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(54) **A HANDGUN CONVERTER AND A METHOD FOR USING A HANDGUN CONVERTER**

(57) A handgun converter (100) comprising a body (1), having a handgun-engaging assembly (101, 102, 103) for holding a handgun (300) wherein said handgun-engaging assembly (101, 102, 103) comprises: a front engaging member (101) in the front of the converter (102), for cradling a front of said handgun (300); and a rear engagement member (102) for engaging an external portion of the rear portion of the frame of said handgun (300), thereby fastening said handgun (300) to the handgun converter (100); wherein said handgun-engaging assembly (101, 102, 103) is configured to allow for a degree of flexibility of said handgun (300) within said body (1) in order to provide shock absorption during a recoil movement of said handgun (300) wherein said flexibility is effected relatively to said body (1).

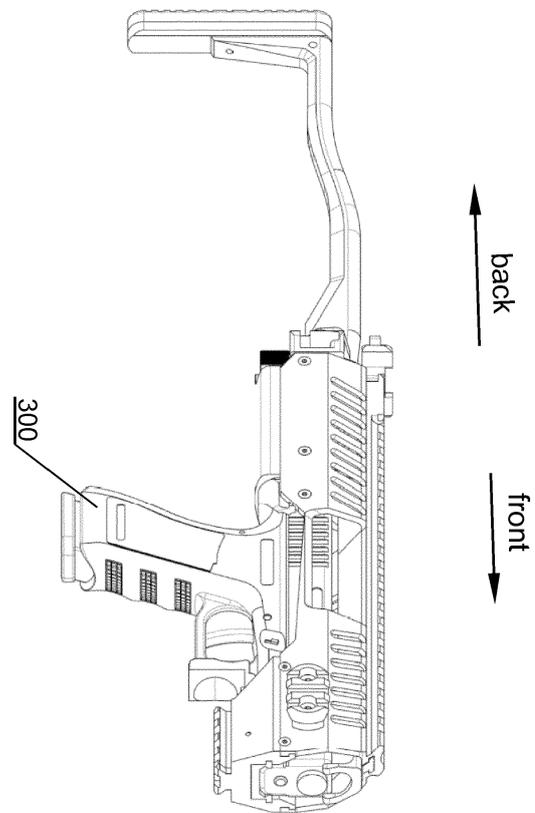


Fig. 3

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## Description

### TECHNICAL FIELD

[0001] The present invention relates to a handgun converter and a method for using a handgun converter. In particular, the present invention relates to auxiliary stocks, or otherwise supports or frames, for stabilising, or for transforming handguns e.g. pistols or revolvers, into shoulder-fired guns.

### BACKGROUND OF THE INVENTION

[0002] A handgun is a short-barrelled firearm that can be held and used with one hand or two hands. The two most common handgun sub-types in use today are revolvers and semi-automatic pistols. One of the most common example of a semi-automatic, hammerless pistol is a Glock-brand pistol. Such semi-automatic pistols use one firing chamber that remains fixed in a constant linear position relative to the gun barrel.

[0003] Glock-brand pistols are a relatively affordable, simple and cost-effective solution considered as entry level with relatively good accuracy of fire and not as sophisticated as for example a Walther P99AS (developed by the German company Carl Walther GmbH Sportwaffen) or CZ P-10SC (made by Ceska zbrojovka (CZ)).

[0004] Pistols are generally a close-range weapons operated below 25 meters from a target (such as a shooting target or a popper on a shooting range). When considering well trained shooters, a typical level of acceptable accuracy or an acceptable level of combat accuracy is usually extended to 20 meters. The accuracy is measured when aiming for "vital zones" on the human body-like popper - it is roughly a 10 cm diameter considered a face of an attacker, and roughly a 20 cm diameter area considered an attacker's upper chest.

[0005] There are known handgun converters enclosing a handgun for a purpose of enhancing operability and safety of said enclosed handgun. An example of such a converter is disclosed in publication of EP2314976 describing a handgun converter enclosing a handgun and allowing a user to operate the handgun with full and increased functionality and enhanced safety. The combined weapon, including the handgun and the converter, endows the handgun with additional supports and an additional mechanical latch mechanism supporting safe use. The handgun converter is constructed to allow quick mounting and unmounting of the handgun, to enhance a given weapon's versatility.

[0006] Frequently, handgun users are confronted with an occasional need to use a longer weapon having an increased accuracy at longer distances (e.g. Effective firing range between 50m and 200m depending on a particular model). In such case, they constantly carry both the handgun and the long-barrel weapon (e.g. from a group of MP5, MP7 machine-guns manufactured by Heckler & Koch).

[0007] Further, ammunition used in longer weapons is frequently different than in case of handguns. Even if the ammunition is not different, it is typically preloaded into magazines that are different in long weapons than in pistols.

[0008] On top of that, there are different laws and regulations in various countries, not allowing a use of long-barrel weapons in certain circumstances. In such cases a possibility of increasing accuracy of a handgun is even more desirable.

[0009] Therefore, it would be advantageous to design and provide a handgun converter, which would be able to increase accuracy of a handgun. At the same time such a handgun conversion would be much cheaper than an additional long-barrel weapon, which would allow for its common use, for example by police patrols or border patrols.

[0010] As is evident from the above, there is a growing need for a rapid-deployment accessory aimed at facilitating a transition from a handgun to a stocked firearm. Needless to mention, that such stocked firearms may further be equipped with a plurality of accessories such as an optical gunsight, a collimator, flashlights or other over-barrel optics (i.e. on suitable mounting rails of a converter).

[0011] To this end, prior art includes a publication of WO2009095921 entitled "Firearm accessory", which discloses a system to enhance a pointability and shootability of firearms. There is provided a firearm accessory including a firearm, a body including at least one securer for readily securing said firearm to the firearm accessory, wherein the securer is selected from the group consisting of: a grip securer, a racker and a trigger guard securer.

[0012] Another pre-grant publication of US2011107644 (A1), patented as US8448366B2 and entitled "Pistol converter" discloses a pistol converter including a body defining a forward pistol frame engaging portion, a stock coupled to the body, and a rear engagement member for firmly engaging an external portion of a rear of a frame of the pistol.

[0013] This converter comprises a spring loaded element configured to urge the rear engagement member and a pistol mounted in the body forwards towards the pistol's frame's front portion engaging portion to firmly grip the pistol and prevent movement thereof in the converter.

[0014] Therefore, firm grip and movement prevention are requirements of this pistol converter.

[0015] Known handgun converters may result in greater fire accuracy because of the additional supports. Because, the handgun converter is a group of elements that physically changes during shooting, it is much more difficult to provide for sustained fire accuracy of such converted handguns when considering a rounds of fire, especially when such rounds are rapidly fired (for example a fire every 0,5s or less).

[0016] It would be advantageous to provide a handgun converter further improving accuracy of handguns, es-

pecially when repetitive shots are considered in a time comparable to a continuous fire (for example a shot every 0,3 s).

**[0017]** The aim of the development of the present invention is an improved-accuracy and cost effective handgun converter and a method for using a handgun converter.

## SUMMARY AND OBJECTS OF THE PRESENT INVENTION

**[0018]** A first object of the present invention is a handgun converter comprising a body, having a handgun-engaging assembly for holding a handgun wherein said handgun-engaging assembly comprises: a front engaging member in the front of the converter, for cradling a front of said handgun; and a rear engagement member for engaging an external portion of the rear of the frame of said handgun, thereby fastening said handgun to the handgun converter; wherein said handgun-engaging assembly is configured to allow for a degree of flexibility of said handgun within said body in order to provide shock absorption during a recoil movement of said handgun wherein said flexibility is effected relatively to said body.

**[0019]** Preferably, said flexibility is present in said front engaging member being fixed to the body wherein it comprises a flexing element configured to allow for a backwards movement of the handgun mounted in the front engaging member.

**[0020]** Preferably, said flexibility is present in said back engaging member being fixed to the body wherein it comprises a flexing element configured to allow for a backwards movement of the handgun mounted in the front engaging member.

**[0021]** Preferably, said flexing element has a recoil travel distance within a range of 1 mm to 2 mm.

**[0022]** Preferably, said flexing element has a recoil travel distance within a subrange of 1,3mm to 1,6mm while a particularly advantageous travel distance is 1,5mm.

**[0023]** Preferably, the fitting of the handgun in said front engaging member is effected by use of a latch resulting in that the handgun may not fall out of the front engaging member once latched therein.

**[0024]** Preferably, said back engaging member comprises a front stabiliser having a front shape tightly adapted to the back shape of said handgun wherein the front stabiliser embraces, after its mounting, also side gaps present in the back portion of the handgun between the frame and the slide.

**[0025]** Preferably, said rear engaging member is mounted in the body by means of a slide configured to fit into rails of said body.

**[0026]** Preferably, the slide comprising front and rear stabilisers is mounted on a rod, which is threaded, whereas the threading makes the back stabiliser remain at a fixed position while during recoil the front stabiliser is pushed towards the back stabiliser; wherein the threaded

rod has a quick release mechanism in a back block fixedly mounted at the back of the body; wherein said quick release mechanism comprises springs and two clamps each mounted on a left and right side of the back block respectively.

**[0027]** Preferably, said handgun-engaging assembly comprises a bracket comprising a bracket core and its fastening means facilitating its mounting inside the body whereas the bracket is mounted in the back of the body in proximity to an ejection port opening and over the rear engagement member; whereas the bracket allows to control a sideways flexibility of the body, during fire and a subsequent recoil movement, taking into account the axis of the handgun barrel.

**[0028]** Preferably, the bracket is made from 7075 type aluminium.

**[0029]** Preferably, said bracket's sideways flexibility in the body is a distance falling within a range from 0,15mm to 0,5mm.

**[0030]** Preferably, said bracket's sideways flexibility in the body is a distance falling within a subrange is 0,2mm to 0,3mm whereas a particularly advantageous flexibility distance is 0,25mm.

**[0031]** Preferably, the bracket is made from a material harder than the body.

**[0032]** Another object of the present invention is a method for using a handgun converter to improve shooting accuracy, the method comprising the steps of: providing a handgun converter having a body, having a handgun-engaging assembly for holding a handgun wherein said handgun-engaging assembly comprises: a front engaging member in the front of the converter, for cradling the barrel of said handgun; and a rear engagement member for engaging an external portion of the rear of said handgun, thereby fastening said handgun to the converter said method further comprising the steps of: configuring said handgun-engaging assembly to allow for a degree of flexibility of said handgun within said body in order to provide shock absorption during a recoil movement of said handgun wherein said flexibility is effected relatively to said body; inserting a handgun within said handgun converter so that it is engaged by said handgun-engaging assembly; aiming and firing said handgun.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0033]** These and other objects of the invention presented herein, are accomplished by providing a handgun converter and a method for using a handgun converter. Further details and features of the present invention, its nature and various advantages will become more apparent from the following detailed description of the preferred embodiments shown in a drawing, in which:

Fig. 1 shows a handgun converter;

Fig. 2 shows a butt of said handgun converter;

Fig. 3 shows a handgun converter having a handgun mounted therein;

Figs. 4A-D show details of a front engaging member in exploded and combined views respectively;

Figs. 5-A-C show details of a rear engaging member in exploded and combined views respectively;

Figs. 6A-B depict a bracket in a perspective and front view;

Fig. 7 presents a recoil movement in a handgun-engaging assembly according to the present invention;

Fig. 8 presents a method according to the present invention; and

Fig. 9 depicts a table presenting a comparative results of the present invention.

## DESCRIPTION OF EMBODIMENTS

**[0034]** A handgun converter, according to the present invention, is constructed in order to allow quick mounting and unmounting of a handgun, in order to enhance the handgun's fire accuracy. The converter encloses said handgun within a frame/body.

**[0035]** The inventors have extensively tested different handguns, and in particular Glock-brand handguns, using different handgun converters.

**[0036]** These tests have shown how extensively a handgun's frame flexes/deforms during firing a shot. Sometimes the flexing is so extensive that it may result in jamming the handgun.

**[0037]** Further, a shot fired is always followed by a recoil movement, which is naturally transferred to the handgun conversion. The conversion, depending on its built and materials used, responds differently to recoil, which may in turn result in lowering fire accuracy during repetitive shots fired.

**[0038]** While working on the present invention it has been established that one of drawbacks of known converters is that they mount a handgun (i.e. something that flexes during firing of a shot) in something rigid (i.e. a plastic or an alloy frame). This results in preventing the frame from flexing under the mount, thereby creating a stress. Now this stress may propagate differently in the converter.

**[0039]** Further, after shooting, said converter, as well as a frame of said handgun, may not return to the same state in a sufficiently short time. Therefore, the converter will differ in its state between shots, which results in changes in fire accuracy.

**[0040]** The handgun conversion shown in details in the drawings that follow, provides for a flexible handgun mount in said conversion so that a disadvantageous ef-

fect of a rigid mount is mitigated and thus fire accuracy, especially in rapid rounds of fire, is hereby increased. Recoil transferred to the shooter is decreased and the handgun conversion returns to its initial state in a relatively short period of time allowing for a rapid succession of shots, that reach a given target, in a time comparable to a continuous fire (for example a shot every 0,3 s).

**[0041]** Said flexible handgun mount is adapted to handguns and configured such that said handgun may flex in said flexible handgun mount relatively to a conversion frame (the degree of flexibility will be explained in the remainder of the present specification). Such a flexible handgun mount may alternatively be called a flexible handgun-engaging assembly and is the subject of the present invention.

**[0042]** Fig. 1 shows a handgun converter while Fig. 2 shows a butt of said handgun converter. Throughout the drawings a front and back directions have been indicated wherein said front portion is aligned with a direction of intended fire of a corresponding handgun.

**[0043]** The handgun converter (100) comprises a rigid body (1), which may otherwise be called a frame or an upper of said handgun converter (100). The body (1) is preferably made of aluminium 6061T6 or similar and comprises a rail configured to enclose a handgun and especially its slide and its frame's upper portion. The slide is an upper portion of a semi-automatic pistol and its function is to chamber ammunition into a barrel chamber and extract the spent casing after the round is fired. It also slides along its tracks during the recoil process.

**[0044]** The handgun converter (100) has a handgun-engaging assembly (101, 102, 103) for holding a handgun wherein said handgun-engaging assembly (101, 102, 103) comprises: a front engaging member (101) in the front of the converter (100), for cradling the front portion of the frame (or a bottom, front section of a frame) of said handgun, and/or a rear engagement member (102) for engaging an external portion of the rear portion of the frame of said handgun, and/or a bracket (103) thereby fastening said handgun to the converter (100).

**[0045]** It is to be noted that any combination of the front of the converter (100), the rear engagement member (102) and the bracket (103) is possible thereby leading to seven envisaged combinations.

**[0046]** Typically, a first option is only to use the rear engagement member (102). A second frequently used option is to use the rear engagement member (102) in combination with the front engaging member (101), while the complete set comprises the rear engagement member (102) in combination with the front engaging member (101) as well as said bracket (103) for a most effective solution according to the present invention.

**[0047]** The aforementioned bracket (103) comprises a bracket core (22) and its fastening means (40) facilitating its mounting inside the body (1). In preferred embodiments, the fastening means (40) are 4 screws such as M3x20 screws.

**[0048]** The bracket core (22) may be be a monolithic

element or be formed from multiple, separate brackets adjoining one another.

**[0049]** The bracket (103) is mounted in the back of the body (1) in proximity to an ejection port (for ejecting an ammunition shell) opening as shown in Fig. 1 and over the rear engagement member (102). The bracket (103) is preferably also made from aluminium, in a best embodiment the aluminium is of 7075 type.

**[0050]** In alternative embodiments, there may more than one bracket (103) installed in said body (1).

**[0051]** The bracket (103) allows to control the sideways flexibility of the body (1), during fire and a subsequent recoil movement, taking into account the axis of the handgun (300) fire/barrel.

**[0052]** During tests, it has been established and verified that said bracket (103) may flex sideways in the body (1) by a distance falling within a range from 0,15mm to 0,5mm whereas a preferred subrange is 0,2mm to 0,3mm whereas a particularly advantageous flex distance is 0,25mm during recoil. In a sense, the bracket (103) may also reduce transverse flexing of the body (1), which, depending on the material used, may be for example up to 1,5mm.

**[0053]** Such flexing has been shown in more details in Figs. 6A-B. To this end the bracket (103) is flexible to the sides while being reinforced in the vertical direction to minimize or even prevent flexing in a vertical direction. This is a result of a handgun flexing sideways during a recoil due to the fact that a Glock handgun's frame has a different stiffness on the left and right sides, because said frame creates a weaker section on the left side.

**[0054]** Further, increase of stiffness of the bracket (103), beyond said range, led to the system being too stiff and the recoil movement was far more felt by a shooter. Typically this also increased the weight of the handgun converter (100), which was also not beneficial.

**[0055]** In some embodiments, the bracket (103) is made from a material harder than the body (1).

**[0056]** Said handgun-engaging assembly (101, 102, 103) is further configured to allow for a degree of flexibility of said handgun, relative to said body (1), in order to provide shock energy absorption. The shock is caused by a firing and a subsequent recoil movement of the handgun and the handgun converter (100).

**[0057]** Details of the front engaging member (101) have been shown in Figs. 4A-D while details of the rear engaging member (102) have been shown in Figs. 5A-C.

**[0058]** The clamping surfaces of the front engaging member (101) and the rear engagement member (102) may be configured and dimensioned to complement and/or mate with the respective, corresponding parts of the handgun used. Therefore, use of another handgun may require adaptation of certain elements (25, 31, 11) to fit, which a person skilled in the art will understand. For example, the body (1) has a length that will accommodate a particular handgun.

**[0059]** A handgun slide pull out mechanism is also shown in Fig. 1, wherein its main parts are a pulling fork

(11), of a handgun slide, mounted (40) to a reload rail (3) pullable by a grip portion (4) mounted (12) to said rail (3).

**[0060]** The rail (3) may be a T-shaped elongated element fitting to a corresponding guide present in the upper part of the body (1).

**[0061]** The rail (3) is positioned over an ejector (14) when mounted in the body (1). Additionally, the bracket (103) may be positioned under said rail (3) thereby positioning the rail (3) between the bracket (103) and the body (1).

**[0062]** The ejector (14) may be mounted to the body (1) by means of screws (46) or other fastening means.

**[0063]** Inside said rail (3) there is positioned a spring mechanism comprising a spring (20) and a spring guiding mandrel (21) fitting inside a cavity of said spring (20). Therefore, once pulled the handgun slide pull out mechanism will return to its initial position.

**[0064]** Fig. 2 shows a butt (2) of said handgun converter (100). Said butt (2) may take different forms and shapes (frequently adapted to a particular user) while in a preferred embodiments it comprises a far end (9) of the butt (2) being furthest from the handgun (300) and configured to be held against a shooter's body. The top of the far end (9) is usually referred to as a heel while the bottom of the far end (9) is usually referred to as a toe.

**[0065]** The far end (9) is coupled to a spacer (10) allowing for adjusting the length of the butt (2) and the elastic properties of the butt (2). Fastening means, such as screws (5, 42) may be used to couple the far end (9), the spacer (10) and the butt (2).

**[0066]** Preferably, the butt (2) is pivotably mounted to the body (1) so that a user may fold it to the side. Preferably, all elements shown are made from metal such as steel or aluminium.

**[0067]** Said pivot may be such that it rotates about a vertical axis, perpendicular to the axis of fire, and when folded it may be positioned parallel to the body (1). To this end, it is preferred to use a pivot-swing mount (6) comprising a butt connector (7) allowing to connect the pivot-swing mount (6) to the butt (2) by means of fastening means (16, 17) such as screws.

**[0068]** A mandrel (8) is used as a pivot point, wherein said mandrel (8) is aligned on said vertical axis perpendicular to the axis of fire.

**[0069]** The pivot-swing mount (6) comprises a recess (6A) for receiving a tongue (7A) of the butt connector (7). A spring (18) is configured to push the tongue (7A) in to said recess (6A) to lock the butt (2) in place. In order to unlock, the butt connector (7) has to be pushed downwards (away from the recess (6A)).

**[0070]** To this end, said mandrel (8) passes via said pivot-swing mount (6) and the butt connector (7) while being fixed by a retaining plate (15).

**[0071]** The complete pivot-swing mount (6) is attached (44) to the body (1) by means of a back block (47). To this end the back block may comprise screw (44) openings corresponding to screw (44) openings present in the pivot-swing mount (6).

**[0072]** The purpose of the back block (47) is twofold: (a) it is a mounting point for the complete butt (2) and (b) it is a stop point holding a threaded rod (39) in a fixed position.

**[0073]** The back block (47) is fixedly mounted at the back of the body (1), preferably by means of screws (41).

**[0074]** In an embodiment of the present invention, the threaded rod (39) may have a quick release mechanism in said back block (47). Such a quick release mechanism is beneficial as it allows for precise positioning of a handgun in said body (1).

**[0075]** Said quick release mechanism, may comprise springs (23) and two clamps (36, 37) each mounted on a left and right side of the back block (47) respectively. Said clamps may be rotatably mounted on fastening means (41) facing upwards. Therefore, said clamps (36, 37) allow for brining their back ends together upon rotating on said fastening means (41).

**[0076]** Further, said clamps (36, 37) may comprise spring nests facing said back block (47) while said back block (47) has corresponding spring nests each facing said clamps (36, 37). Thus, two springs (23) are positioned between each clamp (37) and the back block (47).

**[0077]** The aforementioned back block (47) comprises an opening (47A) for receiving said threaded rod (39) while said clamps may have threaded faces (36A, 37A) correspondingly to the threaded rod (39). This means that said threaded rod (39) will be locked by pushing said threading (36A, 37A) against the threading of the threaded rod (39).

**[0078]** In yet further embodiment, said threading of the clamps (36, 37) and correspondingly of said threaded rod (39) may be such that when said springs (23) push said threads against each other a backward movement of said threaded rod (39) is impossible while its forward movement is possible. Thereby, precise positioning of a handgun in said body (1) is facilitated by means of the rear engaging member (102) as will be described in the following specification.

**[0079]** The threaded rod (39) may have, on its back end, a section for receiving a screwdriver or a key allowing for screwing in or unscrewing the threaded rod (39) caught by the clamps (36, 37). This allows for two benefits: (A) tightening or loosening the spring (35) and (B) unmounting the complete rear engaging member (102) in a case of its jamming situation, in which for example the clamps (36, 37) are damaged.

**[0080]** Fig. 3 shows a handgun converter (100) having a handgun (300) mounted therein. It is the same system as in Fig. 1 wherein the handgun converter (100) has been assembled and the handgun (300) has been mounted therein using the handgun-engaging assembly (101, 102, 103).

**[0081]** Details of the front engaging member (101) have been shown in Figs. 4A-D. It is configured to allow for a degree of flexibility of said handgun (300) relative to said body (1) in the axis of fire i.e. back to front. In particular, when at rest, the front engaging member (101)

may not be pushed in the front direction but may be pushed towards the back direction, which is in line with a recoil movement of a corresponding handgun (300).

**[0082]** It is to be noted that other particular configurations of said front engaging member (101) are possible as long as the foregoing function is provided. A preferred configuration of the front engaging member (101) has been described below.

**[0083]** The front engaging member (101) is preferably also made from aluminium. In other embodiments a polymer material may be applied also in combination with aluminium such as 6061T6.

**[0084]** A main module (30) of the front engaging member (101) is a cradle. This is a basis for the flexible recoil member. The main module (30) is configured to receive a front handgun mount (31). This may be effected by a railing system so that the front handgun mount (31) slides in the main module (30). Said handgun mount (31) preferably comprises a holding member configured to hold a handgun (300) once pushed inside the handgun mount (31). Such holding member may be a rail having a shape adapted to the front section of a particular handgun (300). In particular, a section (31A) of the handgun mount (31) may be configured to receive a trigger guard as shown in Fig. 1 and Figs. 4A-D.

**[0085]** Said holding member may also comprise a latch (29), of a front of a handgun (300), which is positioned in said handgun mount (31). Such handgun (300) is pushed between said handgun mount (31) and said pulling fork (11) of a handgun (300) slide.

**[0086]** A handgun (300) typically has a recess (usually in the main frame, wherein said recess is perpendicular to the line of fire) into which said latch (29) fits and locks the handgun (300) in the handgun mount (31). The latch (29) is movable because it is mounted on a spring (33). To this end the button section (29A) of the latch (29) may be pushed upwards in order for a latch tongue (29B) to disengage said handgun (300) recess.

**[0087]** A pin (34) may be used to hold the latch (29), and its corresponding spring (33) in the handgun mount (31). To this end, the latch (29) has a pin hole (34B), while the handgun mount (31) has a pin hole (34A) for receiving the pin (34). This is best shown in Figs. 4C-D.

**[0088]** A pin (32) and a corresponding pin hole (32B) is present in the main module (30) of the front engaging member (101). Thus, the pin (32) holds at the same time the latch (29), the front handgun mount (31) and the main module (30). The pin (32) passes in a section (32B) marked in Fig. 4D. A spring (35) has its back end resting on the pin (32).

**[0089]** Preferably, the pin holes (32B, 34A, 34B) are positioned perpendicularly to the axis of fire and horizontally.

**[0090]** The foregoing arrangement results in that when mounted in the body (1) by the pin (32), the complete front engaging member (101) is fixed to the body (1) while the spring (35) allows for a movement backwards of the handgun (300) mounted in the front engaging member

(101).

**[0091]** The spring (35) has preferably a recoil travel distance (compression action) within a range of 1 mm to 2 mm and more preferably within a subrange of 1,3mm to 1,6mm while a particularly advantageous travel distance is 1,5mm. This travel distance influences overall fire accuracy.

**[0092]** Since different handguns (300) may have different recoil force level, adjustment of the hardness of the spring (35) may be required to achieve said preferred travel distance.

**[0093]** In other embodiments of the present invention the spring (35) (or the latch (29) spring (33)) may be exchanged for another type of a flexing element (35) such as an elastomer or an element providing properties closely similar to that of a spring. A similar comment applies to spring (35) of the same type used in the back engaging member (102).

**[0094]** The fitting of the handgun (300) in said front handgun mount (31) and use of the latch (29) preferably results in that the handgun (300) may not fall out of the front engaging member (101) once latched therein i.e. is retained therein while being flexible as the spring (35) allows.

**[0095]** The complete front engaging member (101) is fastened to the body (1) preferably by means of screws (12, 40) as shown in Fig. 1. The spring (35) allows the front handgun mount (31) to move backwards in the main module (30) during a recoil movement, wherein said backward movement is limited by the travel distance of said spring (35).

**[0096]** In the case of the screws (12) there may be used self-threading inserts (38) in the respective openings of the main module (30). Such inserts (38) are designed to create highly resilient screw mounts, resistant to vibrations, in materials having relatively low shear strength, such as Aluminium.

**[0097]** When the recoil movement finishes, the front handgun mount (31) returns to its initial position due to the force exerted by said spring (35). The front handgun mount (31) is configured such that it cannot be pulled out (see the pin (32)) from the main module (30) and then the complete front engaging member (101) is mounted in the body (1).

**[0098]** Details of the rear engaging member (102) have been shown in Figs. 5A-C. It is configured to allow for a degree of controlled flexibility of said handgun (300) relative to said body (1) in the axis of fire i.e. back to front. In particular, when at rest, the back engaging member (102) may not be pushed in the front direction but may be pushed towards the back direction, which is in line with a recoil movement of a corresponding handgun (300).

**[0099]** It is to be noted that other particular configurations of said rear engaging member (102) are possible as long as the foregoing function is provided. A preferred configuration of the rear engaging member (102) has been described below.

**[0100]** The rear engaging member (102) is preferably also made from aluminium. In other embodiments a polymer material may be applied also in combination with aluminium such as 6061T6.

5 **[0101]** Said rear engaging member (102) is mounted in the body (1). It comprises a slide (24) that is configured to receive a front stabiliser (25) and a back stabiliser (28) of said rear engaging member (102). Said receiving may be effected by means of rails.

10 **[0102]** The slide (24) preferably has a rail (24A) system configured to adhere against the bottom part of the body (1), while protrusions (25A) of the front stabiliser (25) and protrusions (28A) of the back stabiliser (28) are configured to be received by suitable rails of the body (1) that will hold the complete rear engaging member (102) in place in said body (1) and allow for only its front-back movement while preventing any side movement.

15 **[0103]** The stabilisers (24, 28) have corresponding members so as to slide forth and back and be cushioned by springs (27, 35) so that a recoil movement of a handgun (300) hits the front stabiliser (25) whereas the recoil force is transferred from the front stabiliser (25) via the springs (27, 35) to the back stabiliser (28) (as shown in particular in Fig. 5B).

20 **[0104]** Pins (13), such as expansion pins, are used to mount the stabilisers (24, 28) relatively to the threaded rod (39). In particular, the threaded rod (39) has a collar portion and a recess (39A) perpendicular to the length of the threaded rod (39) for receiving two pins (13) perpendicularly (as well as preferably vertically) to the threaded rod (39), which hold said threaded rod (39) in the back stabiliser (28). Similarly a flange (39B) inserted in the front stabiliser (25) is retained therein by a further pair of pins (13) as shown in Fig. 5A. Naturally, other retaining means may be used instead of said pins (13).

30 **[0105]** The slide (24) and said front and rear stabilisers (25, 28) are mounted on the rod (39), which is threaded. The threading makes the back stabiliser (28) remain at a fixed position while during recoil the front stabiliser (25) is pushed towards the back stabiliser (28).

35 **[0106]** Further, the back stabiliser (28) may be locked (e.g. by means of a screw (12)) against a stop portion (24B) of the slide (24) while said rear engaging member (102) is locked in the back block (47) for example by means of said clamps (36, 37).

40 **[0107]** The recoil movement is damped by the spring (35). To this end the springs (27) stabilise the front stabiliser (25) so that it for example does not rotate or otherwise angle (a twisting motion) with respect to the back stabiliser (28).

45 **[0108]** As previously defined, also in this case the spring (35) has preferably a travel distance (compression action) within a range of 1 mm to 2 mm and more preferably within a subrange of 1,3mm to 1,6mm while a particularly advantageous travel distance is 1,5mm. This travel distance influences overall fire accuracy.

**[0109]** The spring (35) is such that, during a recoil movement, the front stabiliser (25) will not hit the back

stabiliser (28) while at the same time allowing for easy insertion of a handgun (300) into the handgun converter (100). Thus, the spring (35) may be adapted to a handgun (300) used as different handgun (300) may have different recoil forces present.

**[0110]** Said front stabiliser (25) has preferably a front shape tightly adapted to the back shape of a corresponding handgun (300), because the two items adhere to each other. Advantageously, the front stabiliser (25) embraces, after its mounting, also the side gaps in the back portion of the handgun between the frame and the slide. In particular, the side gaps are embraced on a length of 5mm. Owing to this, there is achieved improved sideways stability of the handgun (300) in the handgun converter (100).

**[0111]** One of the springs (35) may be stabilised by a mandrel (26) while preferably being on the same axis as the threaded rod (39). The threaded rod (39) may be made from a stainless steel.

**[0112]** Fig. 7 shows the complete handgun mount (101, 102, 103) with sections E and F magnified to show how the front engaging member (101) and the rear engaging member (102) move towards the back of the handgun converter (100) during a recoil movement. After a recoil, the handgun (300) is returned to its initial position by means of the springs (35).

**[0113]** As may be seen from the above embodiments, the flexing of a handgun (300) in said flexible handgun mount (101, 102, 103) relatively to a conversion frame, body (1) is defined by the flexing of the bracket (103) [e. g. 0,25mm] and the travel length of the spring (35) [preferably 1,5mm].

**[0114]** Lastly, a method according to the present invention is shown in Fig. 8. The method starts from step (801) by providing a handgun converter (100) according to the present invention. Next, at step (801), there is executed configuring of said handgun-engaging assembly (101, 102, 103) to allow for a degree of flexibility of said handgun (300) within said body (1) in order to provide shock absorption during a recoil movement of said handgun wherein said flexibility is effected relatively to said body (1).

**[0115]** Subsequently, there is performed inserting (803) said handgun (300), in said handgun converter (100), so that it is engaged by said handgun-engaging assembly (101, 102, 103). Finally, the method comprises aiming (804) and firing (805) said handgun (300).

**[0116]** It is clear that such method may be fully executed by a suitable machine such as a handgun firing robot. Such robots are frequently used in handgun tests, which remove human factor from weapons tests, especially when comparing different weapons.

**[0117]** Fig. 9 depicts a table presenting a comparative results of the present invention.

**[0118]** The tests have been executed by using the same handgun Glock 17, the same shooter, in the same environmental conditions so as to ascertain comparable results.

**[0119]** A Micro-Roni (CAA USA) handgun converter, one of the most popular converters for a Glock 17 handgun) has been used in the tests to compare with the present invention's handgun converter (100).

5 **[0120]** The tests have been executed for a 10m, 25m and 100m targets with 4 consecutive shots each. The shots were not timed.

**[0121]** As is clearly evident, the present invention's handgun converter (100) has provided improved results in every test scenario. It may also be seen that the present invention's handgun converter (100) is more accurate on a distance of 100m than the compared product is on a distance of 25m, which is a dramatic improvement. The compared product did not provide any hit at 100m with a target size of 30cm.

10 **[0122]** While the invention presented herein has been depicted, described, and has been defined with reference to particular preferred embodiments, such references and examples of implementation in the foregoing specification do not imply any limitation on the invention. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader scope of the technical concept. The presented preferred embodiments are exemplary only, and are not exhaustive of the scope of the technical concept presented herein.

15 **[0123]** Accordingly, the scope of protection is not limited to the preferred embodiments described in the specification, but is only limited by the claims that follow.

## Claims

1. A handgun converter (100) comprising:

- a body (1), having a handgun-engaging assembly (101, 102, 103) for holding a handgun (300);
- wherein said handgun-engaging assembly (101, 102, 103) comprises:

- a front engaging member (101) in the front of the converter (102), for cradling a front of said handgun (300); and
- a rear engagement member (102) for engaging an external portion of the rear portion of the frame of said handgun (300), thereby fastening said handgun (300) to the handgun converter (100);

said handgun converter (100) being **characterized in that**

- said handgun-engaging assembly (101, 102, 103) is configured to allow for a degree of flexibility of said handgun (300) within said body (1) in order to provide shock absorption during a recoil movement of said handgun (300) wherein

- said flexibility is effected relatively to said body (1).
2. A handgun converter (100) according to claim 1 wherein said flexibility is present in said front engaging member (101) being fixed to the body (1) wherein it comprises a flexing element (35) configured to allow for a backwards movement of the handgun (300) mounted in the front engaging member (101).
  3. A handgun converter (100) according to claim 1 wherein said flexibility is present in said back engaging member (102) being fixed to the body (1) wherein it comprises a flexing element (35) configured to allow for a backwards movement of the handgun (300) mounted in the front engaging member (102).
  4. A handgun converter (100) according to claims 2 and 3 wherein said flexing element (35) has a recoil travel distance within a range of 1 mm to 2 mm.
  5. A handgun converter (100) according to claim 4 wherein said flexing element (35) has a recoil travel distance within a subrange of 1,3mm to 1,6mm while a particularly advantageous travel distance is 1,5mm.
  6. A handgun converter (100) according to claim 2 wherein the fitting of the handgun (300) in said front engaging member (101) is effected by use of a latch (29) resulting in that the handgun (300) may not fall out of the front engaging member (101) once latched therein.
  7. A handgun converter (100) according to claim 3 wherein said back engaging member (102) comprises a front stabiliser (25) having a front shape tightly adapted to the back shape of said handgun (300) wherein the front stabiliser (25) embraces, after its mounting, also side gaps present in the back portion of the handgun (300) between the frame and the slide.
  8. A handgun converter (100) according to claim 1 wherein said rear engaging member (102) is mounted in the body (1) by means of a slide (24, 25, 28) configured to fit into rails of said body (1).
    - the slide (24) comprising front and rear stabilisers (25, 28) is mounted on a rod (39), which is threaded, whereas the threading makes the back stabiliser (28) remain at a fixed position while during recoil the front stabiliser (25) is pushed towards the back stabiliser (28);
    - wherein the threaded rod (39) has a quick release mechanism in a back block (47) fixedly mounted at the back of the body (1);
      - wherein said quick release mechanism comprises springs (23) and two clamps (36, 37) each mounted on a left and right side of the back block (47) respectively.
  9. A handgun converter (100) according to claim 8 wherein:
    - the slide (24) comprising front and rear stabilisers (25, 28) is mounted on a rod (39), which is threaded, whereas the threading makes the back stabiliser (28) remain at a fixed position while during recoil the front stabiliser (25) is pushed towards the back stabiliser (28);
    - wherein the threaded rod (39) has a quick release mechanism in a back block (47) fixedly mounted at the back of the body (1);
      - wherein said quick release mechanism comprises springs (23) and two clamps (36, 37) each mounted on a left and right side of the back block (47) respectively.
  10. A handgun converter (100) according to claim 1 wherein said handgun-engaging assembly (101, 102, 103) comprises a bracket (103) comprising a bracket core (22) and its fastening means (40) facilitating its mounting inside the body (1),
    - whereas the bracket (103) is mounted in the back of the body (1) in proximity to an ejection port opening and over the rear engagement member (102);
    - whereas the bracket (103) allows to control a sideways flexibility of the body (1), during fire and a subsequent recoil movement, taking into account the axis of the handgun (300) barrel.
  11. A handgun converter (100) according to claim 10 wherein the bracket (103) is made from 7075 type aluminium.
  12. A handgun converter (100) according to claim 10 wherein said bracket's (103) sideways flexibility in the body (1) is a distance falling within a range from 0,15mm to 0,5mm.
  13. A handgun converter (100) according to claim 10 wherein said bracket's (103) sideways flexibility in the body (1) is a distance falling within a subrange is 0,2mm to 0,3mm whereas a particularly advantageous flexibility distance is 0,25mm.
  14. A handgun converter (100) according to claim 10 wherein the bracket (103) is made from a material harder than the body (1).
  15. A method for using a handgun converter (100) to improve shooting accuracy, the method comprising the steps of:
    - providing a handgun converter (100) having,
    - a body (1), having a handgun-engaging assembly (101, 102, 103) for holding a handgun (300);
    - wherein said handgun-engaging assembly (101, 102, 103) comprises:
      - a front engaging member (101) in the front of the converter (100), for cradling the barrel of said handgun (300); and
      - a rear engagement member (102) for engaging an external portion of the rear of said handgun (300), thereby fastening said

handgun (300) to the converter (100)

said method being **characterized in that** it further comprises the steps of:

- configuring said handgun-engaging assembly (101, 102, 103) to allow for a degree of flexibility of said handgun (300) within said body (1) in order to provide shock absorption during a recoil movement of said handgun (300) wherein said flexibility is effected relatively to said body (1);
- inserting a handgun (300) within said handgun converter (100) so that it is engaged by said handgun-engaging assembly (101, 102, 103);
- aiming and firing said handgun (300).

**Amended claims in accordance with Rule 137(2) EPC.**

**1.** A handgun converter (100) comprising:

- a body (1), having a handgun-engaging assembly (101, 102, 103) for holding a handgun (300);
- wherein said handgun-engaging assembly (101, 102, 103) comprises:
  - a front engaging member (101) in the front of the converter (102), for cradling a front of said handgun (300); and
  - a rear engagement member (102) for engaging an external portion of the rear portion of the frame of said handgun (300), thereby fastening said handgun (300) to the handgun converter (100);

said handgun converter (100) being **characterized in that**

- said handgun-engaging assembly (101, 102, 103) is configured to allow for a degree of flexibility of said handgun (300) within said body (1) in order to provide shock absorption during a recoil movement of said handgun (300) wherein said flexibility is effected relatively to said body (1).
- 2.** A handgun converter (100) according to claim 1 wherein said flexibility is present in said front engaging member (101) being fixed to the body (1) wherein it comprises a flexing element (35) configured to allow for a backwards movement of the handgun (300) mounted in the front engaging member (101).
- 3.** A handgun converter (100) according to claim 1 wherein said flexibility is present in said rear engaging member (102) being fixed to the body (1) wherein

it comprises a flexing element (35) configured to allow for a backwards movement of the handgun (300) mounted in the front engaging member (101).

- 4.** A handgun converter (100) according to claims 2 or 3 wherein said flexing element (35) has a recoil travel distance within a range of 1 mm to 2 mm.
- 5.** A handgun converter (100) according to claim 4 wherein said flexing element (35) has a recoil travel distance within a subrange of 1,3mm to 1,6mm while a particularly advantageous travel distance is 1,5mm.
- 6.** A handgun converter (100) according to claim 2 wherein the fitting of the handgun (300) in said front engaging member (101) is effected by use of a latch (29) resulting in that the handgun (300) may not fall out of the front engaging member (101) once latched therein.
- 7.** A handgun converter (100) according to claim 3 wherein said back engaging member (102) comprises a front stabiliser (25) having a front shape tightly adapted to the back shape of said handgun (300) wherein the front stabiliser (25) embraces, after its mounting, also side gaps present in the back portion of the handgun (300) between the frame and the slide.
- 8.** A handgun converter (100) according to claim 1 wherein said rear engaging member (102) is mounted in the body (1) by means of a slide (24, 25, 28) configured to fit into rails of said body (1).
- 9.** A handgun converter (100) according to claim 8 wherein:
- the slide (24) comprising front and rear stabilisers (25, 28) is mounted on a rod (39), which is threaded, whereas the threading makes the back stabiliser (28) remain at a fixed position while during recoil the front stabiliser (25) is pushed towards the back stabiliser (28);
  - wherein the threaded rod (39) has a quick release mechanism in a back block (47) fixedly mounted at the back of the body (1);
  - wherein said quick release mechanism comprises springs (23) and two clamps (36, 37) each mounted on a left and right side of the back block (47) respectively.
- 10.** A handgun converter (100) according to claim 1 wherein said handgun-engaging assembly (101, 102, 103) comprises a bracket (103) comprising a bracket core (22) and its fastening means (40) facilitating its mounting inside the body (1),

- whereas the bracket (103) is mounted in the back of the body (1) in proximity to an ejection port opening and over the rear engagement member (102);
  - whereas the bracket (103) allows to control a sideways flexibility of the body (1), during fire and a subsequent recoil movement, taking into account the axis of the handgun (300) barrel. 5
11. A handgun converter (100) according to claim 10 wherein the bracket (103) is made from 7075 type aluminium. 10
12. A handgun converter (100) according to claim 10 wherein said bracket's (103) sideways flexibility in the body (1) is a distance falling within a range from 0,15mm to 0,5mm. 15
13. A handgun converter (100) according to claim 10 wherein said bracket's (103) sideways flexibility in the body (1) is a distance falling within a subrange is 0,2mm to 0,3mm whereas a particularly advantageous flexibility distance is 0,25mm. 20
14. A handgun converter (100) according to claim 10 wherein the bracket (103) is made from a material harder than the body (1). 25
15. A method for using a handgun converter (100) to improve shooting accuracy, the method comprising the steps of: 30
- providing a handgun converter (100) having,
  - a body (1), having a handgun-engaging assembly (101, 102, 103) for holding a handgun (300); 35
  - wherein said handgun-engaging assembly (101, 102, 103) comprises:
    - a front engaging member (101) in the front of the converter (100), for cradling the barrel of said handgun (300); and 40
    - a rear engagement member (102) for engaging an external portion of the rear of said handgun (300), thereby fastening said handgun (300) to the converter (100) 45

handgun-engaging assembly (101, 102, 103);

- aiming and firing said handgun (300).

said method being **characterized in that** it further comprises the steps of: 50

- configuring said handgun-engaging assembly (101, 102, 103) to allow for a degree of flexibility of said handgun (300) within said body (1) in order to provide shock absorption during a recoil movement of said handgun (300) wherein said flexibility is effected relatively to said body (1); 55
- inserting a handgun (300) within said handgun converter (100) so that it is engaged by said

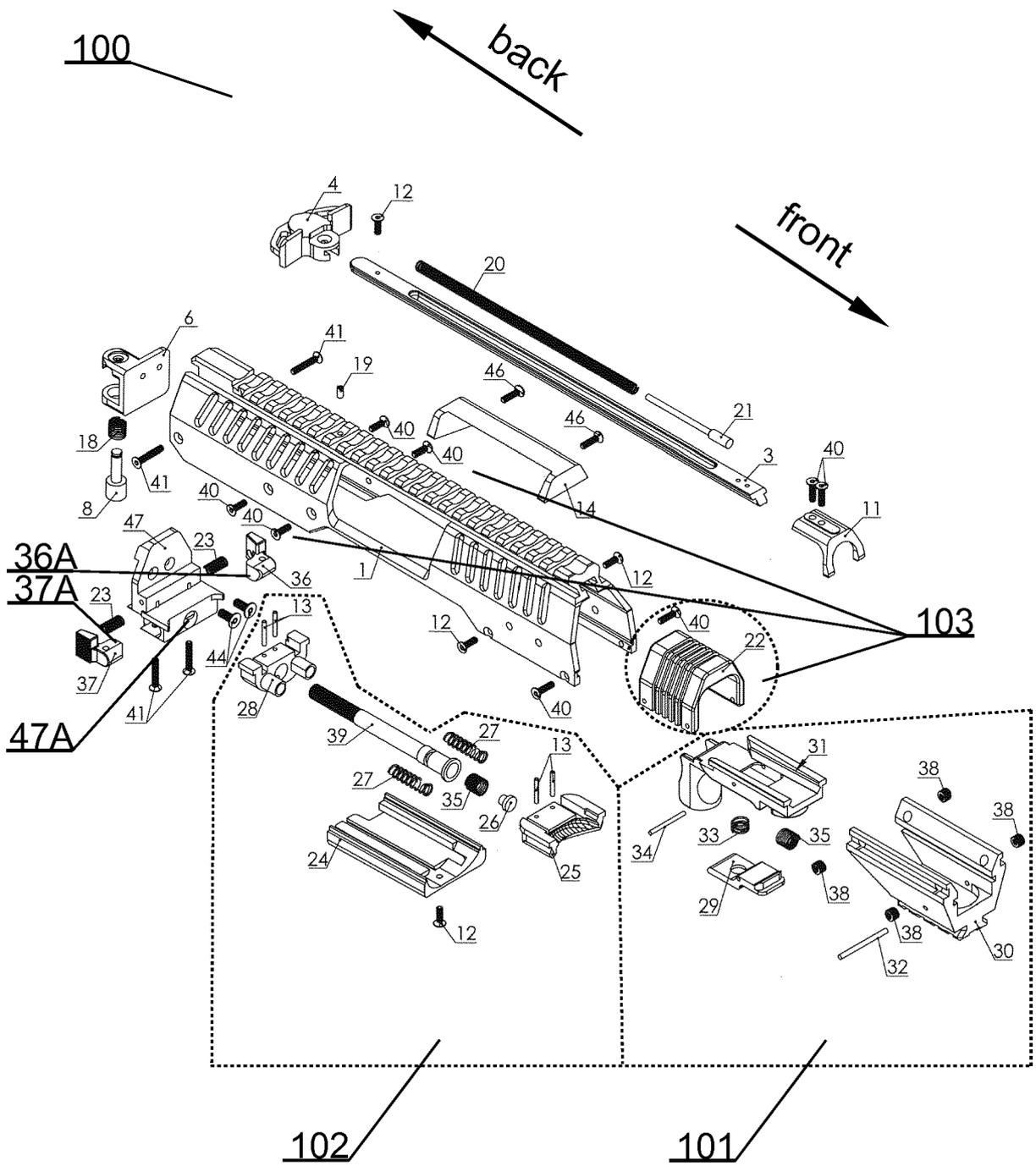


Fig. 1

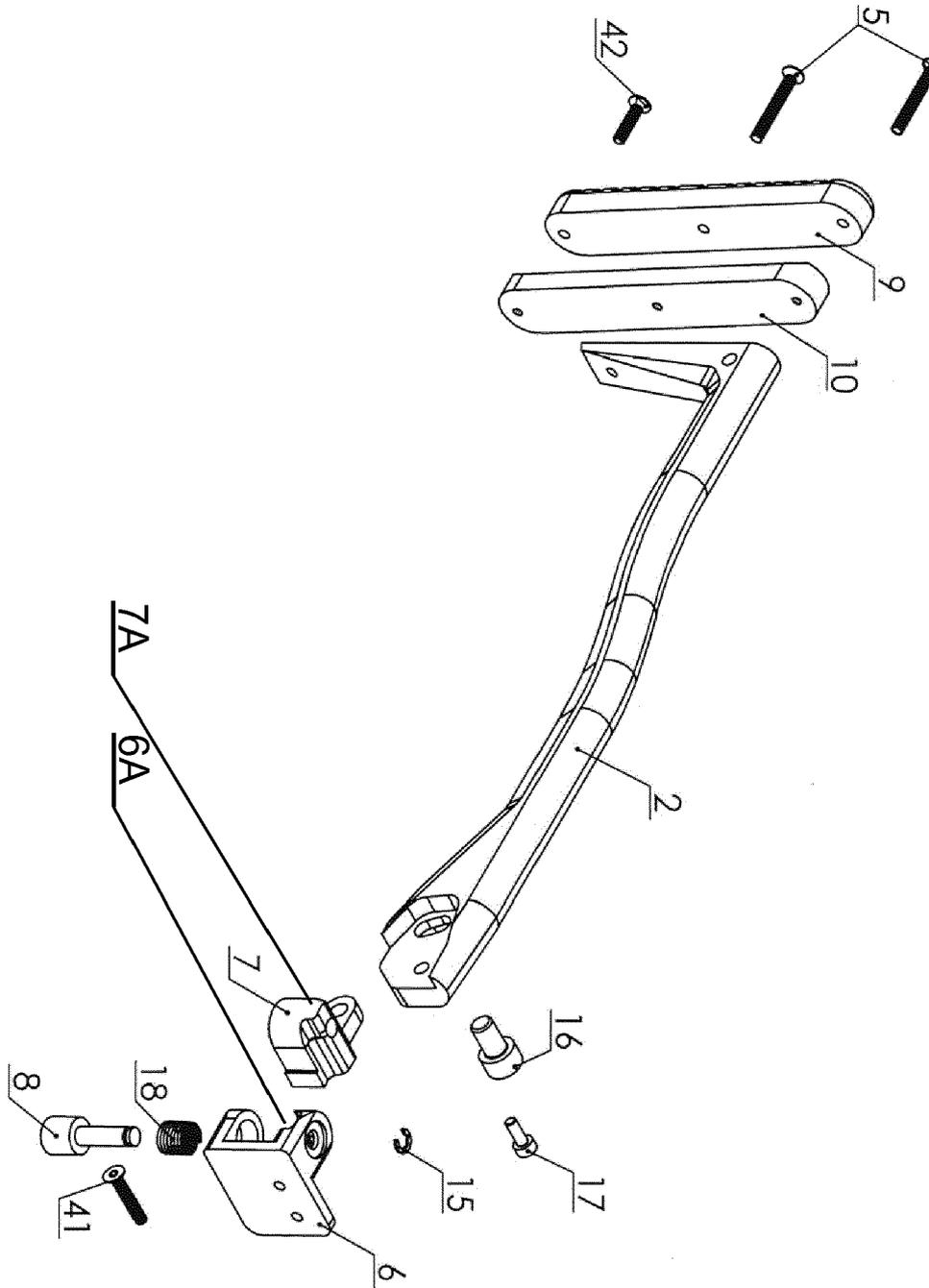


Fig. 2

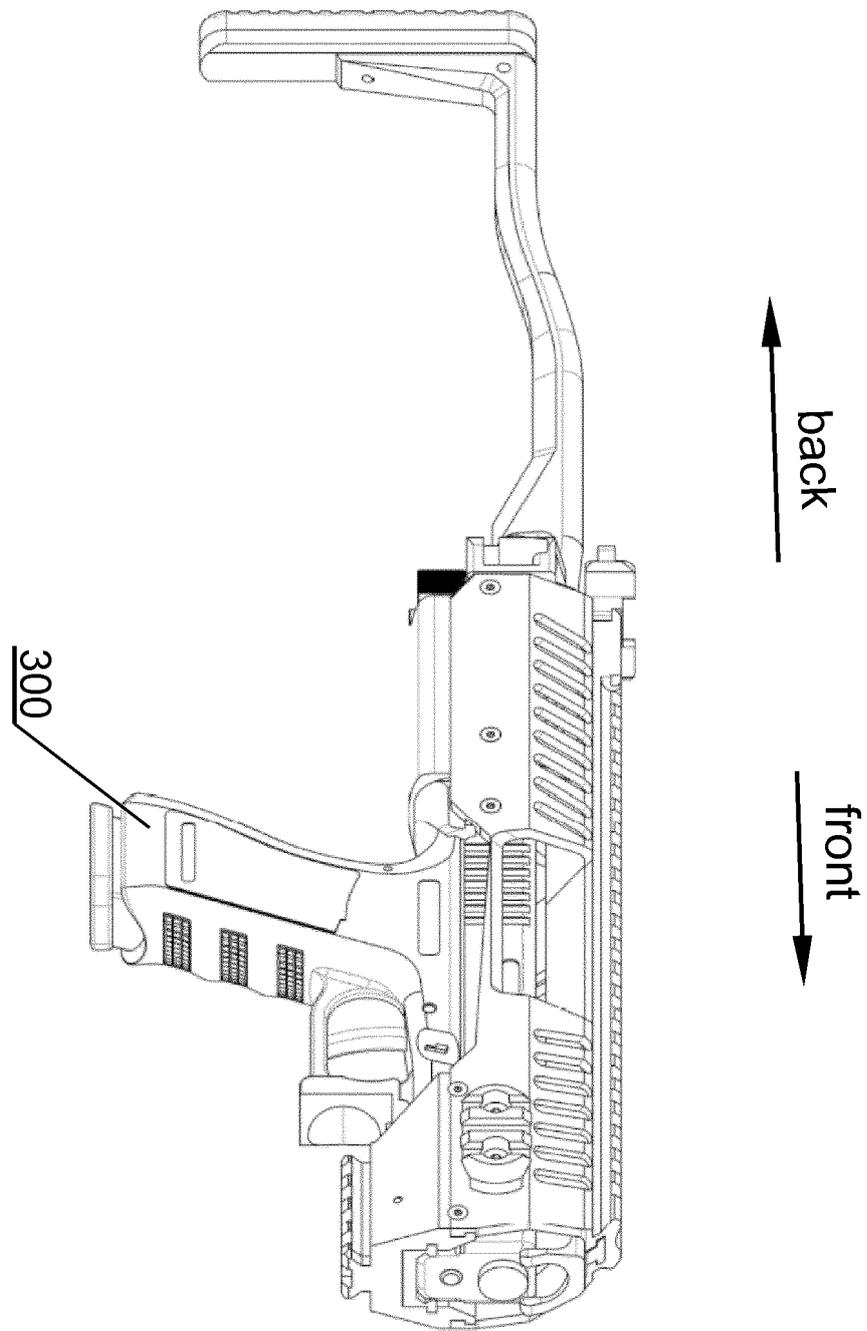


Fig. 3

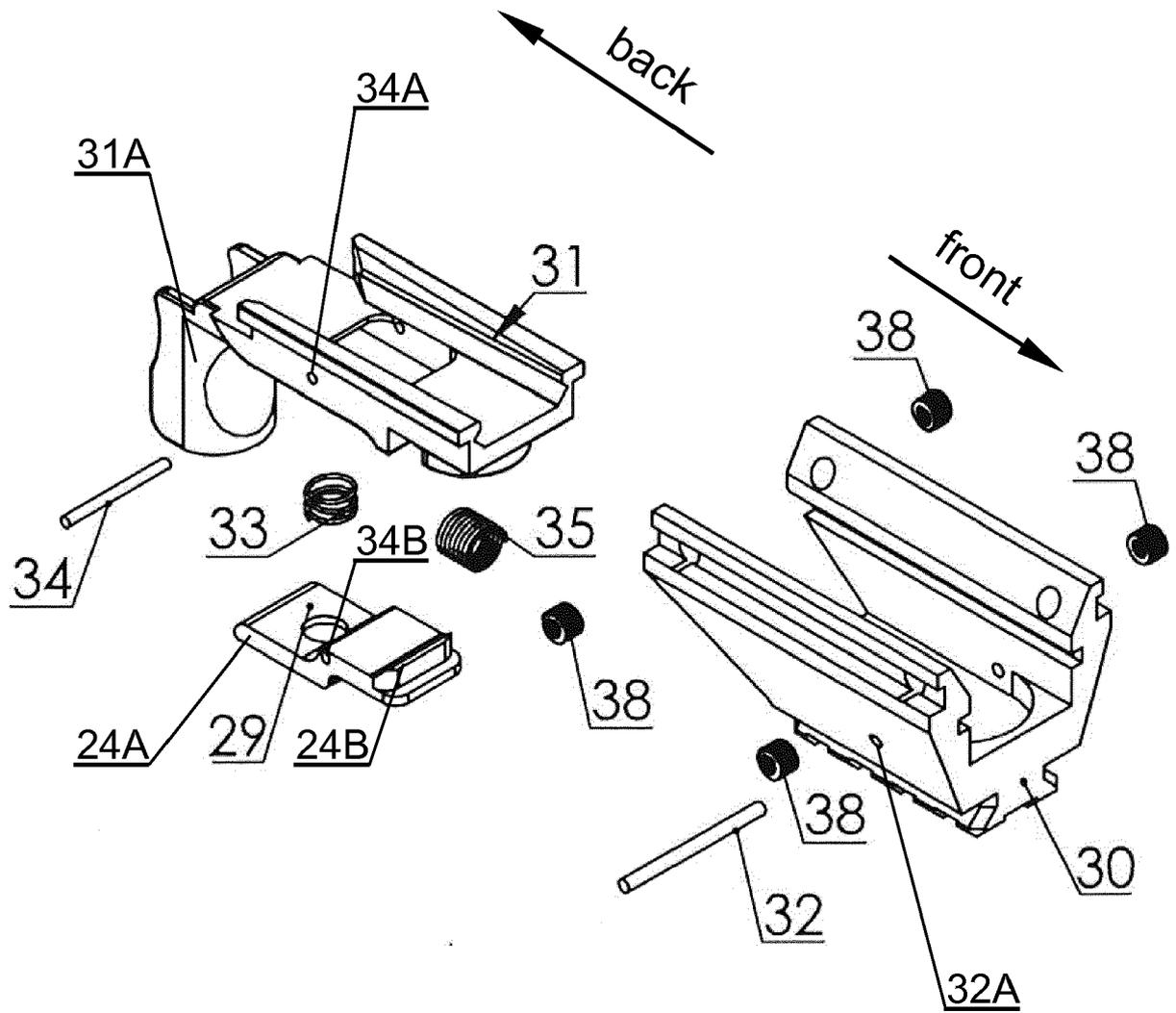


Fig. 4A

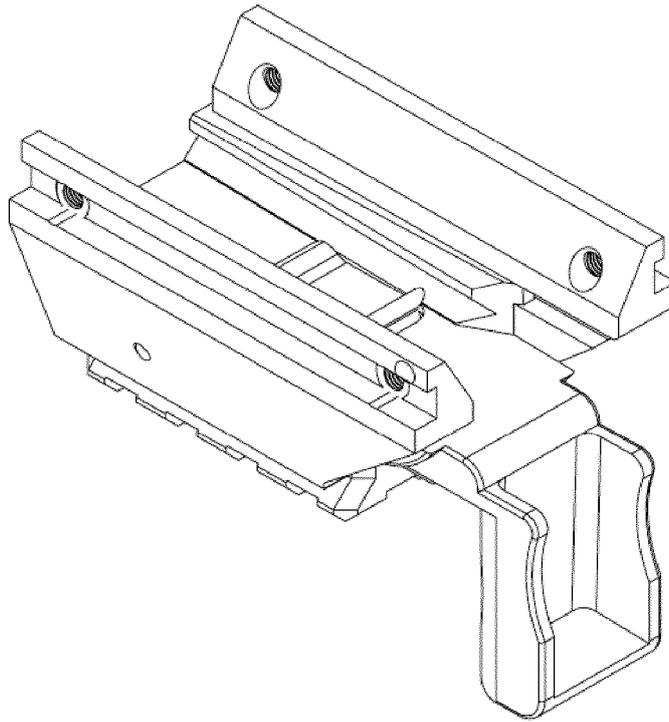


Fig. 4B

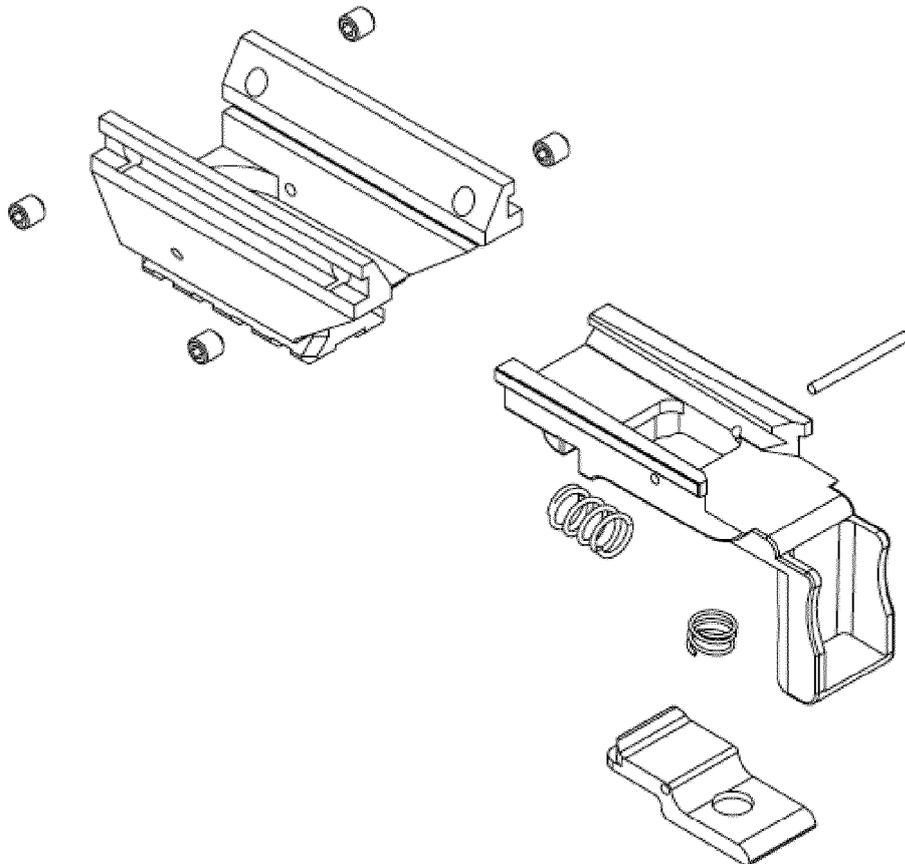


Fig. 4C

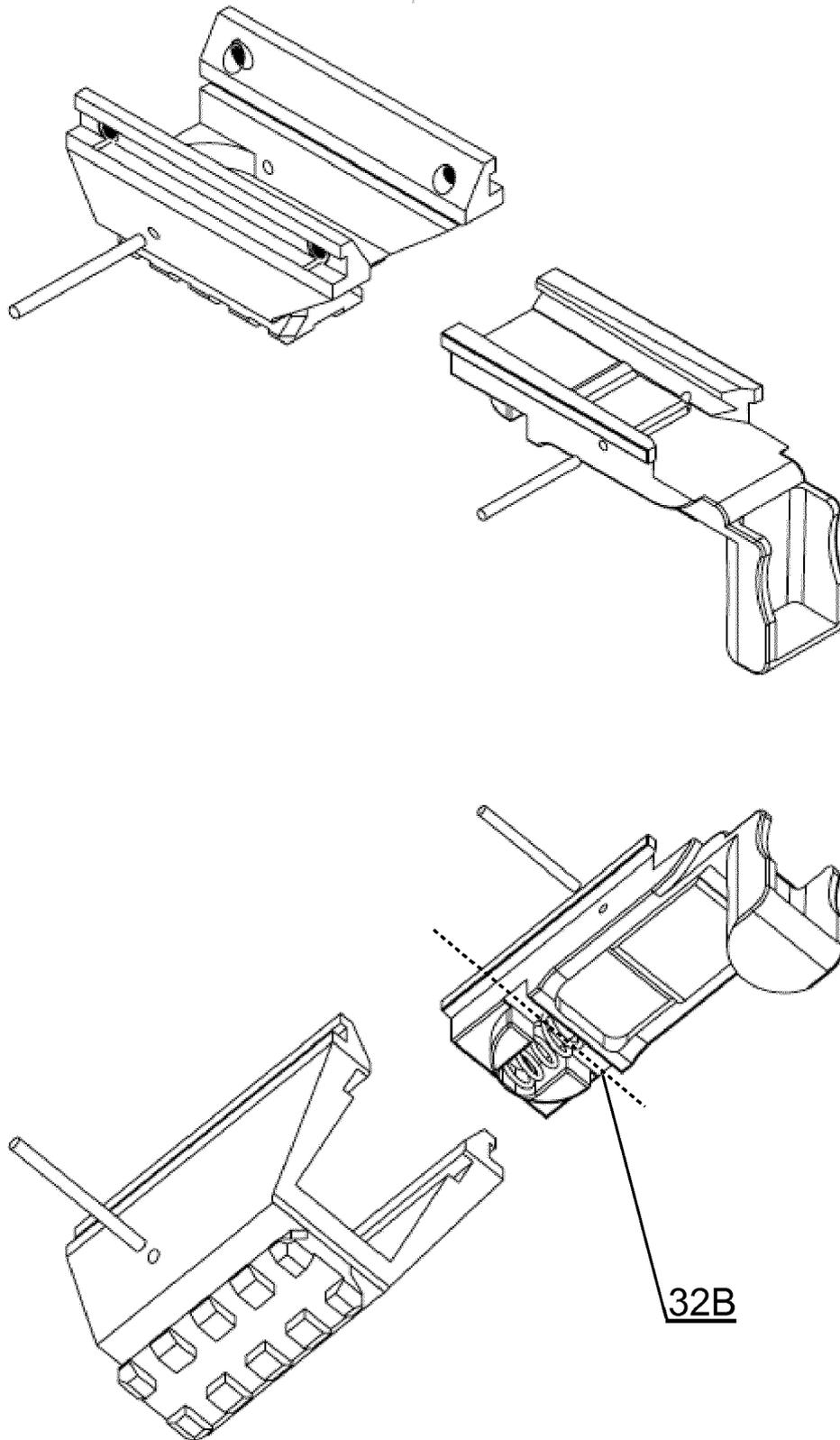


Fig. 4D

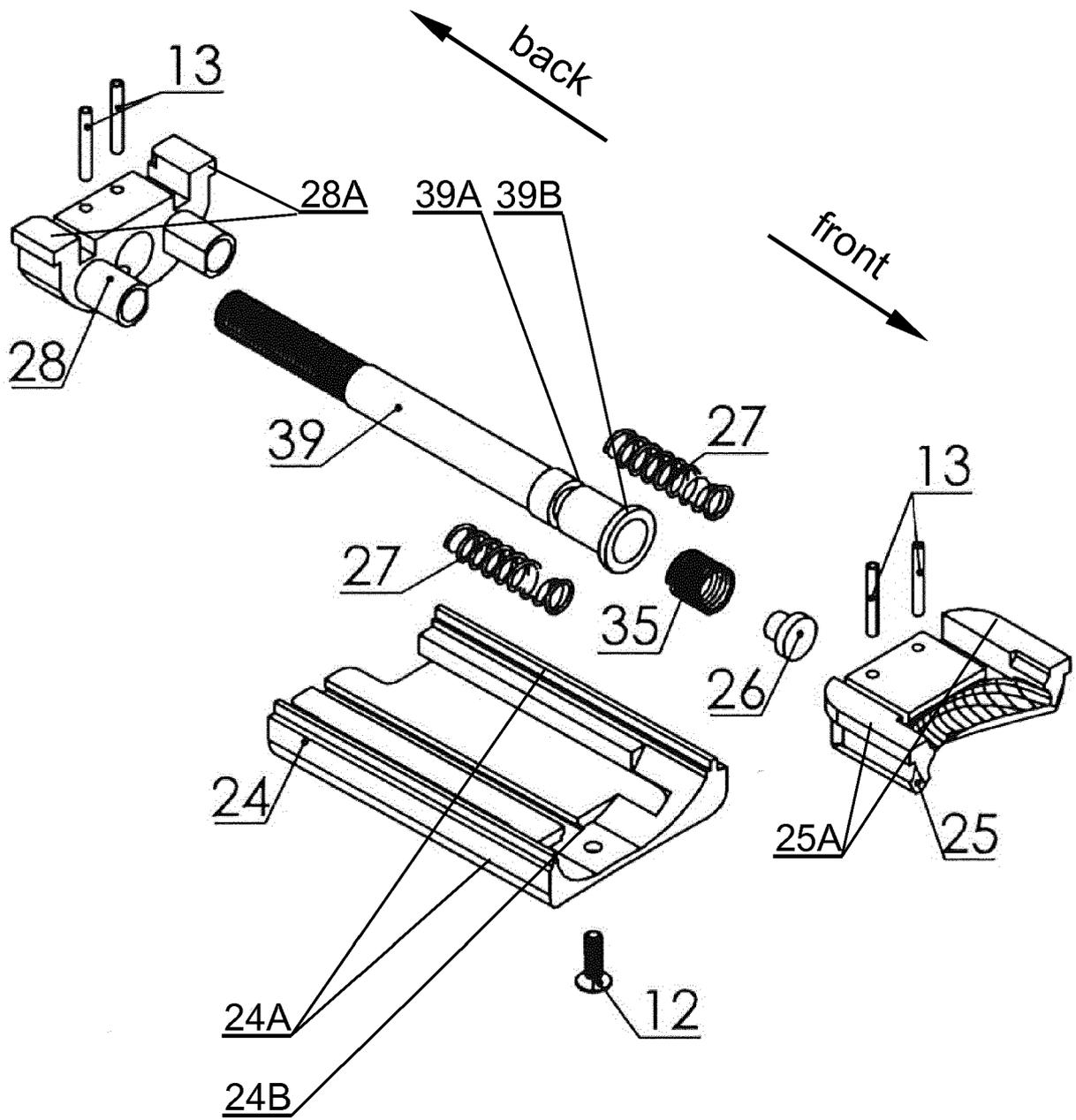


Fig. 5A

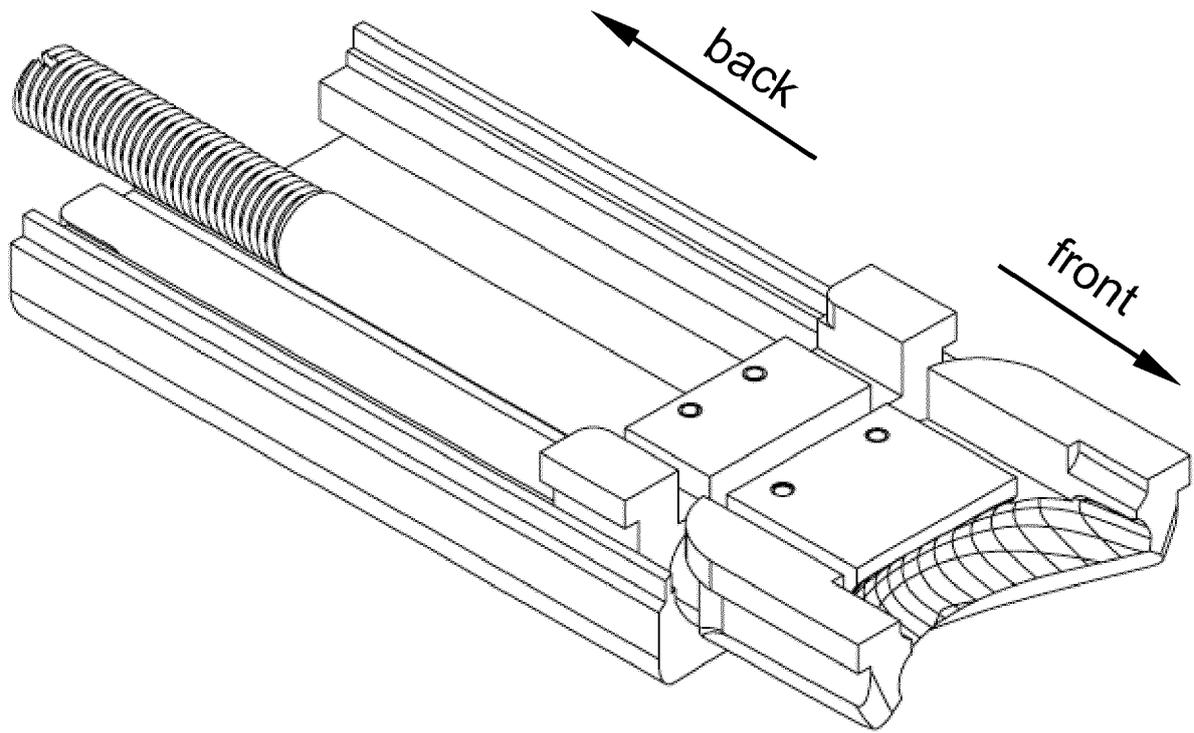


Fig. 5B

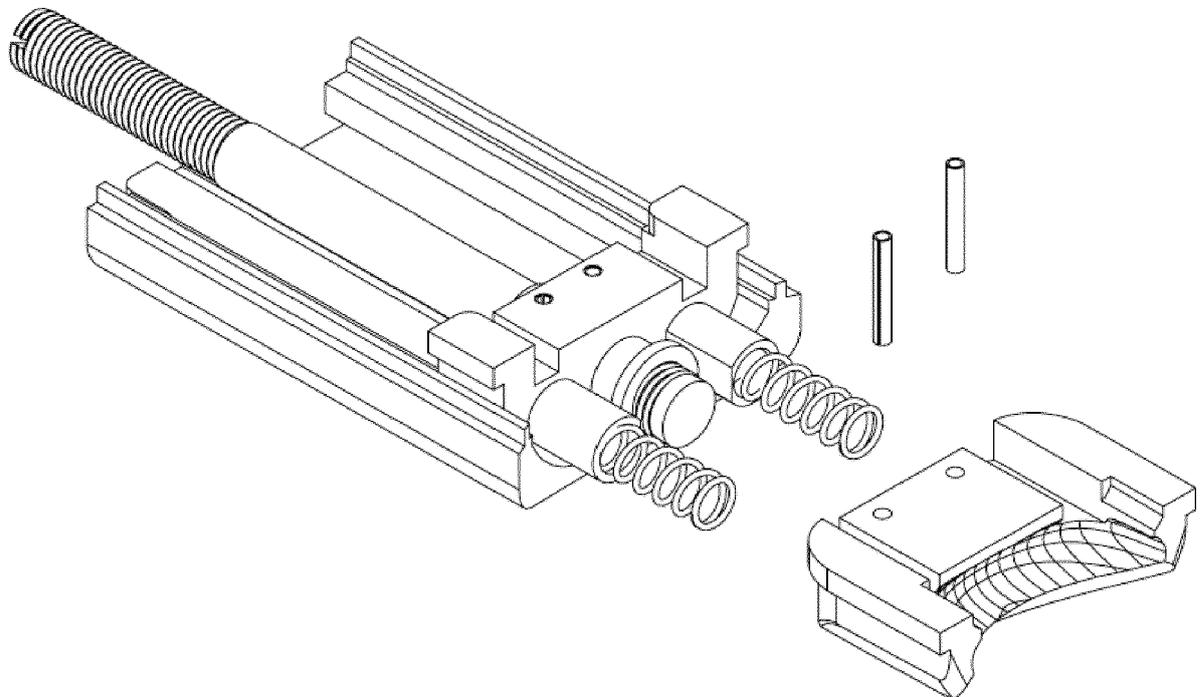


Fig. 5C

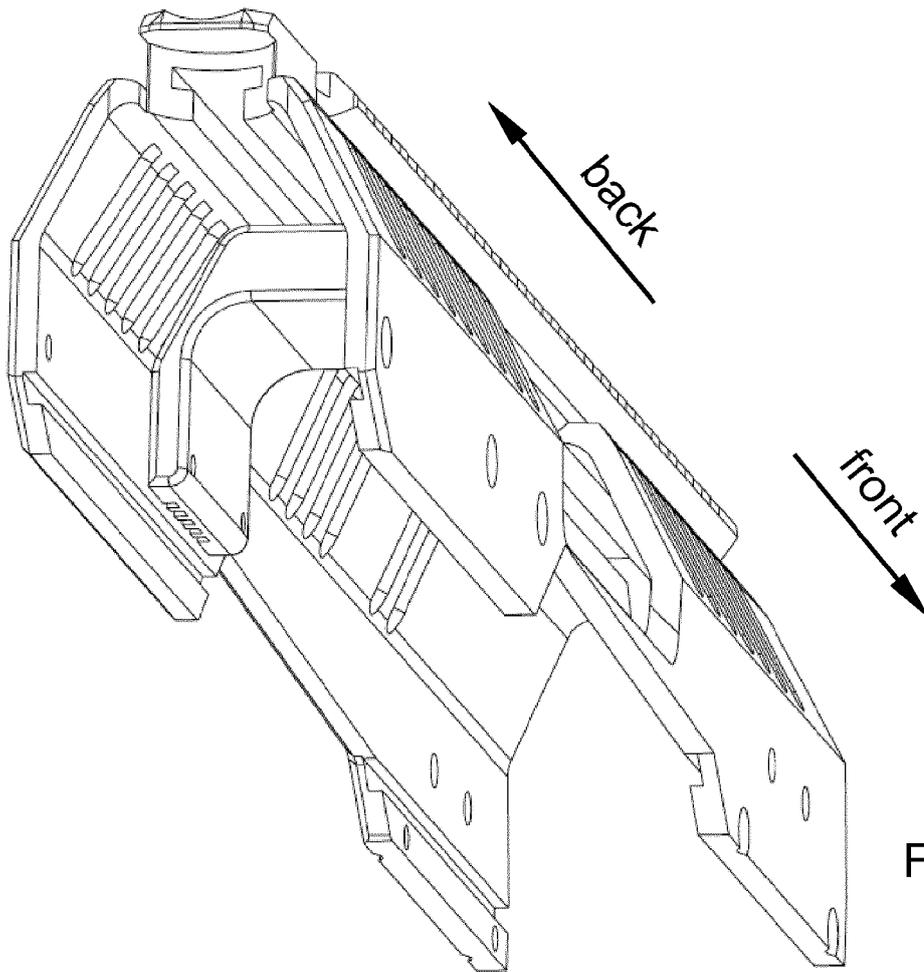


Fig. 6A

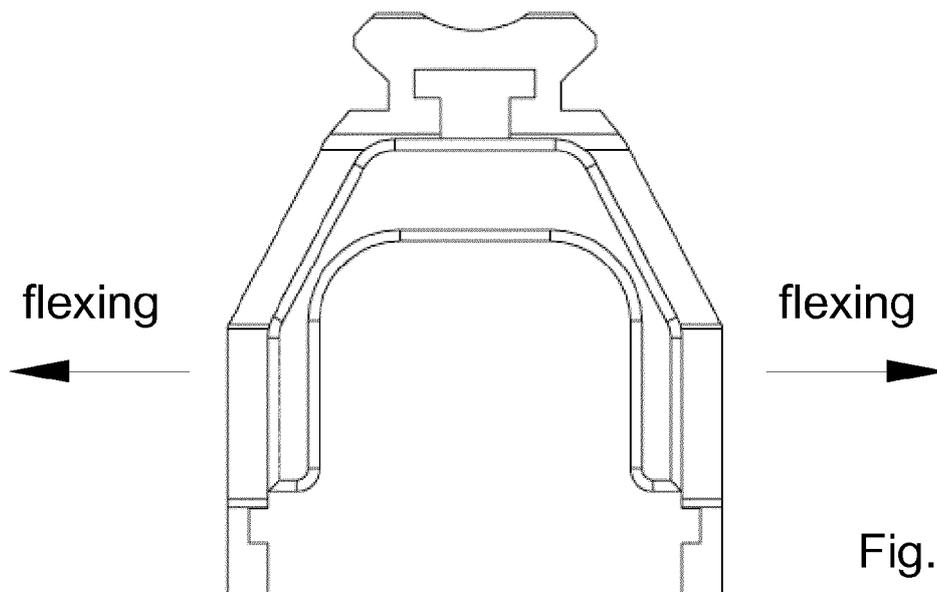


Fig. 6B

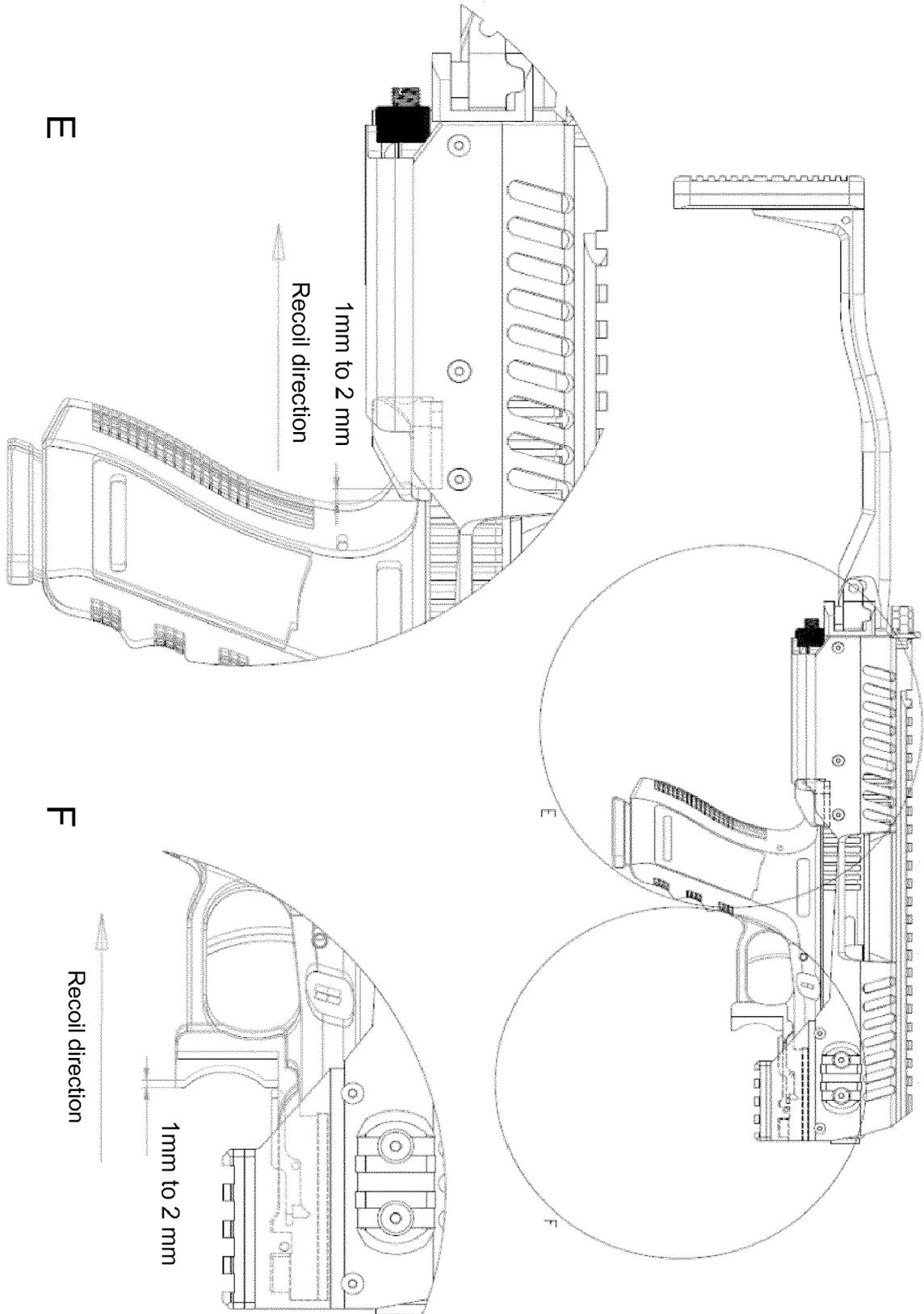


Fig. 7

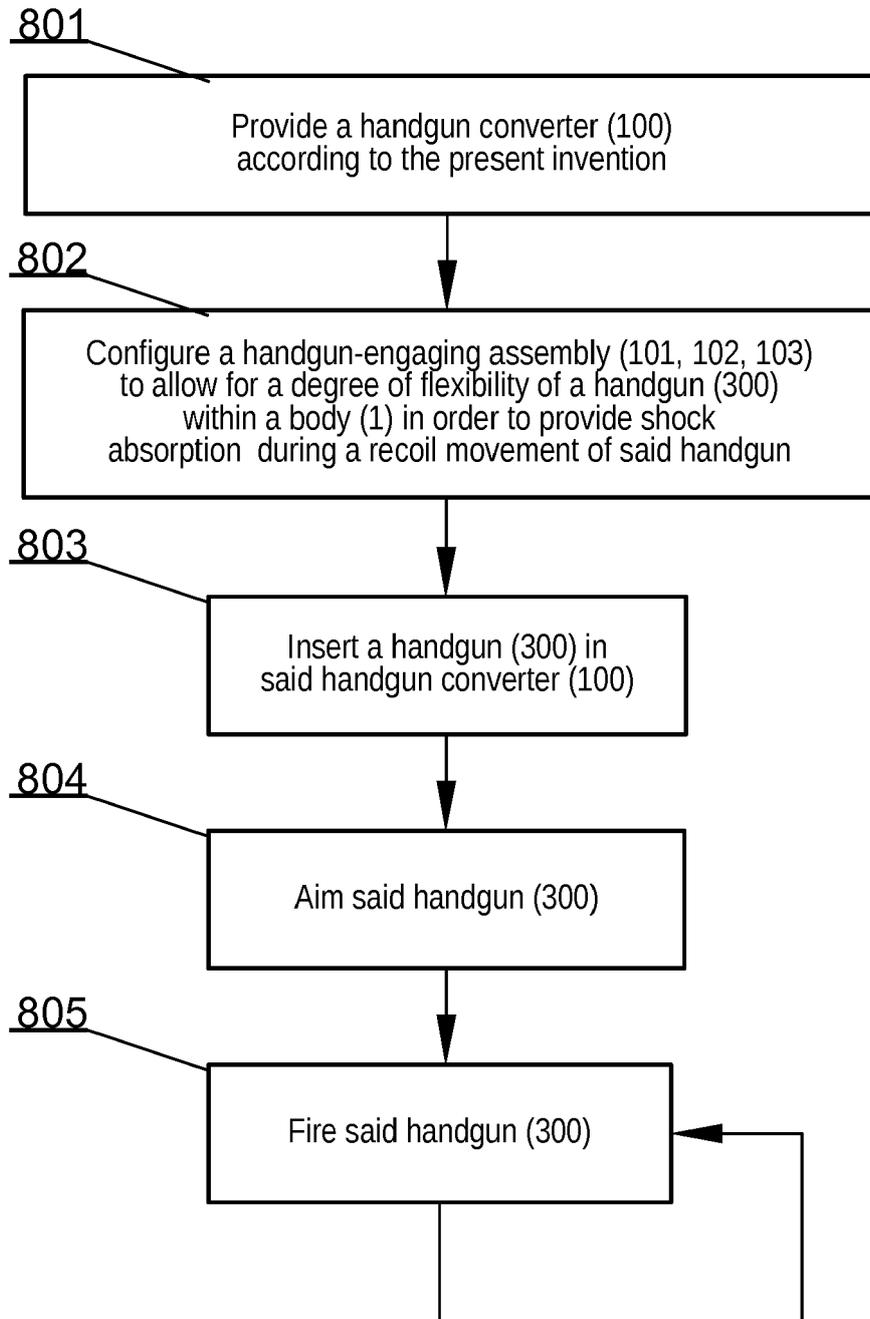


Fig. 8

901

Handgun Converter	Hits spread at 10m	Hits spread at 25m	Hits spread at 100m
Micro Roni	25,0mm	100,7mm	-
Present Invention	10,4mm	22,3mm	62,5mm

Fig. 9



EUROPEAN SEARCH REPORT

Application Number  
EP 19 46 1607

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A	* abstract; figures 1-3 * * paragraphs [0028] - [0034] * * paragraph [0037] *	9-14	ADD. F41C23/04
A	----- US 2015/316346 A1 (BRANDT URI [IL]) 5 November 2015 (2015-11-05) * abstract; figures 1,3,4 * * paragraphs [0017], [0018] * * paragraph [0023] *	1-15	
A	----- CN 104 111 005 B (LIANG GUODONG) 24 February 2016 (2016-02-24) * figures * * paragraphs [0031] - [0048] *	1-15	
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			F41C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 April 2020	Examiner Schwingel, Dirk
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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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.  
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22-04-2020

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**REFERENCES CITED IN THE DESCRIPTION**

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