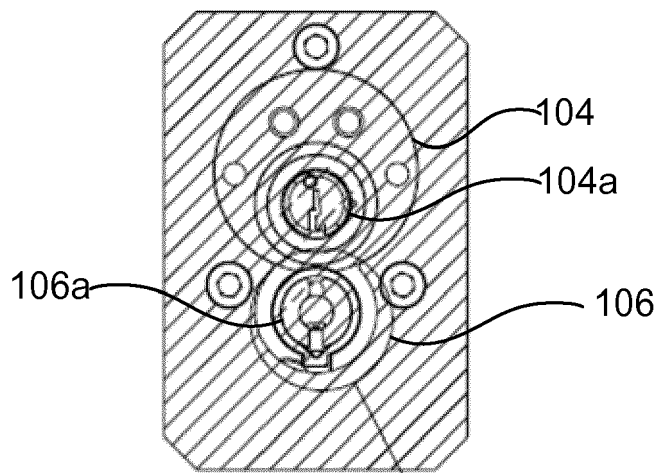


Fig. 4a

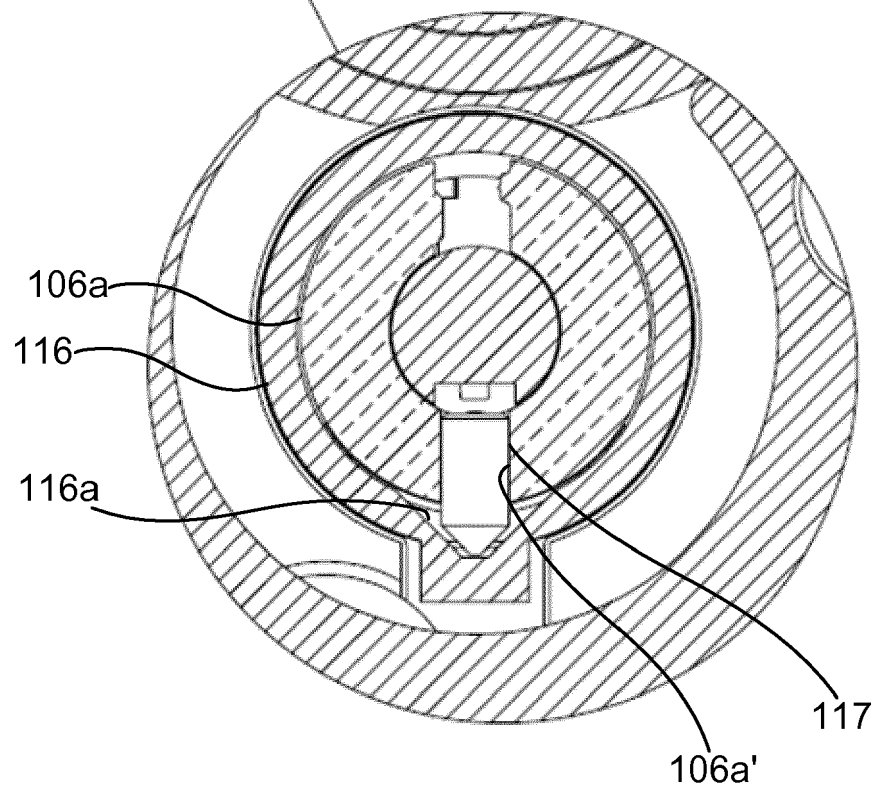
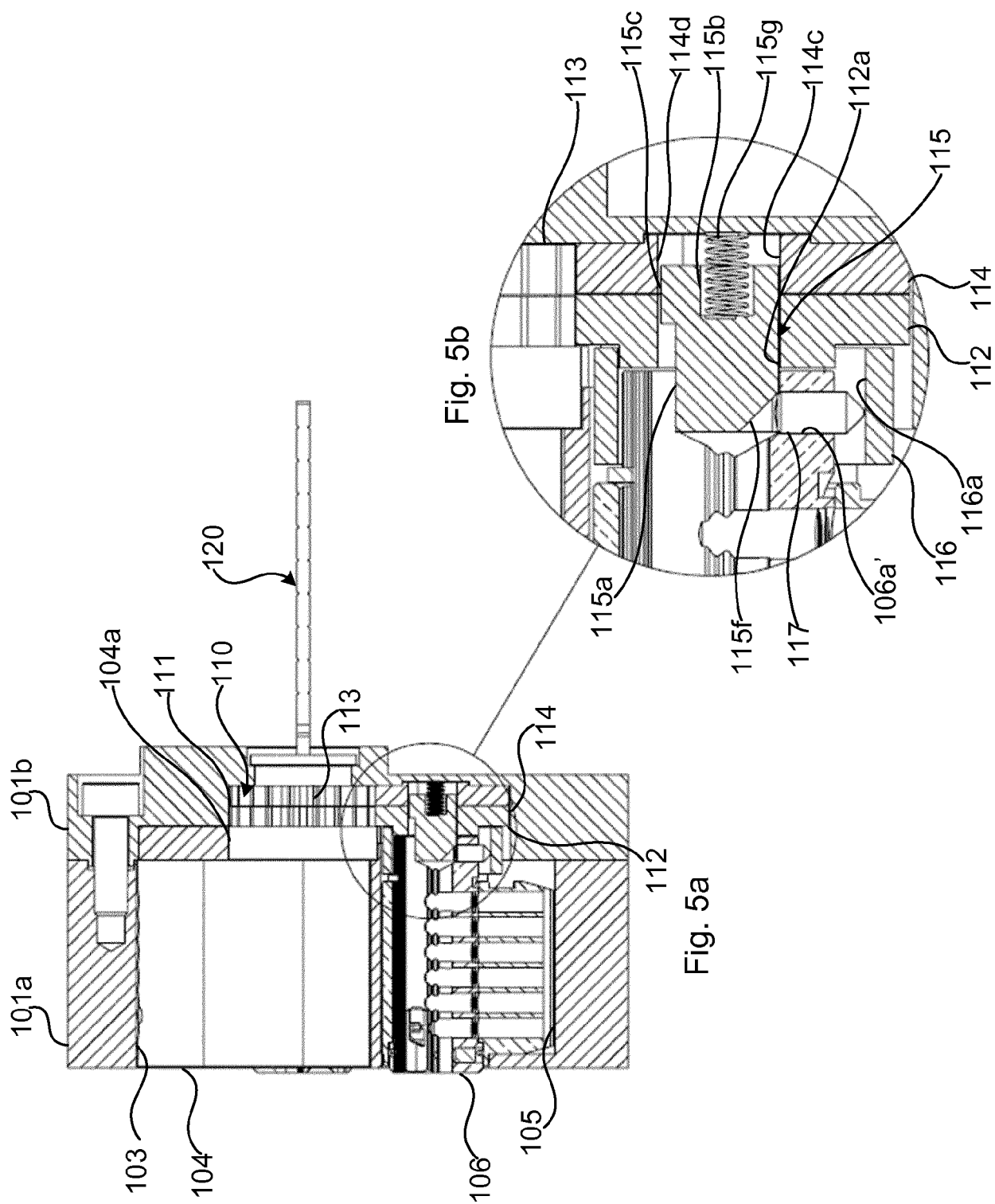


Fig. 4b



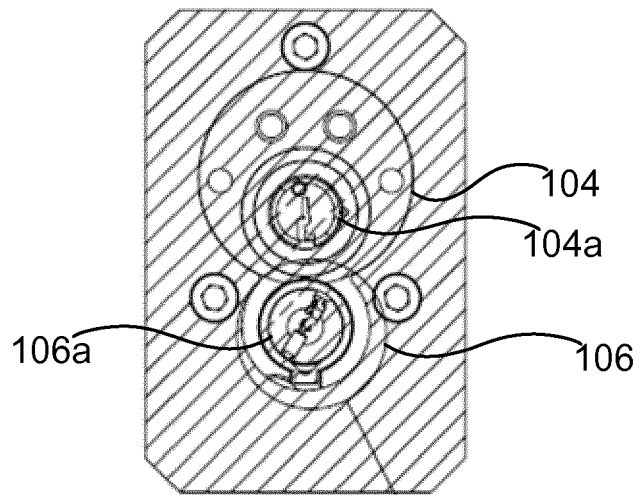


Fig. 6a

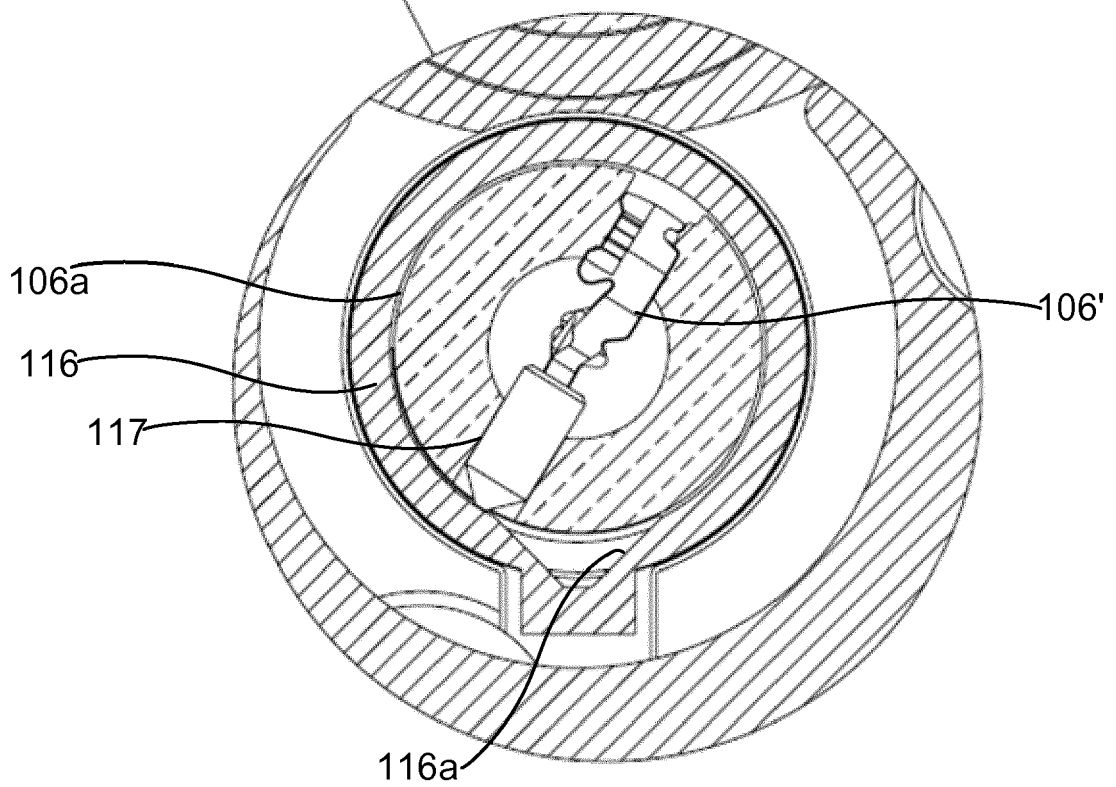
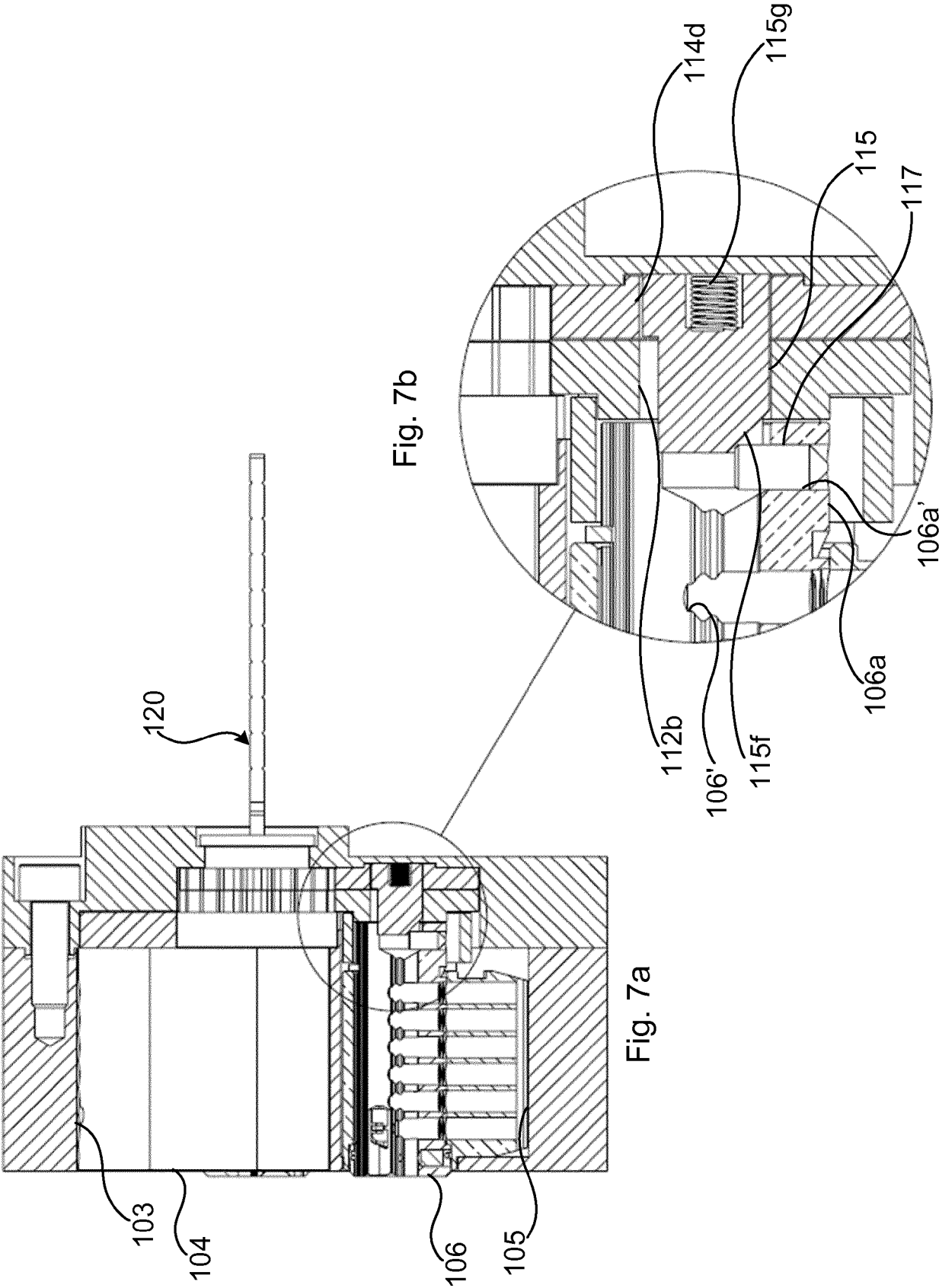


Fig. 6b



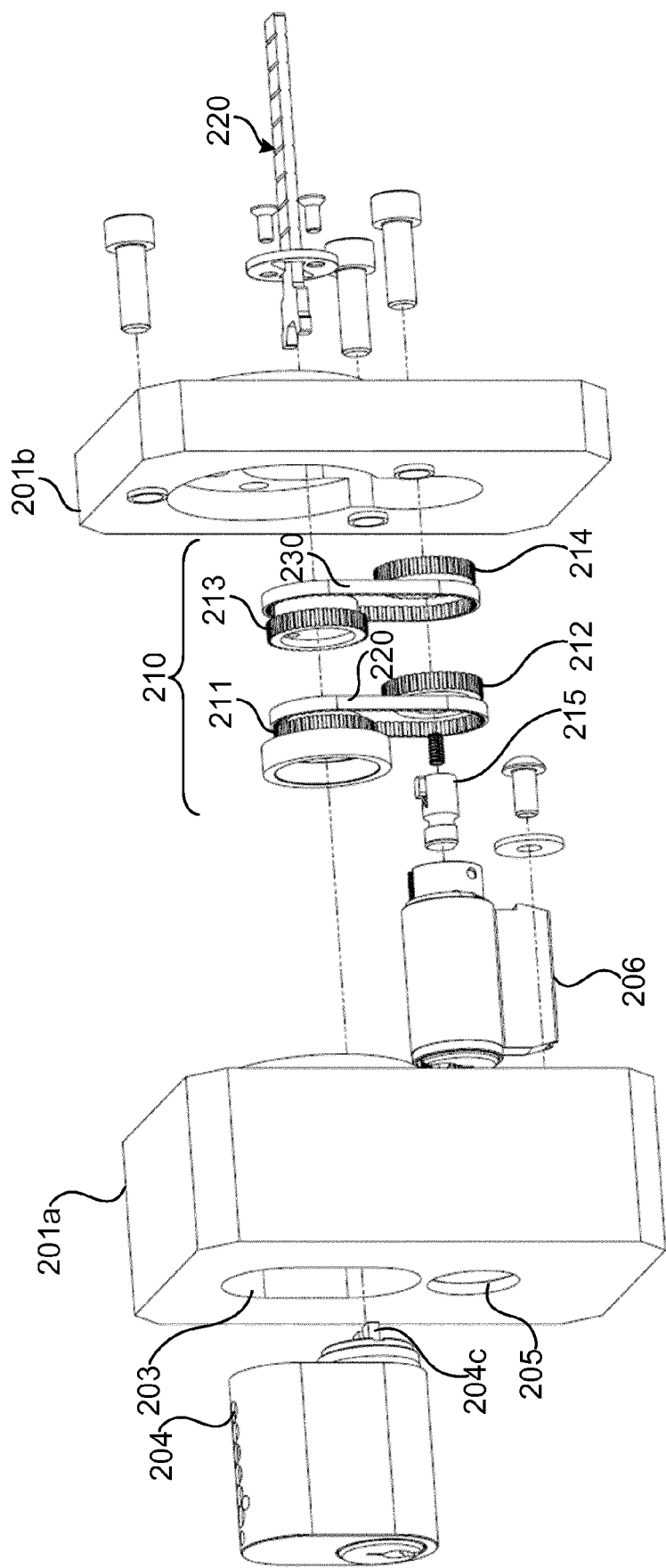


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 19 17 2567

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X	US 4 069 694 A (RAYMOND JAMES W ET AL) 24 January 1978 (1978-01-24) * column 3, line 16 - line 37; figures 1-10 * * column 4, line 20 - line 26 * * column 4, line 55 - line 59 *	1,12-15	ADD. E05B47/06
X	SIMON L: "BUILD ME ONE", LOCKSMITH LEDGER INTERNATIONAL, CYGNUS BUSINESS MEDIA, FORT ATKINSON, WI, US, vol. 62, no. 12, 1 December 2002 (2002-12-01), pages 58-60, XP001228780, ISSN: 1050-2254 * the whole document *	1,12-15	
A,D	US 2017/321450 A1 (TRENT DOUGLAS E [US] ET AL) 9 November 2017 (2017-11-09) * paragraph [0012]; figures 1-9 *	1,12-15	TECHNICAL FIELDS SEARCHED (IPC) E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 October 2019	Examiner Pérez Méndez, José F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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07-10-2019

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