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(54) FIRING PIN SAFETY OF A BOLT OF A FIREARM

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EP 3 891 460 B1

Description

[0001] The present invention relates to firing pin safeties for firearms. More precisely the present invention relates to a firing pin safety of a bolt of a firearm according to the preamble part of claim 1.

[0002] In US patent publication US 2010/0313459 is disclosed a firearm, firing pin safety catch mechanism comprising a bolt having a face and proximal end for receiving a firing pin, a bolt carrier, a fi ring pin having a distil end, a proximal end opposite the distil end and a recess, or catch surface, disposed in proximity to the proximal end, a hammer which is moveable from a cocked position through a travel path to make contact with the firing pin, a firing pin spring biasing the firing pin into a rest portion wherein the distil end of the firing pin is designed to be spaced from the forward face of the bolt. and a safety catch mechanism.

[0003] In US patent publication 4,658,529 is disclosed a firing pin safety mechanism for a weapon provided with a slide having a firing pin channel, comprising: a firing pin mounted for sliding movement between a "ready" position wherein at least one end of the firing pin extends outside said firing pin channel and a "sheathed" position wherein both ends of said firing pin are disposed within the firing pin channel, said firing pin being yieldingly loaded to said "ready" position, a safety channel in the weapon slide extending transversely of the firing pin channel and intersecting the firing pin channel, a safety mounted in said safety channel for sliding movement between "on" and "off" positions, said safety and firing pin being provided with cam means for moving said firing pin to and locking said firing pin in the "sheathed" position when said safety is moved to the "on" position and for releasing said firing pin for movement to said "ready" position when said safety is moved to the "off" position.

[0004] In US patent publication 4,389,919 is disclosed a firing pin block with an enlarged head or abutment formed on the firing pin, which is engageable with the rear end of the bolt carrier slide to block the firing pin from any forward protrusion beyond the bolt face until locking lugs formed on the breech bolt are at least partially, and locked into complementary lugs on the barrel or barrel extension, in which the blocking action is achieved by coordination of the relative longitudinal movements of the bolt carrier and bolt with the operation of cam means.

[0005] In US patent publication 2,626,474 is disclosed a firearm having a slide reciprocable between a recoil and a counter-recoil position and means on the slide for actuating a bolt between a battery and a recoil position, the combination of, a firing pin slidably mounted in the bolt for longitudinal movement between a fired and a retracted position, which firing pin has an elongated transverse slot therethrough, a slidable firing pin retractor transversely mounted in the bolt so as to extend through said firing pin slot, first cam means in the slide for actuating said retractor in one direction during recoil and in the opposite direction during counter-recoil, and second cam means located on said retractor for moving said firing pin rearwardly to the retracted position during recoil of the slide.

[0006] One problem in firearms, usually in semi-automatic or automatic firearms, is a slamfire, which is a premature, unintended discharge of a firearm and which typically may occur, when a bolt of the firearm stops rapidly, while a firing pin continues its movement by inertia forward and hits and sets off a primer. Sometimes, the firing pin only causes a dent onto the primer but in the worst cases the slamfire occurs. Typically, the slamfire is prevented by providing the firing pin with a spring around it for slowing down the movement but in all cases the spring is not effective enough as the force of the spring is not enough to prevent the continuation of the movement of the firing pin. In case one should try to prevent the continuation of the movement of the firing pin in order to prevent the slamfire by increasing preventing force of the spring, it would also mean that the force of the striking hammer should also be increased, which may then cause other problems in the firearm.

[0007] An object of the present invention is to create a firing pin safety of a bolt of a firearm by which the above described problems relating to the possible slamfire are eliminated or at least minimized.

[0008] Another object of the present invention is to create a new type of a firing pin safety of a bolt of a firearm, in which slamfire is prevented automatically.

[0009] In order to achieve the above objects and those that will come apparent later the firing pin safety of a bolt of a firearm is mainly characterized by the features of the characterizing part of claim 1.

[0010] Dependent claims present advantageous features and embodiments of the invention.

[0011] According to the invention the bolt comprises a bolt carrier, a firing pin and a bolt body, in which the bolt body is located in a bolt body channel formed to the bolt carrier as a central opening in longitudinal direction of the bolt carrier, in which a cam pin is provided for turning movement of the bolt body, in which the firing pin is located in a firing pin channel formed to the bolt body as a central opening in longitudinal direction of the bolt body, and in which in the firing pin channel around the firing pin a spring is located for keeping the firing pin in back position and for slowing down movement of the firing pin, wherein the bolt comprises an automatic firing pin safety provided by a safety element located in between guides at each side of the bolt carrier setting the position of the safety element.

[0012] According to an advantageous feature the safety element is used by the turning of the bolt body.

[0013] According to an advantageous feature of the invention the spring is located between the cam pin and a radially extending shoulder formed on and around the firing pin for keeping the firing pin in its back position.

[0014] According to the invention the guides are movable in respect of the bolt body forward/backward by turning movement of and simultaneously moved by the bolt

body such that the guides move the safety element sideways.

[0015] According to an advantageous feature of the invention the bolt closed or near closed the safety element is movable sideways to a position, where the firing pin passes the safety element and the firearm can be fired.

[0016] According to an advantageous feature of the invention a stopper is provided at the back part of the firing pin resting in a groove of the firing pin for keeping the firing pin inside the bolt body and in the firing pin channel.

[0017] By the firing pin safety according to the invention the slamfire is automatically prevented and the firing pin safety according to the invention is applicable in all firearms with revolving type bolts.

[0018] In the following the invention and its advantages are explained in greater detail below in the sense of example and with reference to accompanying drawing, where

in figure 1 is schematically shown an exploded view of an advantageous example of the invention,

in figure 2 is schematically shown the advantageous example of figure 1, when the bolt is open,

in figure 3 is schematically shown the example of figure 2 with projections of figures 4A-4B marked,

in figures 4A-4B are schematically shown the projections A-A and B-B of figure 3,

in figure 5 is schematically shown the example of figure 1, when the bolt is closed,

in figure 6 is schematically shown the example of figure 5 with projections of figures 7A-7B marked and

in figures 7A-7B are schematically shown the projections C-C and D-D of figure 6.

[0019] During the course of the following description like numbers and signs will be used to identify like elements according to the different views which illustrate the invention and its advantageous example. In the figures some repetitive reference signs have been omitted for clarity reasons.

[0020] As shown in the example of figure 1 the bolt 10 comprises a firing pin 15, a bolt body 22, a bolt carrier 32 with a cam pin 34 and guides 35 located in openings 36 at each side of the bolt carrier 32. Through the bolt carrier 32 extends a bolt body channel 33, into which the bolt body 22 is located and through the bolt body 22 extends a firing pin channel 23 for the firing pin 15. To secure the firing pin 15 a stopper 19 is provided. Additionally, the bolt comprises a spring 17 located around the firing pin 15 in the firing pin channel 23, as can be seen for example in figures 4A-4B and 7A-7B.

[0021] In figures 2-4B the bolt 10 and the firing pin safety is shown, when the bolt is open. As can be seen in this position the movement of the firing pin 15 is prevented by the safety element 25 positioned between the guides 35 after the cam pin 34 has turned the bolt body 22 to the open position.

[0022] In figures 5-7B the bolt 10 and the firing pin safety is shown, when the bolt is closed. As can be seen in this position the firing pin 15 can pass the safety element 25 and the firearm can be fired as the safety element 25 has been moved sideways to a position guided by the guides after the cam pin 34 has turned the bolt body 22 to the closed position.

[0023] In the following function of the bolt 10 and the firing pin safety is explained with reference to the figures 1-7B.

[0024] The cam pin 34 is in contact with the bolt body 22 and when the cam pin 34 is turned also the bolt body 22 moves. The bolt carrier 32 is provided with a cam pin groove 37 for the pivot pin 34. The bolt body 22 can turn for example 45° as defined by the cam pin 34 and the cam pin groove 37 in the bolt carrier 32. Due to the turning movement of the bolt body 22, the bolt body 22 moves forwards/backward in the bolt body channel 33. The turning movement of for example 45 ° causes that locking surfaces 24, for example four locking surfaces 24 of the bolt body 22 will be set locked and thus to a bolt closed position, in which the firearm can be fired. Inside the bolt body 22 in the firing pin channel 23 the firing pin 15 is provided to move. Around the firing pin 15 and between the cam pin 34 and a shoulder 18 of the firing pin 15 the spring 17 is located to keep the firing pin 15 in its back position. A stopper 19 is provided at the back part of the firing pin 15 resting in a groove 14 of the firing pin 15 to keep the firing pin 15 inside the bolt body 22 and in the firing pin channel 23.

[0025] When the firearm is fired a strike hammer of the firearm strikes the back end of the firing pin 15 and the movement of the firing pin 15 caused by the strike sets primer of the cartridge. During the charging cycle the bolt 10 is pushed backwards by a force of the gas piston and/or recoil simultaneously the used case is ejected. The force of the bolt return spring (not shown) returns the bolt 10 forward and a next cartridge is provided.

[0026] The bolt 10 according to the invention comprises an automatic firing pin safety provided by a safety element, which is used by the turning of the bolt body 22 in the bolt carrier 32.

[0027] When the bolt 10 is moving in open state forward until the bolt body 22 stops, the safety element 25 is in on-position and prevents movement of the firing pin 15 further forward and the movement of the firing pin 15 is prevented. The safety element 25 is located in between the guides 35 at each side of the bolt carrier 32 setting the position of the safety element 25 preventing the movement of the firing pin 15.

[0028] When the bolt body 22 turns the guides 35 move

in respect of the bolt body 22 forward and simultaneously moves by the guides the safety element 25 sideways. At this stage the movement and inertia of the firing pin 15 is over. When the bolt 10 is closed or near closed-position, the safety element 25 has been moved sideways to a position, where the firing pin 15 can pass the safety element 25 and the firearm can be fired. Although features have been described with reference to certain embodiments or examples, those features may also be present in other embodiments or examples whether described or not.

Reference signs used in the drawing

[0029]

10	bolt
14	groove
15	firing pin
17	spring
18	shoulder
19	stopper
22	bolt body
23	firing pin channel
24	locking surfaces
25	safety element
32	bolt carrier
33	bolt body channel
34	cam pin
35	guide
36	guide opening
37	cam pin groove

Claims

1. A bolt for a firearm with a firing pin safety, wherein the bolt (10) comprises a bolt carrier (32), a firing pin (15) and a bolt body (22),

   in which the bolt body (22) is located in a bolt body channel (33) formed to the bolt carrier (32) as a central opening in longitudinal direction of the bolt carrier (32),
   in which a cam pin (34) is provided for turning movement of the bolt body (22),
   in which the firing pin (15) is located in a firing pin channel (23) formed to the bolt body (22) as a central opening in longitudinal direction of the bolt body (22),
   and in which in the firing pin channel (23) around the firing pin (15) a spring (17) is located for keeping the firing pin (15) in back position and for slowing down movement of the firing pin (15),
   characterized in that the bolt (10) comprises an automatic firing pin safety provided by a safety element (25) located in between guides (35) at two sides of the bolt carrier (32) opposite each other, setting the position of the safety element (25) by the turning movement of the bolt body (22) and **that** the guides (35) are configured to be movable in respect of the bolt body (22) forward/backward by the turning movement of the bolt body (22) provided by the cam pin (34) and simultaneously configured to be moved by the bolt body (22) such that the guides (35) provide movement of the safety element (25) sideways setting the position of the safety element (25).

2. The bolt according to claim 1, **characterized in that** the spring (17) is located between the cam pin (34) and a radially extending shoulder (18) formed on and around the firing pin (15) for keeping the firing pin (15) in its back position.

3. The bolt according to any of previous claims, **characterized in that** the safety element (25) is configured to be movable sideways to a position, where the firing pin (15) passes the safety element (25) and the firearm can be fired when the bolt (10) is in closed or near closed position.

4. The bolt according to any of previous claims, **characterized in that** a stopper (19) is provided at the back part of the firing pin (15) resting in a groove (14) of the firing pin (15) for keeping the firing pin (15) inside the bolt body (22) and in the firing pin channel (23).

Patentansprüche

1. Verschluss für eine Feuerwaffe mit einer Schlagbolzensicherung, wobei der Verschluss (10) einen Verschlussträger (32), einen Schlagbolzen (15) und einen Verschlusskörper (22) umfasst,

   wobei der Verschlusskörper (22) in einem Verschlusskörperkanal (33) angeordnet ist, der an dem Verschlussträger (32) als eine mittige Öffnung in einer Längsrichtung des Verschlussträgers (32) geformt ist,
   wobei ein Steuerbolzen (34) für eine Drehbewegung des Verschlusskörpers (22) bereitgestellt wird,
   wobei der Schlagbolzen (15) in einem Schlagbolzenkanal (23) angeordnet ist, der an dem Verschlusskörper (22) als eine mittige Öffnung in einer Längsrichtung des Verschlusskörpers (22) geformt ist,
   und wobei in dem Schlagbolzenkanal (23) um den Schlagbolzen (15) eine Feder (17) angeordnet ist, um den Schlagbolzen (15) in einer hinteren Position zu halten und um eine Bewegung des Schlagbolzens (15) zu verlangsamen,
   dadurch gekennzeichnet, dass der Ver-

schluss (10) eine automatische Schlagbolzensicherung umfasst, die durch ein Sicherungselement (25) bereitgestellt wird, das zwischen Führungen (35) an zwei zueinander gegengesetzten Seiten des Verschlussträgers (32) angeordnet ist, welche die Position des Sicherungselements (25) durch die Drehbewegung des Verschlusskörpers (22) festsetzen, und dass die Führungen (35) dafür konfiguriert sind, durch die Drehbewegung des Verschlusskörpers (22), die durch den Steuerbolzen (34) gewährleistet wird, in Bezug auf den Verschlusskörper (22) vorwärts/rückwärts beweglich zu sein, und gleichzeitig dafür konfiguriert sind, durch den Verschlusskörper (22) derart bewegt zu werden, dass die Führungen (35) eine Bewegung des Sicherungselements (25) seitwärts gewährleisten, was die Position des Sicherungselements (25) festsetzt.

2. Verschluss nach Anspruch 1, **dadurch gekennzeichnet, dass** die Feder (17) zwischen dem Steuerbolzen (34) und einem sich in Radialrichtung erstreckenden Absatz (18) angeordnet ist, der an dem Schlagbolzen (15) und um denselben geformt ist, um den Schlagbolzen (15) in seiner hinteren Position zu halten.

3. Verschluss nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Sicherungselement (25) dafür konfiguriert ist, seitwärts zu einer Position beweglich zu sein, wo der Schlagbolzen (15) das Sicherungselement (25) passiert und die Feuerwaffe abgefeuert werden kann, wenn sich der Verschluss (10) in einer geschlossenen oder nahezu geschlossenen Position befindet.

4. Verschluss nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** ein Anschlag (19) an dem hinteren Teil des Schlagbolzens (15) bereitgestellt wird, der in einer Rille (14) des Schlagbolzens (15) ruht, um den Schlagbolzen (15) innerhalb des Verschlusskörpers (22) und in dem Schlagbolzenkanal (23) zu halten.

Revendications

1. Culasse pour arme à feu comportant une sécurité de percuteur, la culasse (10) comprenant un support de culasse (32), un percuteur (15) et un corps de culasse (22),

dans laquelle le corps de culasse (22) se trouve dans un canal de corps de culasse (33) formé sur le support de culasse (32) sous forme d'une ouverture centrale dans le sens longitudinal du support de culasse (32),

dans laquelle une broche de came (34) est prévue pour le mouvement tournant du corps de culasse (22),

dans laquelle le percuteur (15) se trouve dans un canal de percuteur (23) formée sur le corps de culasse (22) sous forme d'une ouverture centrale dans le sens longitudinal du corps de culasse (22),

et dans laquelle, dans le canal de percuteur (23) autour du percuteur (15), se trouve un ressort (17) pour garder le percuteur (15) en position arrière et pour ralentir le mouvement vers le bas du percuteur (15),

caractérisé en ce que la culasse (10) comprend une sécurité de percuteur automatique créée par un élément de sécurité (25) situé entre des guides (35) sur deux faces du support de culasse (32) opposées l'une à l'autre, et réglant la position de l'élément de sécurité (25) par le mouvement tournant du corps de culasse (22) et que les guides (35) sont configurés pour être mobiles par rapport au corps de culasse (22) vers l'avant/vers l'arrière par le mouvement tournant du corps de culasse (22) créé par la broche de came (34) et configurés simultanément pour être déplacés par le corps de culasse (22) de manière à ce que les guides (35) créent un mouvement de l'élément de sécurité (25) vers le côté réglant la position de l'élément de sécurité (25).

2. Culasse selon la revendication 1, **caractérisée en ce que** le ressort (17) se trouve entre la broche de came (34) et un épaulement s'étendant radialement (18) formé sur et autour du percuteur (15) pour garder le percuteur (15) dans sa position arrière.

3. Culasse selon l'une quelconque des revendications précédentes, **caractérisée en ce que** l'élément de sécurité (25) est configuré pour être mobile vers le côté vers une position où le percuteur (15) passe devant l'élément de sécurité (25) et que l'arme à feu peut tirer lorsque la culasse (10) est en position fermée ou presque fermée.

4. Culasse selon l'une quelconque des revendications précédentes, **caractérisée en ce qu'un** arrêt (19) est prévu sur la partie arrière du percuteur (15) reposant dans une gorge (14) du percuteur (15) pour garder le percuteur (15) à l'intérieur du corps de culasse (22) et dans le canal de percuteur (23).

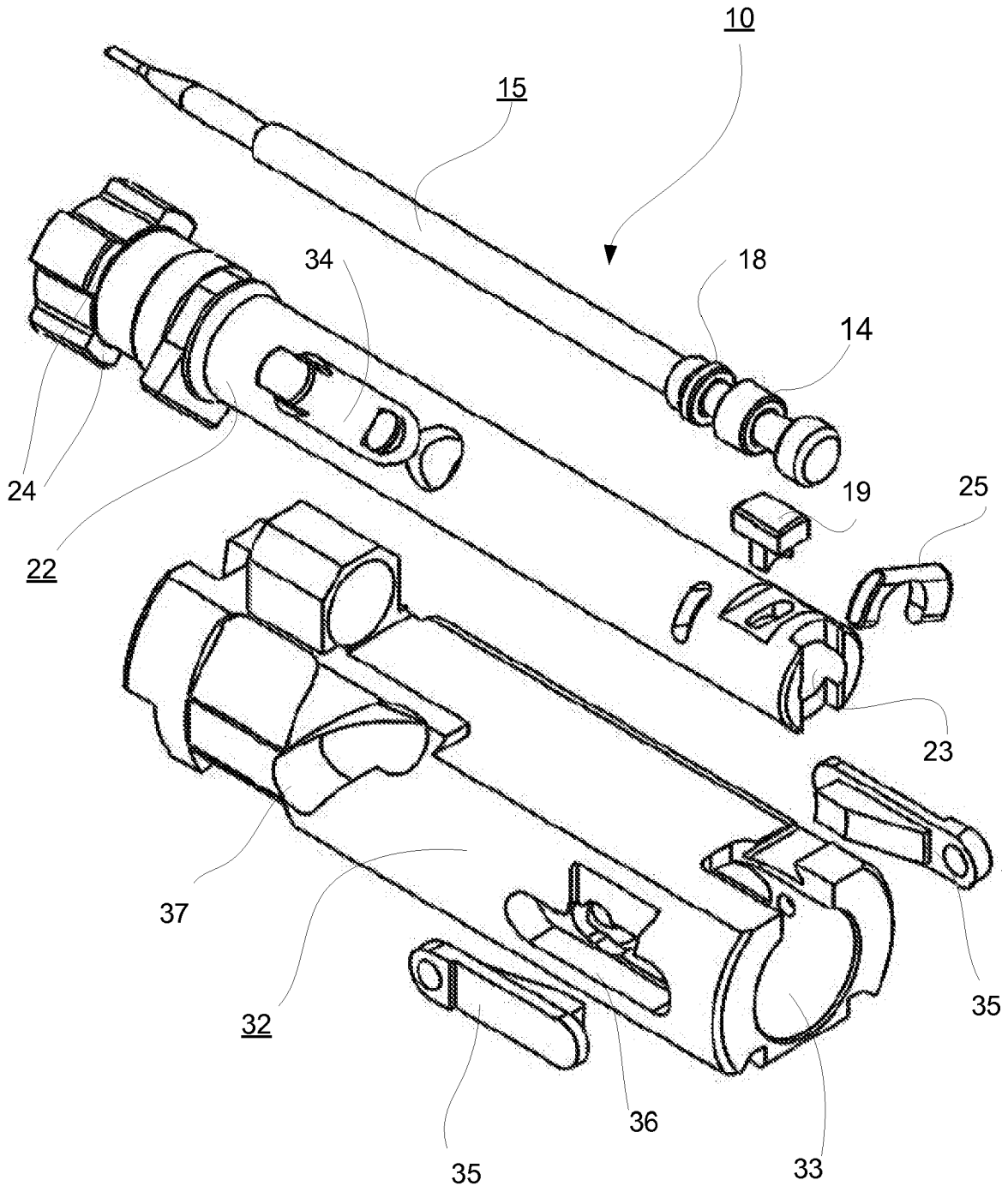

Fig. 1

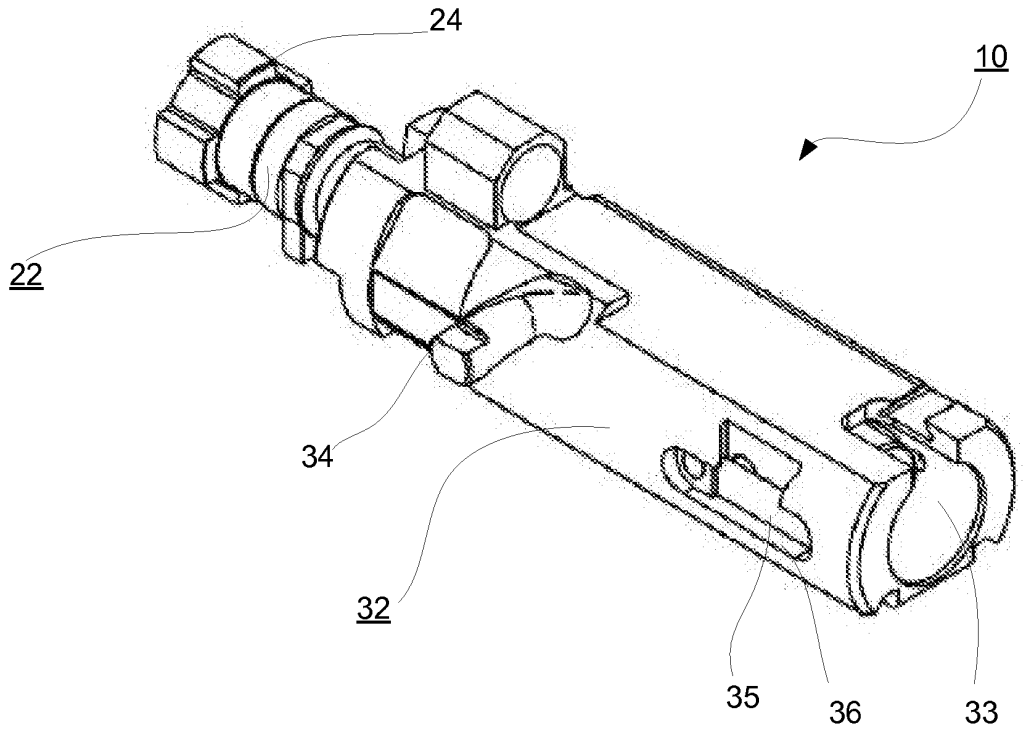

Fig. 2

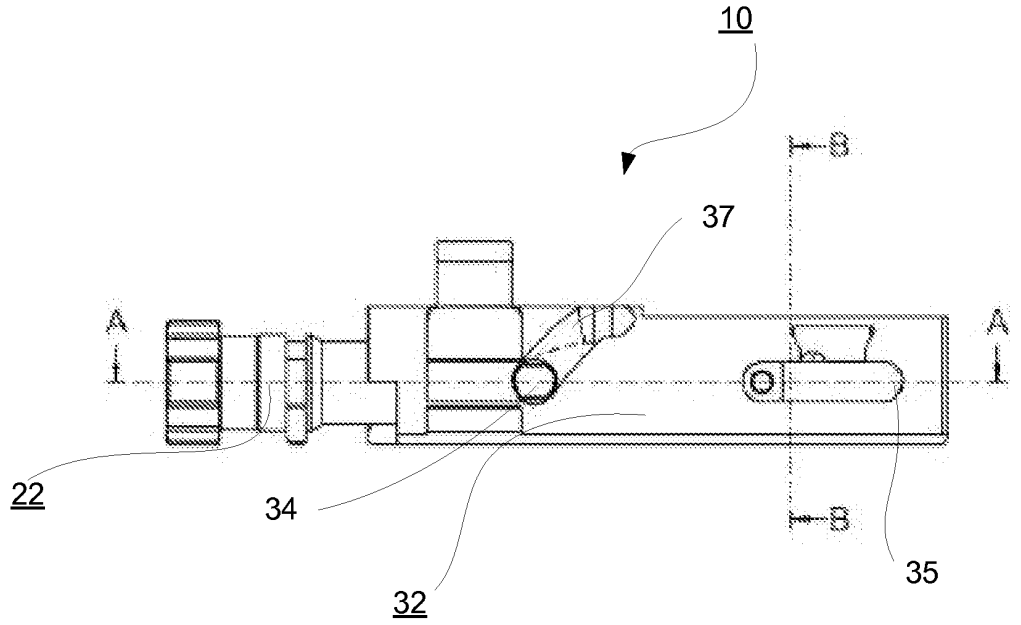

Fig. 3

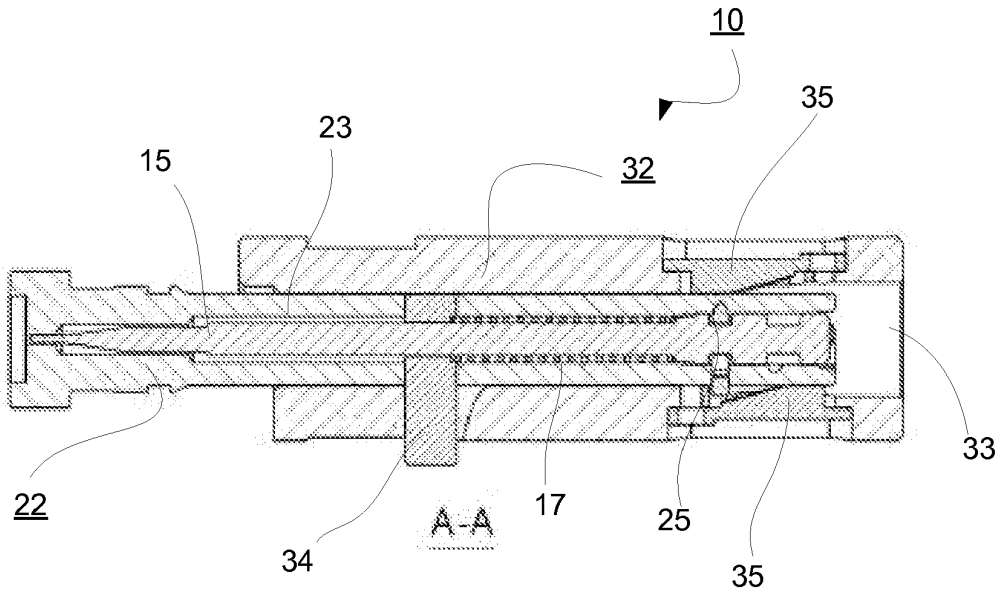

Fig. 4A

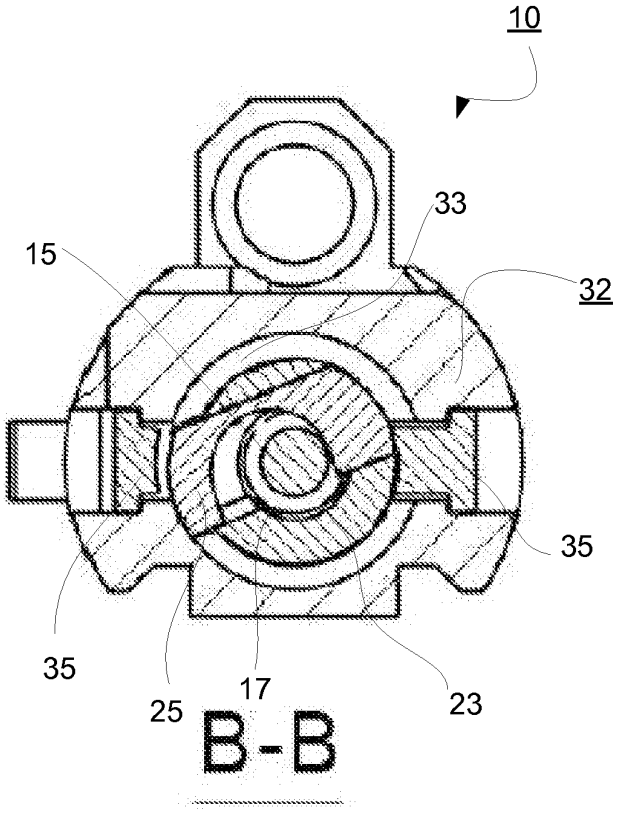

Fig. 4B

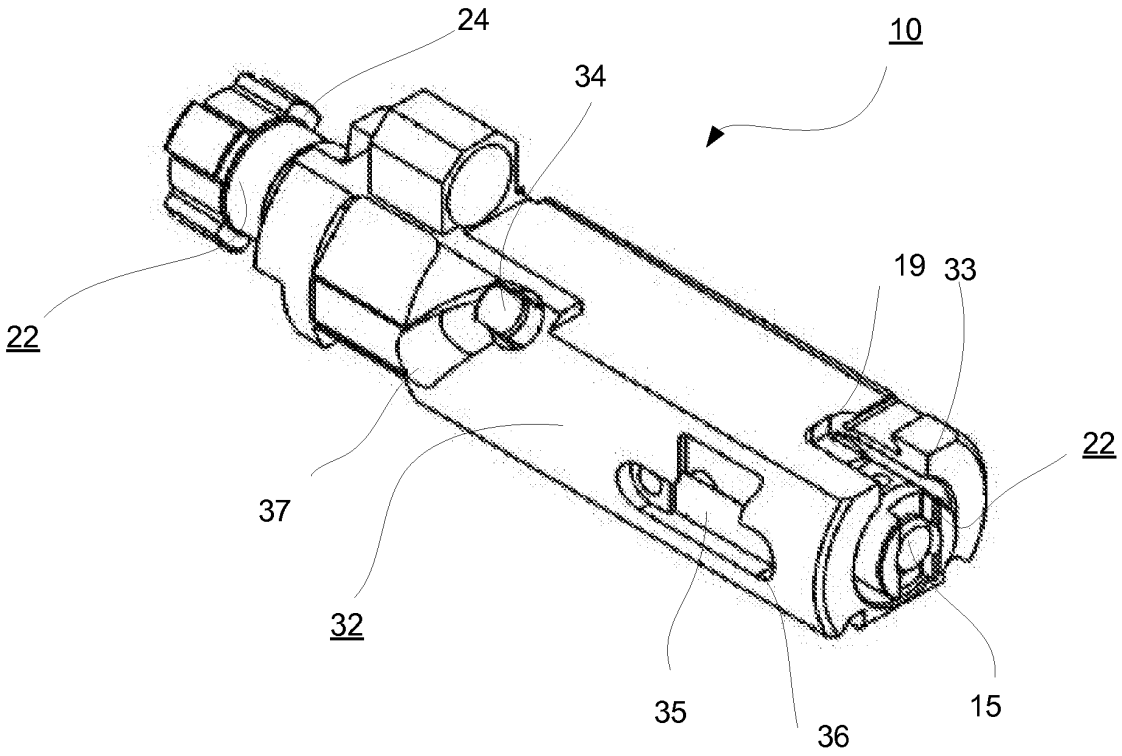

Fig. 5

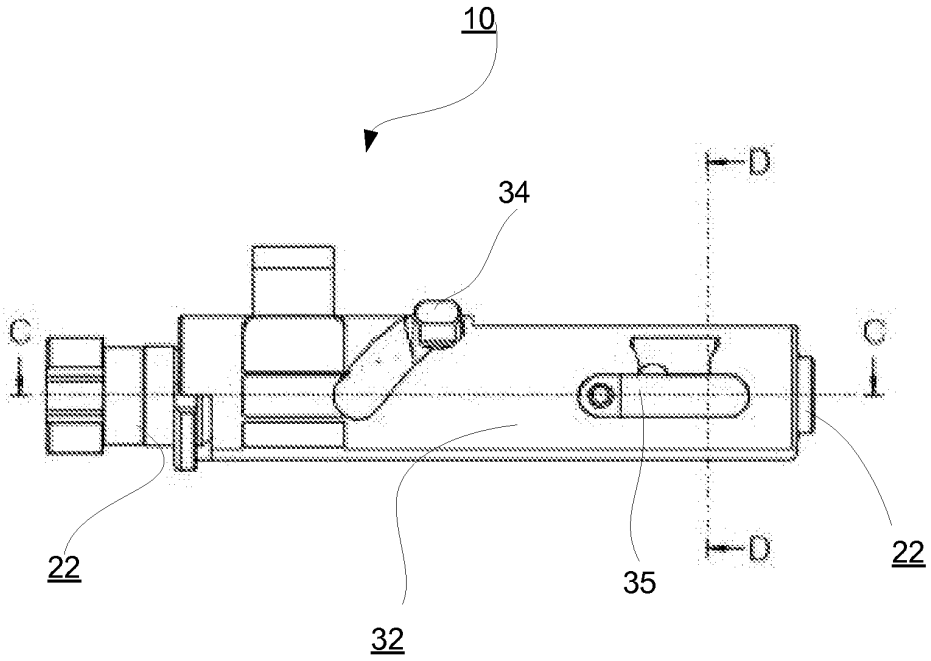

Fig. 6

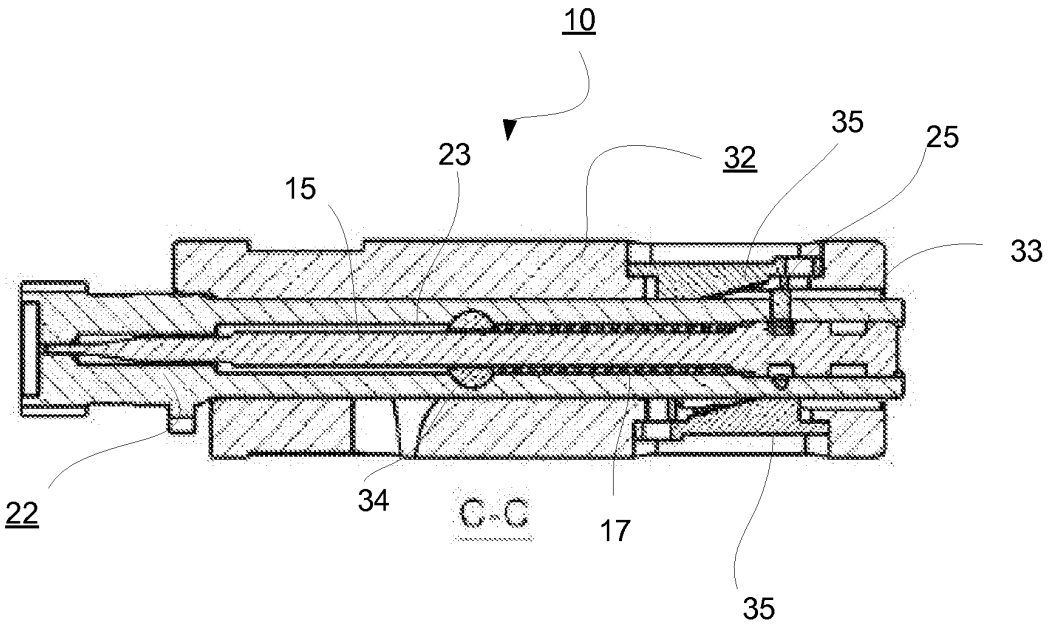

Fig. 7A

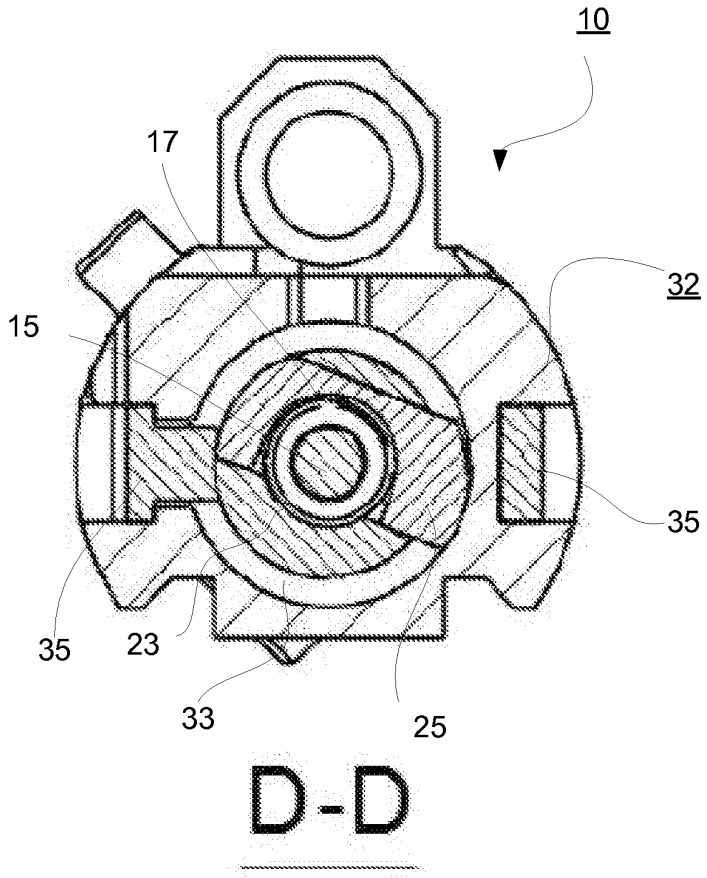

Fig. 7B

REFERENCES CITED IN THE DESCRIPTION

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