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(54) Title: A LOCK FOR SEVERAL DIFFERENT CYLINDER LOCK TYPES AND A METHOD FOR ASSEMBLY OF THE LOCK

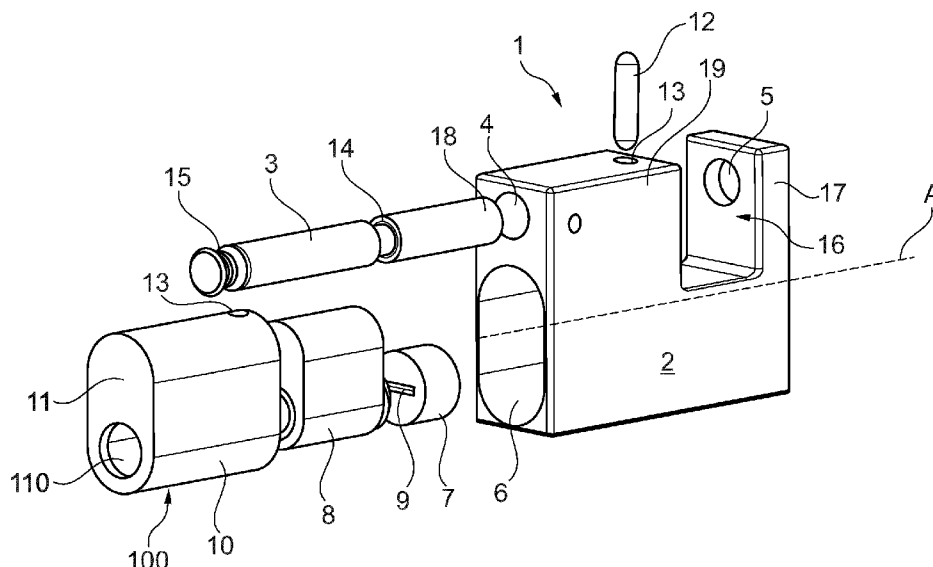


Fig. 1

(57) Abstract: The present invention relates to a lock, wherein the lock is suitable for locking for example a shipping container or other, wherein the lock in principle appears as a padlock or a separate lock for use together with other locking equipment or in direct locking to an object. According to the invention, the object stated above is obtained with a lock/padlock that can adopt a cylinder lock. By means of a skirt and/or a case, the cylinder lock can be of various types (shapes), for instance an eight-cylinder, snowman cylinder, oval cylinder, DIN cylinder (profile cylinder, euro cylinder, drop work), but is not limited to these. The cylinder lock can in other words be of any common type, given that, as mentioned, by means of a skirt or a case (in the following referred to as case or cylinder case) or the like it is adjusted to a notch for the purpose in the lock body itself.

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A lock for several different cylinder lock types and a method for assembly of the lock

Field of the invention

- 5 The present invention relates to a lock, wherein the lock is suitable for locking for example a shipping container or other, wherein the lock in principle appears as a padlock or a separate lock for use together with other locking equipment or in direct locking to an object.

10 Background of the invention

Various types of padlocks are known and have been so for many years. However, their use has become increasingly sophisticated over the years, and likewise security has been optimized substantially.

- 15 An example of a use as well as a known lock type appears from US 9,341,002B2, which specifies a fitting, but also shows a padlock of a newer known type. This concerns a strong padlock in high alloy steel and with smart locking that blocks a lock latch close to the end of the track in the lock body that faces away from the tip of the lock latch. This is smart as the lock latch in
20 this way is actually double-acting. During an attempted burglary, it will thus be necessary to cut or shear the lock latch in two places, namely at both sides of the track/notch in the lock body itself, to be able to remove enough of the lock latch to also be able to remove the pad lock. This is obtained because the lock latch is fixed in the lock body at either end.

25

Such a padlock can be fixedly mounted and hence be included in a fixed installation, as the padlock is executed with threaded holes for fixed mounting. Obviously, it can also be used as a separate lock.

- 30 However, there are several disadvantages of that lock type and one of the major disadvantages is high manufacturing costs. Another disadvantage is

that the cylinder lock cannot be chosen freely, as this lock is produced for a specific cylinder type. Yet another factor that increases the costs is that both the front plate and the lock body is manufactured with corresponding dovetail slots for attachment of the front plate in front of the cylinder lock in the lock
5 body. The production of these dovetail slots is particularly cost-intensive.

Furthermore, that lock is semi-automatic, which means that auxiliary springs are included for opening and locking the padlock. These technical features also contribute to the high costs of the product, and as there are several
10 moveable parts – it is also more vulnerable to unintended dirt coming into the lock. This is particularly problematic as this lock cannot be opened directly for service without the use of special tools.

Objects of the invention

15 The object of the invention is to specify a lock that is easy to use, and which is simple in its structure, and which is so that different types of cylinder locks can easily and effortlessly be used in the same lock body and with the same lock latch.

20 Furthermore, the object of the invention is to specify a lock that is easy to service, and which can be used as a separate lock, or which can be attached to a lock fitting via holes, for example threaded holes or through-going holes.

Description of the invention

25 According to a first aspect of the invention, the object stated above is obtained with a lock/padlock that can receive a cylinder lock. By means of a skirt and/or a case, the cylinder lock can be of various types (shapes), for instance an 8-cylinder, snowman cylinder, oval cylinder, DIN cylinder (profile cylinder, euro cylinder, drop work), but is not limited to these. According to
30 another aspect, the invention also relates to a method for assembly of the lock.

The cylinder lock can in other words be of any common type, given that, as mentioned, by means of a skirt or a case (in the following referred to as case or cylinder case) or the like it is adjusted to a notch for the purpose in the lock
5 body itself.

The padlock is thus multi-functional, meaning that it has wide coverage relative to the user being able to choose a particular specific type of cylinder, depending on what is common in the part of the world, where the lock is to be
10 used. The reason is that a user of a padlock typically wants the padlock to be used together with a cylinder type that is common on the market in the geographical location, where the lock is intended to be used.

The lock can be manufactured in a suitable material, typically metal, though,
15 such as a suitable type of steel that is traded at most steel wholesalers. According to the invention, the lock can be manufactured at substantially lower costs than corresponding locks, which primarily is possible due to shorter processing time and the possibility of using the same lock body for many different cylinder types. Moreover, the lock can be manufactured with
20 the use of standard tools.

The padlock can comprise a so-called front plate, a cover plate or a lock case, in the following the term "front plate" is used, which is intended to centre the cylinder lock in the lock body as well as to protect the cylinder lock
25 against mechanical attacks, for example attempts to force open the padlock. At the same time, the object of the front plate is to protect the cylinder lock against being demounted or taken out or in any other way removed from the padlock, for example with the purpose of opening the padlock without use of the right key.

The front plate is configured so that it fits into a notch/milling in the lock body of the padlock, wherein the object of said notch is to encircle the sides of the front plate, so that the lock body protects the sides of the front plate against a potential attempt of forcing open the padlock. This could for example be attempted by removing the front plate, whereby it would be possible to take out the cylinder lock and open the padlock without use of the right key.

However, the front plate has an extension in the cylinder's longitudinal direction, which is also the direction of the keyhole, meaning into the cylinder, which implies that the front plate cannot be stripped free of the lock body. The longer the front plate extends into the notch of the lock body, the more difficult or even impossible it will be to remove the front plate either by use of violence or by other mechanical force.

On at least one of the sides or surfaces of the front plate, there is at least one depression, which is for example shaped as a cylindrical hole, a threaded hole, a notch or other, wherein a blocking device can be fixed. Such blocking device can be constituted by a bar, a ball, a screw, a bolt or other suitable device, or alternatively combinations thereof. The lock body can advantageously have a corresponding depression for the same blocking device, whereby the front plate is fixed to and in the lock body.

The object of the blocking device is to fix the front plate in the lock body, and thereby block it, so that it cannot be taken out of the lock body. For the same reason, the front plate is very important for protecting the cylinder lock.

The front plate is constructed, so that, with the right fixation, it can be fixedly mounted as a permanent solution, wherein it is not desired that it will be possible to demount the cylinder lock. This could for example be done by using a securing pin/ or spring pin or a mandrel, which is squeezed into place in said depressions in the cylinder and/or the lock body, respectively.

Likewise, a separate blocking device can be mounted in said depressions, whereupon for example a hardened steel ball is mounted, which is squeezed down into the depression. With such a solution, the possibility of boring out the blocking device is prevented.

5

Another option is that the front plate is fixed, so that it is possible, with the right tool and/or key, to dismount the front plate, for example to be able to dismount, replace or mount a cylinder lock.

10 In a preferred variant, the point of fixation or the depression, in which the blocking device for the front plate is placed when the lock is closed, is covered by a lock latch, lock bolt, lock clamp, and it is thus not possible to access the blocking device or the depression, into which it is placed, when the padlock is locked.

15

The lock front plate, the lock cylinder and/or the lock body can also be connected with a blocking device, which is not covered by a lock bolt or the like, but which is then blocked for attacks in other manners, for example by a steel ball or another type of "non-drillable" object being placed in front of the
20 actual blocking device or even constituting the blocking device in its entirety. In such a case, the item in front of the blocking device and/or the blocking device is best executed, so that it is squeezed into place in either the lock body and/or in the front plate and/or in the cylinder.

25 The front plate can be constructed, so that, on the side facing towards the cylinder lock, it comprises a cylinder case, which both encircles the cylinder lock and retains the cylinder lock in the desired position. The front plate and the cylinder case can thus be integral, but can also consist of an independent front plate and an independent cylinder case. See more about this in the
30 following and in the drawing.

On the outer side of the front plate, being the side from which a key would preferably have to be inserted into a cylinder lock, a hole, a cut-out, a milling is formed, allowing a key to be inserted through the formed hole, cut-out, milling to thereby allowing insertion of a fitting key further into the mounted
5 cylinder lock in order to be able to activate the cylinder lock to unlock or lock the padlock with the right key.

The front plate can be arranged so that it extends a bit into the lock body, or it can be arranged to encompass the cylinder lock and extend further into the
10 lock body and thus also comprise a cylinder case.

In a variant, the front plate can have a cylinder case and a depth corresponding to the length of a cylinder lock and be configured so that it fits one or more specific cylinder lock types. However, it will primarily be
15 configured to fit a specific cylinder type.

The front plate alone can also be configured, so that it fits a range of various cylinder locks and at the same time fits a specific cylinder case, which is configured to the respective cylinder types. A cylinder lock will thus be
20 encircled by such a replaceable cylinder case and a separate front plate, which is either universal or specifically configured to a cylinder type, wherein the cylinder, the case as well as the front plate are fixed in the lock body as described above and below.

At the bottom of said bore or milling for the cylinder lock in the lock body, a so-called driver can be placed, the purpose of which is to transmit the movement from the movement coming from the cylinder lock when a fitting key inserted into the cylinder lock is turned clockwise or anti-clockwise, respectively, to either lock or unlock the lock.
25

The driver can be constructed so that, at the end facing towards the backside of the cylinder lock, it contains a connection point or a form of coupling, to which the movement from the cylinder lock is transmitted.

- 5 The body of the padlock - the lock body, meaning the part of the padlock that contains the cylinder lock, the front plate, the driver and so on, can be configured (viewed from one side) as a rectangle, wherein from the one uppermost edge, an open track is formed, forming a passage, wherein the padlock can partially encircle an eye, a lug, a padlock fitting, a holed plate or
10 the like. This will be described in more detail in the description of the drawing and appear from the drawing.

- The parts of the lock body to the right and the left, respectively, of said track and which are taller than the horizontal lowermost part of the track are called
15 towers. Thus, there are two towers, namely the central tower and an end tower, wherein the central tower is closest to the middle of the lock body, while the end tower is closest to one end of the lock body.

- Viewed from the same side, to the right and left, respectively, of this track, a
20 cross hole is constructed in the longitudinal direction of the lock body, which in the central tower closest to the front plate, is through-going, and which at the end tower farthest away from the front plate, is preferably closed at the end of the tower farthest away from the track.

- 25 The purpose of the cross hole is to accommodate a so-called lock latch, lock bolt, lock clamp, which when the padlock is "unlocked", can be moved in a straight line to release the track, so that the padlock is open and can be dismounted from any fitting or the like. As the cross hole in the end tower is preferably a pocket hole, it is thus not possible to access the lock latch from
30 the end, which provides additional security.

In the central tower, which is the one closest to the front plate, inside the lock body a hole can be constructed between the transverse hole and the driver. In the hole between the cross hole and the driver, the blocking device mentioned above can be placed, which blocking device can for example be
5 one or more metal or steel balls, metal or steel bars or combinations of either balls or bars. Moreover, combinations of balls and springs can be used, and/or of several identical or different bars. All or selected parts of a blocking device can be manufactured in the same or different materials according to needs and design criteria.

10

In a preferred variant of a lock according to the invention, the blocking device has two objects. One object is to form a connecting link between the driver and the lock latch, so that, when the right key is inserted into the cylinder lock and rotated in one direction, movement from the cylinder lock will be
15 transmitted to the driver, which will transmit movement to the blocking device, which will block for the lock latch to be moveable in a straight line in the cross hole mentioned above. When the right key is rotated in the opposite direction, the blocking device will allow the lock latch to be moved in a straight line and thus respectively lock or unlock the padlock.

20

The second object of the blocking device is, as mentioned above, to retain the front plate and possibly also the cylinder lock in the lock body.

The lock latch can advantageously be bar-shaped and is preferably
25 constructed as a cylindrical bar, where in the periphery at a distance from the one end, a cut-down has been made, implying that the diameter at this cut-down is smaller than the largest diameter on the lock latch, in other words there is an area of the lock latch with a smaller cross-sectional area, in which the blocking device can engage.

30

In a preferred variant of a lock latch for a lock according to the invention, the lock latch is cylindrical and with a recess/groove in the circumferential direction of the lock latch. Such a design allows the lock latch to rotate about its central axis, which offers increased security, as it is not possible to easily
5 break or retain the lock latch – it will be able to turn and thereby relieve the pressure on itself in the case of knocks and impact forces.

However, it is also possible that the lock latch is either cylindrical or not, for example with corners or oval and has a recess that does not entirely encircle
10 the lock latch. This could for example be a cylindrical lock latch, wherein said recess is constituted by a pocket hole.

The object of the blocking device is, via the hole between the cross hole and the driver, to be able to be moved by means of the driver, whereby the
15 blocking device, when the lock latch is placed, so that said recess on the lock latch is on a level with the blocking device, fully or partially can fill said recess in the lock latch. This happens when the blocking device via the driver is impacted to do so.

20 **Description of drawing**

- Fig. 1 shows a lock in the disassembled state.
- Fig. 2 shows a cross section of the same lock as in Fig. 1.
- Fig. 3 shows a variant of a combined front plate and cylinder case, cylinder and driver.
- 25 Fig. 4 shows a second variant of a combined front plate and cylinder case, cylinder and driver.
- Fig. 5 shows a universal front plate.
- Fig. 6 shows a variant of a cylinder case.
- Fig. 7 shows a second variant of a cylinder case.
- 30 Fig. 8 shows a variant of the blocking device.

In the description of the figures, identical or corresponding elements will have the same reference numerals in the different figures. Thus, there will not be given an explanation of all details in connection with each figure/embodiment.

5 List of reference numerals

	1	lock
	2	lock body/lock housing
	3	lock latch/lock bolt/lockable part
	4	cross hole
10	5	pocket hole
	6	cylinder notch/first cavity
	7	driver
	8	cylinder lock
	9	coupling means
15	10	cylinder case
	11	front plate/wall
	12	blocking device
	13	hole for blocking device
	14	recess in lock latch
20	15	finger grip
	16	track in lock body
	17	end tower
	18	end of lock latch
	19	central tower
25	100	Oblong housing part
	110	inner second cavity
	E1, E2	first and second end
	A	longitudinal axis

Detailed description of the invention

Fig. 1 shows a lock 1 in the disassembled state and in all individual parts. The lock 1 consists of a lock body 2, wherein a lock latch/lockable part 3 can be placed in a cross hole 4 and in a pocket hole 5. Innermost in an outwardly open cavity 6 in the lock body 2 is placed a driver 7, which, when the lock is mounted, is connected to a cylinder lock 8 via coupling means 9. The cylinder lock 8 is arranged to be accommodated by an oblong housing part 100 with an encompassing cylinder case or wall 10, which here is shown integrated with a front plate 11.

10

When the cylinder lock 8, front plate 11, cylinder case 10 and driver 7 are in place in the cavity/cylinder notch 6 in the lock body 2, a blocking device 12, here in the form of a bar with rounded ends, can be placed in a hole 13 for this blocking device 12.

15

The blocking device 12 can, via the driver 7, be raised and lowered in the hole 13, whereby the blocking device 12 can engage with a recess 14 or the like in the lock latch 3, whereby the lock latch 3 is locked in the lock body 2. This figure shows the recess 14 circa on the middle of the lock latch 3, and at the one end of the lock latch 3, a finger grip 15 is seen.

20

Here the lock body/lock housing 2 is shown with a rectangularly configured track 16, wherein on the one side at the end of the lock body, an end tower 17 is seen, with a pocket hole 5 for accommodating the lock latch end 18, when the lock 1 is locked.

25

On the on the side of the track 16, a second tower can be seen, namely the central tower 19, and along the lock body 2, the cross hole 4 for the lock latch 3 can be seen. In the central tower 19, the hole 13 for the blocking device 12 can also be seen.

30

Fig. 2 shows the same as is seen in Fig. 1, but here in cross section along the disassembled lock 1. Here it is clearly illustrated how the front plate 11 and the cylinder case/wall 10 internally is arranged to accommodate the cylinder lock 8 with a geometric complementarity. Moreover, the coupling means 9 between the driver 7 and the cylinder lock 8 can also be seen. The cylinder lock 8 is kept in place via the front plate 11 and the cylinder case 10, which here is a contiguous unit by exactly the housing part 100 with the wall/cylinder case 10 being fixed to the lock body 2 via the blocking device 12, which is placed in the hole 13. When the lock latch 3 is in place in the cross hole 4 and the driver 7 is turned into the locked position via a key in the cylinder lock 8, the blocking device 12 will extend into the recess 14 in the lock latch 3, and the lock 1 is safely locked.

Fig. 3 shows a variant of a combined front plate 11 and cylinder case 10, with an oval cylinder lock 8 and a driver 7 fitting thereto.

Fig. 4 shows a second variant of a combined front plate 11 and cylinder case 10, with a drop-shaped cylinder lock 8 and a driver 7 fitting thereto.

For the sake of clarity, Fig. 3 and Fig. 4 show two of many types of cylinder locks 8, which can be used with a solution according to the invention.

Fig. 5 shows a universal front plate 11, which can be used for several different cylinder lock types, including the two shown cylinder locks 8 in Fig. 3 and in Fig. 4.

Fig. 6 shows a variant of a separate cylinder case 10, which is used together with a separate front plate 11, which can either be universal as shown in Fig. 5 or which can be adapted to the current cylinder lock 8.

Fig. 7 shows a second variant of a separate cylinder case 10, which is used together with a separate front plate 11, which can either be universal as shown in Fig. 5, or which can be adapted to the current cylinder lock 8.

- 5 Fig. 8 shows a variant of the blocking device 12 that is formed on the basis of an outer cylindrical tube/pin 12', bringing about securing of the oblong/elongated housing part 100 to the lock house 2 as well as an inner tube/pin 12'', which is moved up and down relative to the outer tube/pin 12' to and from engagement with the recess 14, depending on the movement/rotation of the driver's 7 driver surface 7' when operating the cylinder lock 8.

The lock 1 can be manufactured of processed metal. The oblong housing part 100 can be made of metal or of cast plastic, for example manufactured in a plastic casting process with a core with a contour, corresponding to the outside contour of the cylinder lock 8. As appears, the wall 10 has an outer surface with a geometry that is complementary to the contour of the oblong first cavity 6 to prevent rotation relative to the oblong first cavity 6 of the housing part 100 about a longitudinal axis A of the oblong first cavity 6, and which during a mounting condition allows a displacement, for example along said axis A, of the housing part 100 relative to the oblong first cavity 6. Preferably the wall, as shown, has an inner surface with a geometry, which is complementary to an outer contour of the cylinder lock 8 to prevent rotation relative to the oblong first cavity 6 of the cylinder lock 8 about the longitudinal axis A of the oblong first cavity 6, and which during a mounting condition allows a displacement, for example along said axis A, of the cylinder lock 8 relative to the housing part 100.

As shown in Fig. 6, the housing part 100 can for example have outer dimensions D1, D2 in the magnitude of 22mm +/- 10% and 40mm +/-10%, respectively, which allows for manufacturing of a housing part 100 with a

cavity 110 with an inner contour for accommodation and fixing against rotation of many of the commonly known cylinder locks 8 mentioned above. The first cavity 6 can advantageously, out of consideration for the metal processing, be manufactured with a contour that is oval, with dimensions
5 corresponding to D1 and D2 mentioned above.

Claims

1. A lock (1) with:

- 5 a lock housing (2) with a blocking device (12), which is moveable between a first position and a second position, and
- a lockable part (3) arranged to be moveable relative to the lock housing (2) from a locked position, wherein the lockable part (3) is retained relative to the lock housing (2) by the blocking device (12),
- which lock housing (2) has:
- 10 - an oblong cylinder lock (8) arranged, in operation, to allow or bring about a movement of the blocking device (12) between the first position for said retention of the lockable part (3) relative to the lock housing (2) and said second position, wherein the lockable part (3) can be moved relative to the lock housing (2), and
- 15 - an oblong first cavity (6), which is open towards the outside of the long housing (2),

characterized in

- that** the lock housing (2) further comprises a separate oblong housing part (100), which has a wall (10) that encompasses an oblong second cavity
- 20 (110), and which is accommodated in the oblong first cavity (6),
- which oblong housing part (100) has a first end (E1) oriented towards the inside of the lock housing (2) and a second end (E2) oriented towards the outside of the lock housing (2),
- that** the cylinder lock (8) extends into the oblong second cavity (110) and is
- 25 retained against movement relative to the lock housing (2), and
- that** the cylinder lock (8) is arranged to be operated at said second end (E2) of the oblong housing part (100).

2. A lock (1) according to claim 1, **characterized in that** said second end (E2)
- 30 comprises a wall (11), which retains the cylinder lock (8) against movement relative to the lock housing (2).

3. A lock (1) according to claim 1 or 2, **characterized in that** the blocking device (12) retains the cylinder lock (8) against movement relative to the lock housing (2).

5

4. A lock (1) according to any one of the preceding claims, **characterized in that** the lock housing (2) comprises a passage (13) for the blocking device (12).

- 10 5. A lock (1) according to any one of the preceding claims, **characterized in that** the oblong housing part (100) comprises a passage (13) for the blocking device (12).

- 15 6. A lock (1) according to any one of the preceding claims, **characterized in that** the blocking device (12) retains the oblong housing part (100) to the lock housing (2).

- 20 7. A lock (1) according to any one of the preceding claims, **characterized in that** said wall (10) has an outer surface with a geometry, which is complementary to the contour of the oblong first cavity (6) to prevent rotation relative to the oblong first cavity (6) of the housing part (100) about a longitudinal axis (A) of the oblong first cavity (6), and which during a mounting condition allows a displacement of the housing part (100) relative to the oblong first cavity (6).

25

8. A lock (1) according to any one of the preceding claims, **characterized in that** said wall (10) has an inner surface with a geometry, which is complementary to the outer contour of the cylinder lock (8) to prevent rotation relative to the oblong first cavity (6) of the cylinder lock (8) about a longitudinal axis (A) of the oblong first cavity (6), and which during a
- 30

mounting condition allows a displacement of the cylinder lock (8) relative to the housing part (100).

9. A lock according to any one of the preceding claims, **characterized in that**
5 a driver (7) is arranged, in key operation of the cylinder lock (8), to move the blocking device (12) between the first position for said retention of the lockable part (3) and the second position, wherein the lockable (3) can be moved relative to the lock housing (2), wherein the driver preferably at least during a mounting condition can be displaced in the longitudinal direction
10 (A) of the cylinder lock (8).
10. A method for assembly of the lock (1) according to any one of the preceding claims **characterized in**
that a cylinder lock (8) and a housing part (100) is first selected, wherein
15 said wall (10) has an inner surface with a geometry, which is complementary to an outer contour of the cylinder lock (8),
that the cylinder lock (8) is subsequently inserted into the oblong second cavity (110), preferably together with a driver for movement of the blocking device (12) between the first position for said retention of the lockable part
20 (3) and the second position,
that the housing part (100) with the cylinder lock (8) is subsequently inserted into the first cavity (6), and
that the blocking device (12) is subsequently mounted, so that it retains the cylinder lock (8) against movement relative to the lock housing (2).

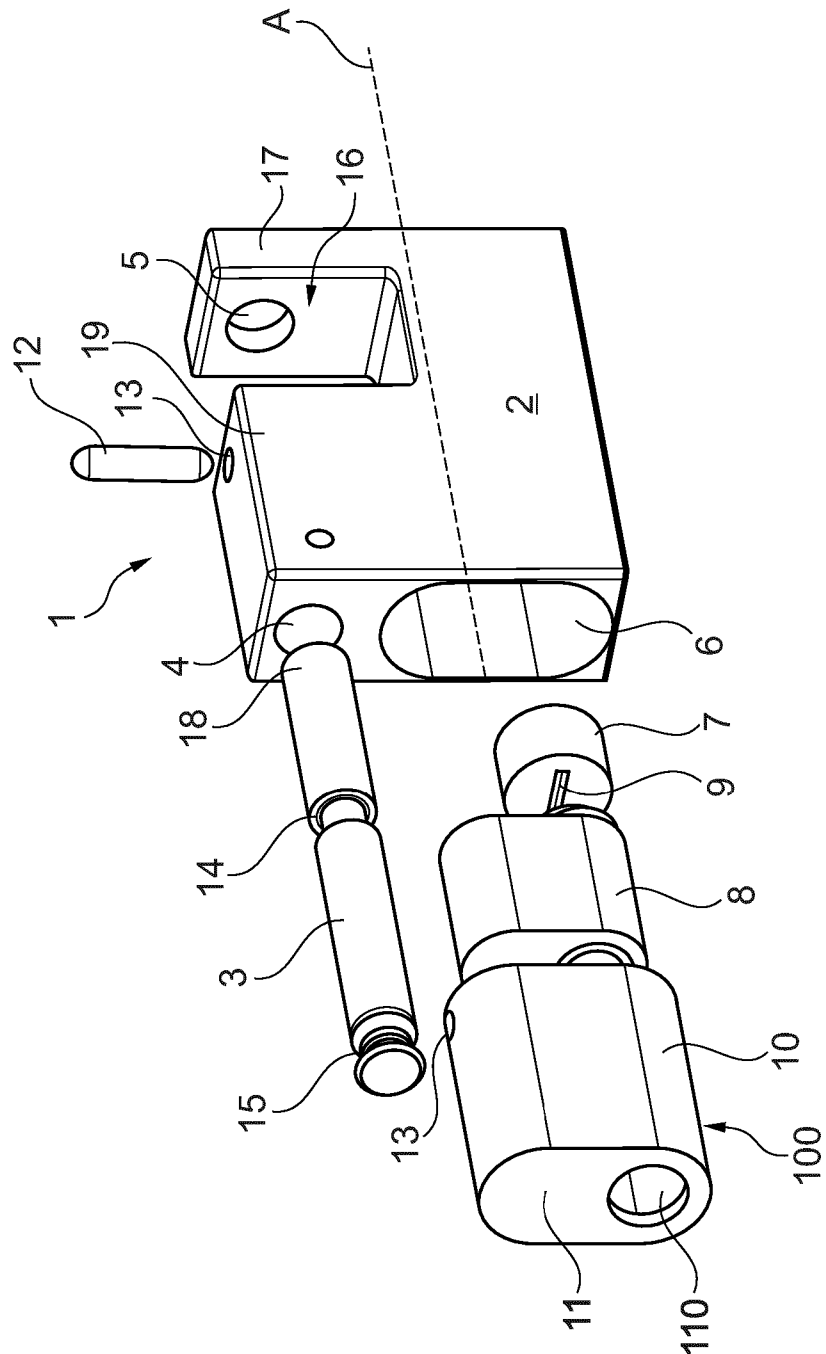


Fig. 1

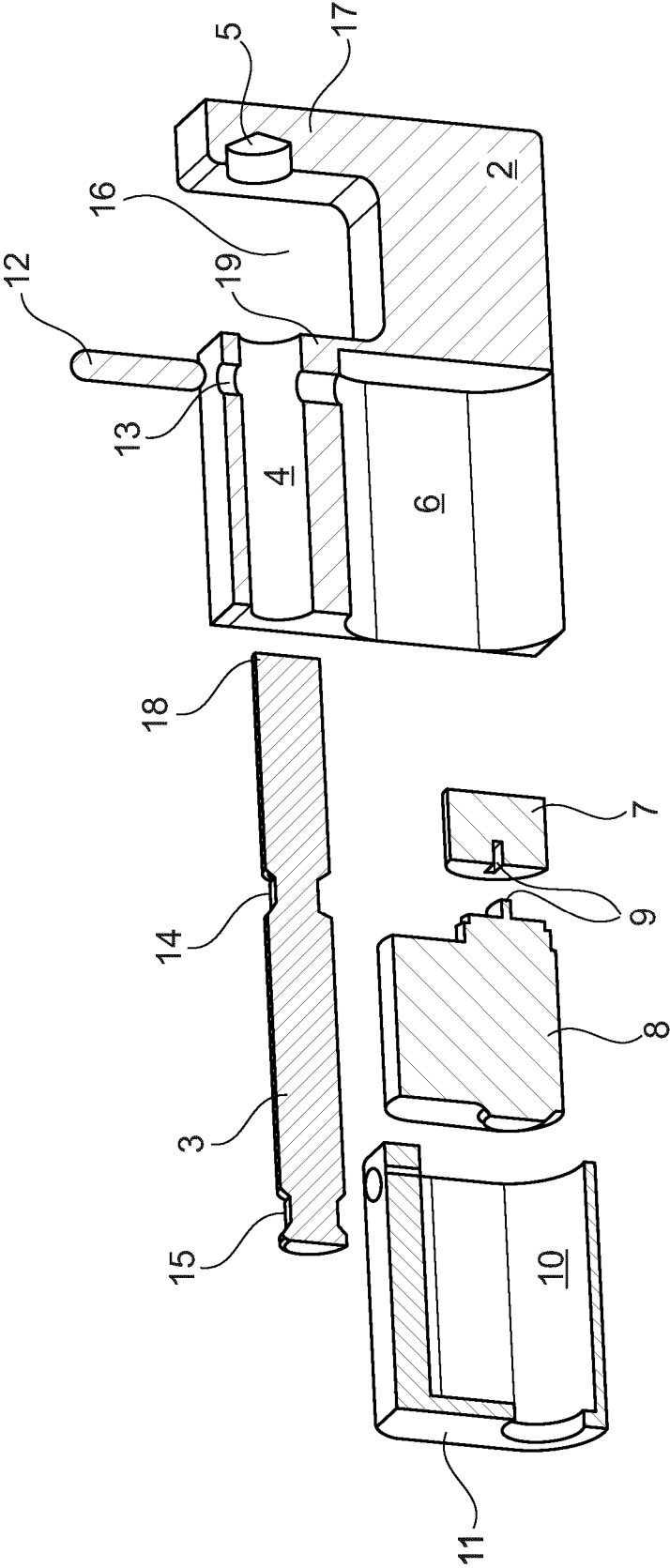


Fig. 2

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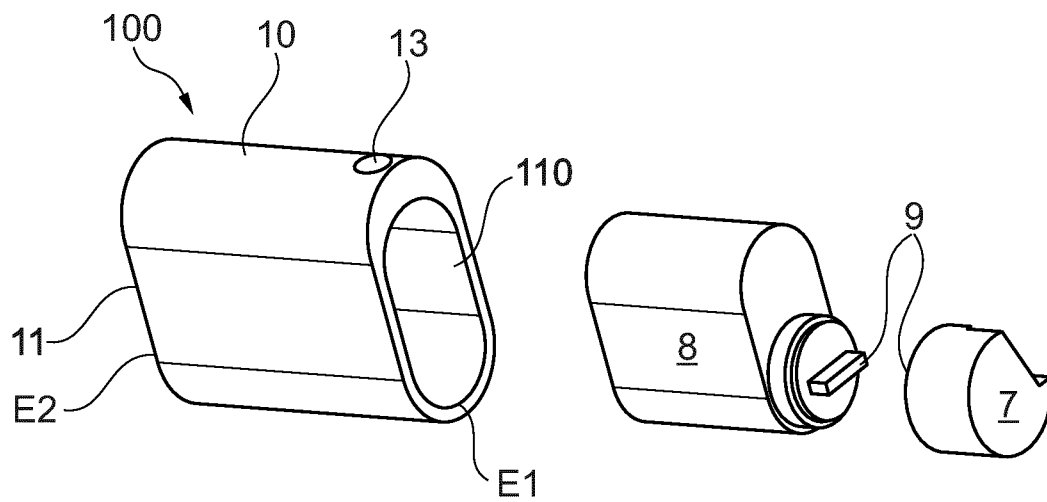


Fig. 3

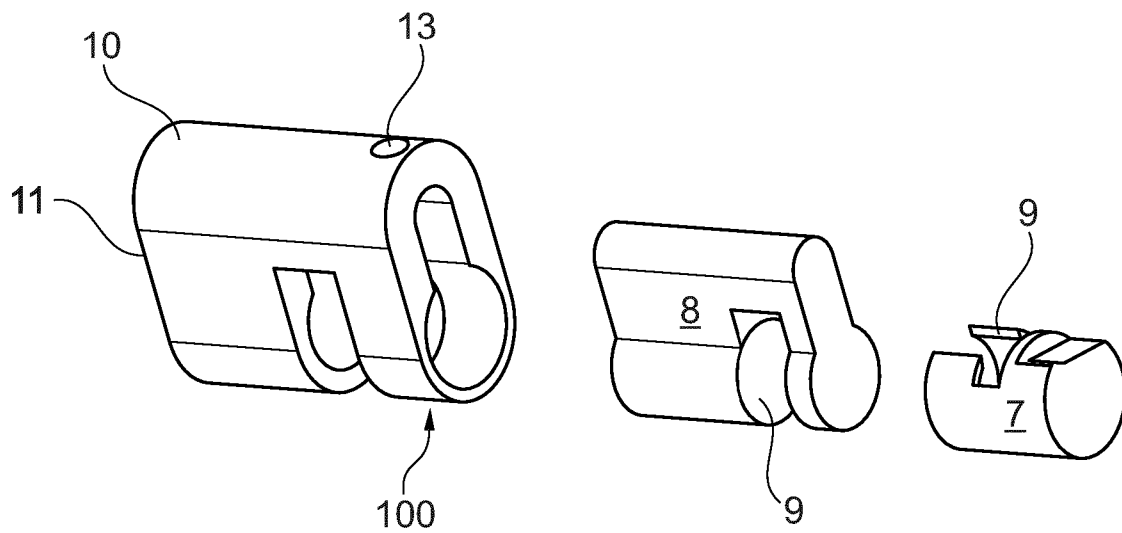


Fig. 4

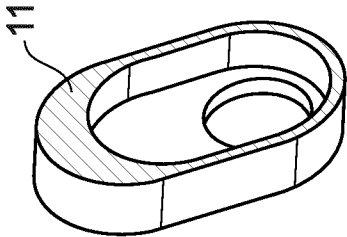


Fig. 5

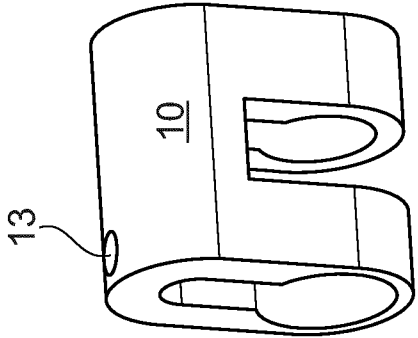


Fig. 7

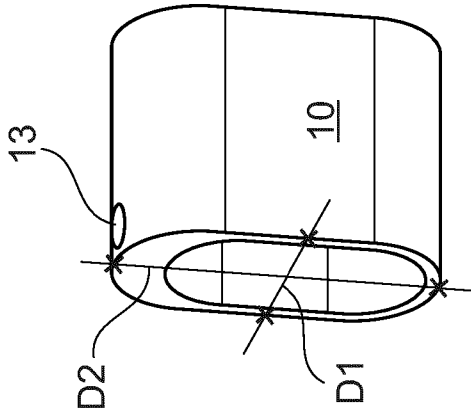


Fig. 6

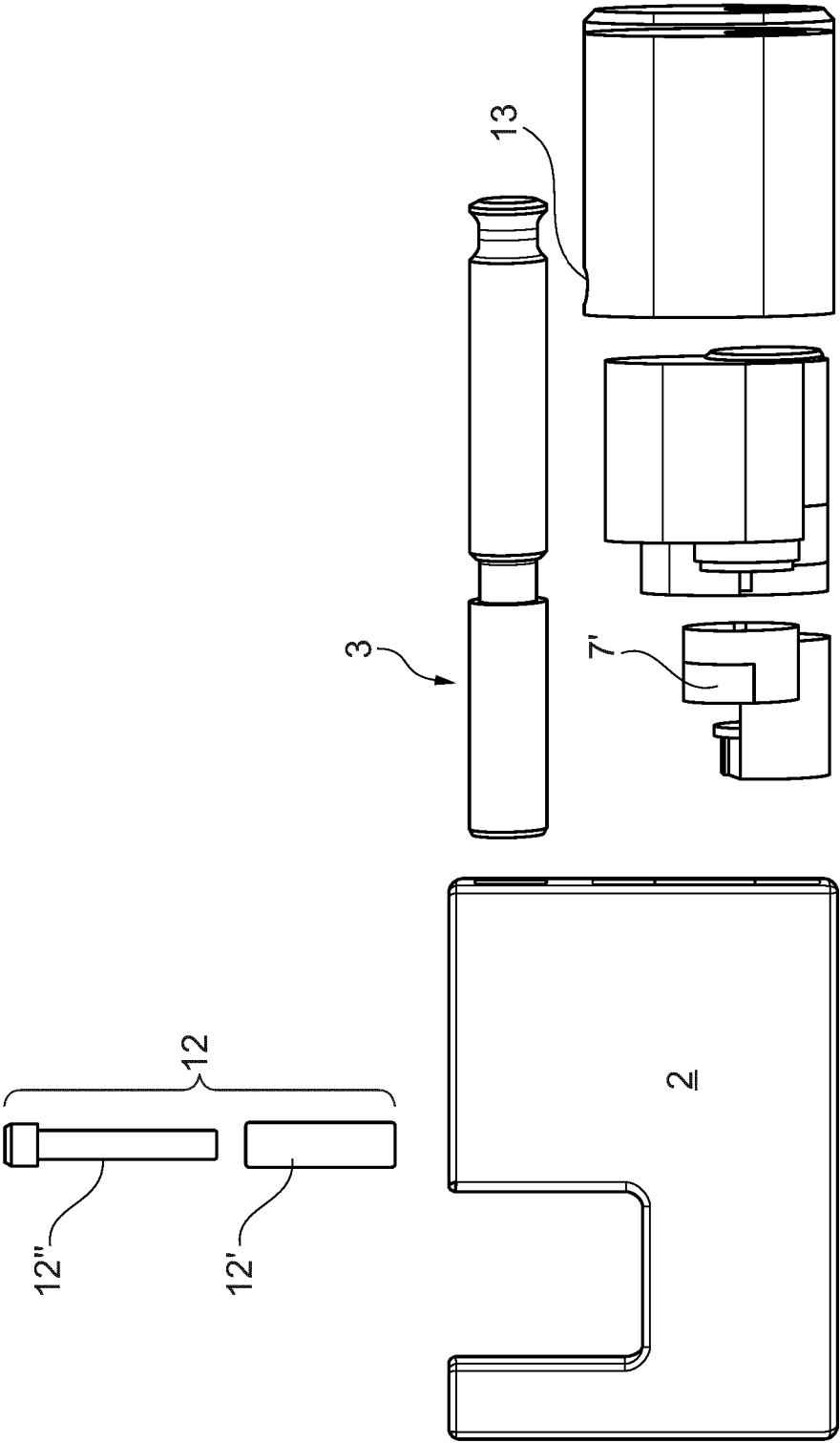


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/054996

A. CLASSIFICATION OF SUBJECT MATTER
INV. E05B67/02 E05B67/24 E05B67/36
ADD. E05B83/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

29 May 2020

Date of mailing of the international search report

09/06/2020

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/054996

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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