(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 November 2024 (28.11.2024)

WIPO | PCT

(10) International Publication Number
WO 2024/242578 A1

(51) International Patent Classification:
F41A 17/44 (2006.01) *F41A 9/53* (2006.01)

(21) International Application Number:
PCT/PL2024/000029

(22) International Filing Date:
22 May 2024 (22.05.2024)

(25) Filing Language: Polish

(26) Publication Language: English

(30) Priority Data:
P.444966 23 May 2023 (23.05.2023) PL

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *of inventorship (Rule 4.17(iv))*

Published:
— *with international search report (Art. 21(3))*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(54) **Title:** FIREARM CHAMBER DISCHARGE INDICATOR

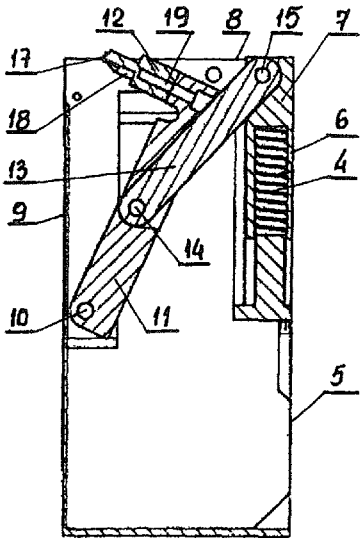


Fig. 3A

(57) **Abstract:** The firearm chamber discharge indicator has the form of a body (1) with its shape similar to the shape of a firearm clip, with the body (1) containing elements corresponding to the elements fixing the shell clip in the socket of the firearm, in the form of an indicator formed on the body (1), a socket (2) cooperating with a known lock locking the clip body (1) in the firearm socket. The body (1) is provided with an opening (3) in the part cooperating with the chamber of the firearm and a spring element (4) placed inside the body (1). The body (1) of the indicator has an internal duct (6) near its rear edge (5), inside which the spring element (4) is placed, and a moving pin (7) pressed against the top edge (8) of the body (1) by said spring element (4) is placed along the rear edge (5) of the body, above said spring element (4). At the opposite, front edge (9), inside this body (1), the arm (11) is fixed at the bottom pivot axis (10) and is terminated with the test pin (12). The arm (11) fixed at the bottom pivot axis (10) is connected to the moving pin (7) via a diagonal pusher (13). The diagonal pusher (13) is fixed using two pivot axes (14, 15), on one side of the pivot axis (15) in the top part of the moving pin (7) and on the other side of the pivot axis (14) in the central part of the arm (11), above the pivot axis (10) of said arm (11).

WO 2024/242578 A1

Firearm chamber discharge indicator

The subject of the invention is a firearm chamber discharge indicator. In this patent disclosure, the term firearm denotes, in particular, a weapon adapted to mechanised reloading using individual shells placed in a clip, which is adapted to fixing it in the socket of the firearm.

The shell clip is usually elongated and fixed in the socket behind the chamber of the firearm. In the case of a multi-shot weapon, the clip may contain between one and several dozens of shells stored in the clip one above another and with the bullet directed according to the line of shot. A spring resting on the bottom of the clip is present below the last shell, counting from the top of the clip. Once the first shell is inserted into the chamber, the spring inside the clip shifts all the remaining shells towards the line of shot and the next shell occupies the ready position, prepared for introduction to the chamber. The firearm clip can be used as an additional handle of the weapon, thus enabling improved aiming precision. In this patent disclosure, the term firearm should be understood as repeated, non-automatic or automatic weapon. In the case of long firearms, the shell clips are located before or after the handle of the weapon, and in the case of short firearms, for example a pistol, in the handle itself. A repeated, non-automatic firearm requires manual reloading of the new shell, namely to introduce a new shell to the chamber for the next shot. The problem with this type of weapon lies in the determination of its loaded or unloaded condition, namely the development of a shell presence indicator for the chamber. The indicator indicating the presence or absence of a shell in the chamber, namely the chamber discharge indicator, is an important element of the firearm during its storage and use.

The international patent application no. WO 2016/113455 discloses an independent system of shell detection in the chamber of a firearm in situations, in which the user contacts the metal parts of the firearm or in situations, in which such contact is absent. The system includes the means to determine changes of electric capacity between two possible states of the system using power supply voltage: with and without a shell in the chamber. At least one electrode was used, regardless of the grip of the user.

The international patent application no. WO 2015/044903 discloses a known firearm solution containing a system adequate for detection of the presence of a shell inside the chamber. The detection system includes a detection device placed in the front position, in which its detecting part is placed inside the chamber and moved to the rear position by the shell in the barrel. The detecting device contains at least one main sensor. The detecting device receives information about the presence of the shell in the barrel depending on the position of the main sensor element which contains at least one magnetically sensitive element per the aforementioned, main sensing element.

In another international document no. WO 98/02704, the known mechanism used to determine the presence of a shell inside the firearm acts on the basis of a resistance measurement for test current passage through the electrodes contacting the munitions and, optionally, with means determining the munitions life.

A device used to monitor the firearm loading status according to the description in the patent application no. WO 2005/003673 contains a radiation source on one side of the pistol and a receiver used to measure the amount of radiation emitted from the radiation source on the other side, was well as a display indicating the amount of radiation absorbed by the receiver, wherein incorrect shell position is indicated using a displaying element.

In another solution according to the international patent application WO 03/046465, the invention includes an automatic pistol indicator, installed on the pistol barrel and containing a sensor protruding into the chamber and an indicating member protruding outwards. The sensor and the indicating elements are placed in a recess provided in the rear of the chamber and is pressed against the inner surface of the chamber by a spring. The indicating element is formed as a single-part wire strip made of spring wire, installed at the rear end of the chamber. The load indicator according to the invention provides a simple, inexpensive and reliable device for continuous indication looking from the side or during aiming, indicating whether the weapon is loaded.

In another solution known from the patent document EP 3385657, another solution of a system detecting the shell in the firearms chamber is presented. The system includes means indicating changes of electric capacity between the two possible system conditions using power supply voltage, if no shell is present in the chamber and if a shell is present in the chamber, using at least one electrode.

Most known systems detecting the shell in the chamber is focussed on electric, magnetic or electronic sensor solutions. The known mechanical solutions require careful verification of the indicator mechanism. For example, in the solution according to the

international patent application WO 03/046465, the automatic pistol indicator is installed on the pistol barrel and contains a sensor protruding into the chamber and an indicating member protruding outwards. The indicating element is formed as a single-part wire strip made of spring wire, installed at the rear end of the chamber. Electric, electronic or magnetic solutions depend on the efficiency of systems they depend on. The task of the invention is to develop a mechanical device which is an indicator of the absence of a shell in the chamber, which is simultaneously a shell clip lock and an indicator indicating the absence of a shell in the chamber.

According to the invention, the firearm chamber discharge indicator has the form of a body with its shape similar to the shape of a firearm clip, with the body containing elements corresponding to the element fixing the shell clip in the socket of the firearm, in the form of an indicator formed on the body, a socket cooperating with a known lock locking the clip body in the firearm socket. The body is provided with an opening in the part cooperating with the chamber of the firearm and a spring element placed inside the body.

According to the invention, the firearm chamber discharge indicator is characterised in that the indicator body has near its rear edge an internal duct, inside which the spring element is placed, wherein a sliding pin pressed against the top edge of the body by said spring element is placed above the spring element, along the rear edge of the body. At the opposite, front edge, an arm terminated with a test pin is fixed at the lower pivot axis inside the body, wherein the arm fixed at the lower pivot axis is connected to the moving pin using a diagonal pusher. The diagonal pusher is fixed using two pivot axes, on one side of the pivot axis in the top part of the sliding pin and on the other side of the pivot axis in the central part of the arm, around the pivot axis of said arm.

In a preferable variant of the solution according to the invention, the test pin is a pin generally aligned to the symmetry axis of the firearm chamber and terminated with at least one protrusion.

The terminal, working part of the test pin preferably is provided with a duct in the bottom part.

In a preferred variant of the indicator according to the invention, the test pin is fixed to the arm using a connecting element.

The element connecting the test pin with the arm may be preferably a socket head cap screw.

According to the invention, a mechanical firearm chamber discharge indicator has been developed. The indicator is intended to be placed inside the firearm socket, intended for fixing the shell clip. Thus, the indicator replaces the shell clip and the presence of the indicator in this socket of the firearm indicates that no shell is present inside the chamber of the firearm.

The mechanical design of the indicator according to the invention additionally guarantees the inability to place the indicator if a shell is loaded into the chamber. The indicator cannot be placed mechanically if the chamber is loaded. The presence of an indicator installed inside the firearm thus indicates that the chamber is empty and no shell is present inside it. Any electric, electronic and magnetic systems supplied externally or using cells discharging over time have been eliminated from the indicator design. The disclosed mechanical design of the indicator according to the invention is not subjected to such processes.

Additionally, the material the indicator body is made of, namely plastic which can be coloured using distinct colours, enables the indicator to be obtained in contrasting colours, enabling immediate identification of firearms with discharged chambers even from long distances and even after the firearm has been stored for many years.

The object of the invention has been presented in an embodiment in the attached drawing, in which individual figures represent as follows:

Fig. 1A – a view of the indicator towards the side wall of the body

Fig. 1B – an indicator according to fig. 1A viewed towards the front edge of the body

Fig. 1C – an indicator according to fig. 1A viewed towards the rear edge of the body

Fig. 1D – an indicator according to fig. 1A viewed towards the bottom edge of the body

Fig. 1E – an indicator according to fig. 1A viewed towards the top edge of the body

Fig. 2A – an indicator according to fig. 1A in a perspective view towards the rear edge of the body

Fig. 2B – an indicator according to fig. 1A in a perspective view towards the front edge of the body

Fig. 3A – a cross-section through the indicator according to fig. 1A in a plane parallel to the side wall of the body, in the resting position

Fig. 3B – an view of the interior of the indicator according to fig. 3A with the top edge removed

Fig. 4A – a cross-section through the indicator according to fig. 1A in a plane parallel to the side wall of the body in the working position

Fig. 4B – an view of the interior of the indicator according to fig. 4A with the top edge removed

Fig. 5A – indicator body in its second embodiment

Fig. 5B – a body according to fig. 5A in another perspective view

Fig. 1A presents the indicator according to the invention in a view towards the side wall of the body 1, in the resting position. The term resting position used in this patent disclosure means an indicator according to the invention, before its intended use. The indicator according to the invention has body 1 in a form similar to the external shape of the shell clip. This part of the body 1 of the indicator, intended for placing the indicator inside the clip socket of the firearm, is a representation of the external form of the body of an original clip. The indicator body is thus a type of a dummy clip body and is intended for placing it inside the firearm socket, intended for placement of a standard shell clip in this firearm. The body 1 of the indicator has elements fixing this indicator in the clip socket of the firearm. Fig. 1A and Fig. 2A and Fig. 2B present an example socket 2 of the lock of the body 1 of the indicator inside the firearm socket. The lock comprising a known element of a firearm has not been shown in the attached drawing. Another element cooperating with the known firearm socket is a moving pin 7 present in Fig. 1A, Fig. 2A, Fig. 3A and Fig. 4A. The moving pin 7 is moved upwards in the resting position of the indicator, as shown in Fig. 3A, as a result of action of the spring element 4, while in the working position of the indicator placed inside the firearm clip socket, the moving pin 7 is moved downwards in the duct 6 formed in the rear edge 5 of the body. In this embodiment, a spring element 4 is present in the duct 6 in the form of a spring controlling the in and out motion of the moving pin 7 along the rear edge 5 of the body 1 of the indicator according to the invention.

In this embodiment, the indicator according to the invention has its body 1 and internal parts included in the body 1 and listed further in the text, made of polyethylene coloured in sharp colours, orange in this embodiment. The indicator according to the invention, installed on a firearm, is thus clearly visible and distinguishes firearm pieces in which the indicator according the invention is installed, from a distance. In other embodiments, the indicator according to the invention may be made of other materials and coloured using different colours.

The body 1 of the indicator according to the invention is thus a dummy shell clip of a firearm. However, it contains elements according to the invention inside, enabling the user to estimate the discharge status of the chamber of this firearm, namely that no shell is present

inside the chamber. As indicated above, the body 1 of the clip is provided with an internal duct 6 at its rear edge 5, inside which said spring is placed. A moving pin 7 pressed against the top edge 8 of the body 1 by said spring is placed above the spring and it can slide along the rear edge 5 of the body 1. When the body 1 is fixed in a known socket of the firearm, the sliding pin 7 is moved down inside the duct 6 of the spring, causing the spring to become compressed. Once the indicator is removed from the aforementioned, known socket in the firearm, usually intended for fixing the shell clip, the moving pin 7 guided by the spring returns to the top position, while the described indicator mechanism returns to the resting position.

Fig. 2A and 2B show the body of the indicator in perspective views, Fig. 2A in a view towards the rear edge 5 of the body 1, while Fig. 2B in a view towards the front edge 9 of the body 1. The term edge used in this patent disclosure means all side walls of the body 1, narrow compared to the flat main walls, wherein the lock 2 socket is present in one of these two parallel main walls, as visible in Fig. 2A and Fig. 2B.

Fig. 3A shows the body 1 of the indicator in a cross-section through a plane parallel to the main planes of these parallel main walls of the body 1 of the indicator described above. This figure shows that the moving pin 7 including the spring are placed inside the duct 6 guiding this pin 7 and the spring. This duct 6 is better shown in Fig. 2A. The moving pin 7 is placed inside the duct 6 when the indicator is installed in the known firearm socket.

On the other hand, at the opposite, front edge 9 of the body 1, inside this body, the arm 11 is fixed at the bottom pivot axis 10 and is terminated with the test pin 12. This arm 11 and the test pin 12 are shown clearly in Fig. 3A and Fig. 4A. The cross-section according to Fig. 3A shows the elements of the inside of the body 1 in their resting position, while the cross-section according to Fig. 4A shows the elements of the inside of the body 1 in the working position. These figures show that the arm 11 fixed at the bottom pivot axis 10 is connected to the moving pin 7 via a diagonal pusher 13. The diagonal pusher 13 is installed via two pivot axes 14, 15, on one hand via the pivot axis 15, to the top part of the moving pin (7). The same pusher 13 is connected at the other end via the pivot axis 14 with the central part of the arm 11, above the bottom pivot axis 10 of this arm 11. The bottom pivot axis 10 of the arm 11 is placed in the main, parallel walls of the indicator according to the invention. This axis 10 of the arm 11 is also shown in Fig. 2A and Fig. 2B.

The interior of the body 1 shown in Fig. 3A in their resting position of the indicator according to the invention is also shown in Fig. 3B, where the interior of the body is shown in a top view, with the top edge 8 shown in Fig. 1E removed. Fig. 3B shows the top part of the

arm 11 with the test pin 12 and two protrusion 17 of the test pin 12. Similar as in Fig. 3A, the interior of the body 1 is shown here in the resting position of the indicator, where the indicator is hidden inside the body and ready for use, namely for placement inside the socket of the firearm, where the shell clip is usually installed.

The next Fig. 4A shows a cross-section through the indicator, similar to Fig. 3A, but in Fig. 4A the indicator is in its working position, installed in the firearm socket, with the test pin 12 extended. The known firearm socket is not shown in this figure. As shown in Fig. 4A, the indicator body includes a moving pin 7 inserted into the interior of the body 1, along the rear edge 5, which is the consequence of placing the indicator in the known firearm socket. As a consequence of the moving pin being moved into the interior of the body 1 along the rear edge 5 of this body, the diagonal pusher 13 caused the arm 11 to rotate on the bottom axis 10 and extension of the test pin 12 with the protrusions 17. In this embodiment, the test pin 12 includes two protrusions 17, between which a gap is present. This is shown in Fig. 4B.

As a consequence of the arm 11 moving towards the front edge 9 of the body 1, the test pin 12 protrudes outside the front edge 9 of the body 1 and takes place inside the chamber of the firearm. If the test pin 12 is not introduced to the chamber of the firearm, this means that a shell is present inside the chamber. The body 1 is then not installed in the firearm socket, as the test pin 12 cannot be introduced to the loaded chamber. The inability to introduce the test pin 12 into the chamber if a shell is present inside the chamber results in the inability to install the body 1 of the indicator inside the firearm socket which is normally used for a shell clip. If the chamber is empty, or discharged, the test pin freely enters this chamber of the firearm while the indicator according to the invention is installed. The installation of the indicator according to the invention inside the socket of the firearm is exactly the same as installation of a shell clip inside said firearm. However, the body of the indicator according to the invention cannot be installed in the socket, as the test pin 12 cannot be introduced to the chamber if it is loaded with a shell. Then, the test pin 12 prevents the introduction of the moving pin 7 supported on said spring using the diagonal pusher 13, via the tilted arm 11, which prevents the body 1 of the indicator from occupying its correct position inside the firearm socket.

The indicator according to the invention set in the known firearm socket, not shown in the figure, thus indicates that the chamber of the firearm is not loaded. In this embodiment, the body 1 of the indicator is made of orange polyethylene. In a firearm store or during a competition, where the firearms are usually grey or dark green, each piece of the firearms with an installed indicator according to the invention is thus visible from a distance. As this is

a mechanical solution which does not require external power supply, such a firearm can be stored over long period of time and the information regarding the discharge of the chamber in the given firearm is visible even from large distances. According to the invention, the information is provided by the presence of the indicator inside the clip socket. If a shell was present inside the known chamber of the firearm, installation of the indicator according to the invention would be impossible as it would not be possible to introduce the test pin 12 into the chamber of the firearm.

Fig. 4B shows a top view of the indicator according to Fig. 4A, with the top edge 8 removed from the body 1. Similar as in Fig. 4A, the indicator mechanism is shown here in the working position, with the test pin 12 extended and placed in this position inside the known chamber of a firearm not shown in the attached figure. The presence of the test pin 12 inside the firearm chamber indicates that the chamber of this firearm is discharged and thus is a proof that no shell is present inside the chamber.

In Fig. 5A and Fig. 5B, the indicator according to the invention is shown in a different embodiment, in which the body 1 has a conical end in its bottom part and is provided with a bottom opening for installation of a tag providing utility or information functionalities. These figures show the a perspective view of the indicator, Fig. 5A shows a view towards the rear edge 5 of the indicator, while Fig. 5B in a view towards the front edge 9 of the indicator. The test pin 12, as shown in Fig. 3A and Fig. 4A, is a virtually horizontal pin terminated with at least one protrusion 17 cooperating with the flange of the shell present inside the chamber of the firearm. The terminal, working part of the test pin 12 is provided with a duct 18 in its bottom part, cooperating with the known protrusion at the inlet to the firearm chamber.

Fig. 3A and Fig. 4A show that the test pin 12 is fixed on the arm 11 using a connector 19. The connector 19 is a socket head cap screw in this embodiment. This enables replacement of the test pin 12 if its working part is worn or damaged, without the replacement of other functional elements of the mechanism of the indicator according to the invention.

List of designations used in the drawings

1. Body
2. Socket
3. Body opening
4. Spring element
5. Rear edge

6. Duct
7. Moving pin
8. Top edge
9. Front edge
10. Bottom pivot axis
11. Arm
12. Test pin
13. Diagonal pusher
14. Pivot axis
15. Pivot axis
16. Arm pivot axis
17. Protrusion of the test pin
18. Test pin duct
19. Connector

Claims

1. A firearm chamber discharge indicator
   - in the form of a body (1) with a shape similar to that of a firearm shell clip,
   - wherein the body (1) contains elements corresponding to the elements of the fixture of a shell clip inside the firearm socket, in the form of an indicator (1) formed on the body, a socket (2) cooperating with the known lock fixing the body (1) of the clip inside the firearm socket,
   - wherein the body (1) is provided with an opening (3) in the part cooperating with the chamber of the firearm
   - and contains a spring element (4) installed inside the body (1),

   characterised in that
   - the body (1) of the indicator has an internal duct (6) near its edge (5), inside which the spring element (4) is placed,
   - wherein above the spring element (4), a moving pin (7) pressed against the top edge (8) of the body (1) by said spring element (4) is placed along the rear edge (5) of the body (1),
   - while at the opposite, front edge (9), inside this body (1), the arm (11) is fixed at the bottom pivot axis (10) and is terminated with the test pin (12), wherein
   - the arm (11) fixed at the bottom pivot axis (10) is connected to the moving pin (7) via a diagonal pusher (13),
   - wherein the diagonal pusher is (13) fixed using two pivot axes (14, 15), on one side of the pivot axis (15) in the top part of the moving pin (7) and on the other side of the pivot axis (14) in the central part of the arm (11), above the pivot axis (10) of said arm (11).
2. An indicator according to Claim 1, **characterised in that** the test pin (12) comprises a pin virtually aligned with the axis of symmetry of the firearm chamber, terminated with at least one protrusion (17).
3. An indicator according to Claim 1 or 2, **characterised in that** the terminal, working part of the test pin (12) is provided with a duct (18) in its bottom part.

4. An indicator according to Claim 2 or 3, **characterised in that** the test pin (12) is fixed on the arm (11) using a connector (19).
5. An indicator according to Claim 4, **characterised in that** the connector (19) is a socket head cap screw.

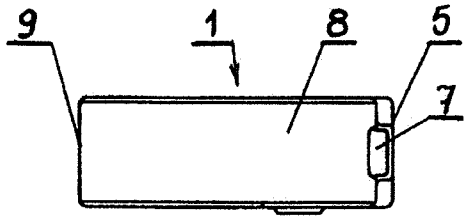


Fig. 1E

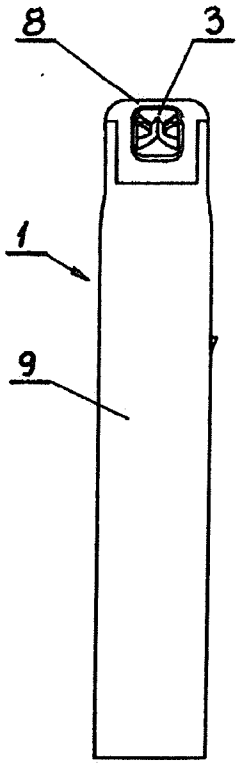


Fig. 1B

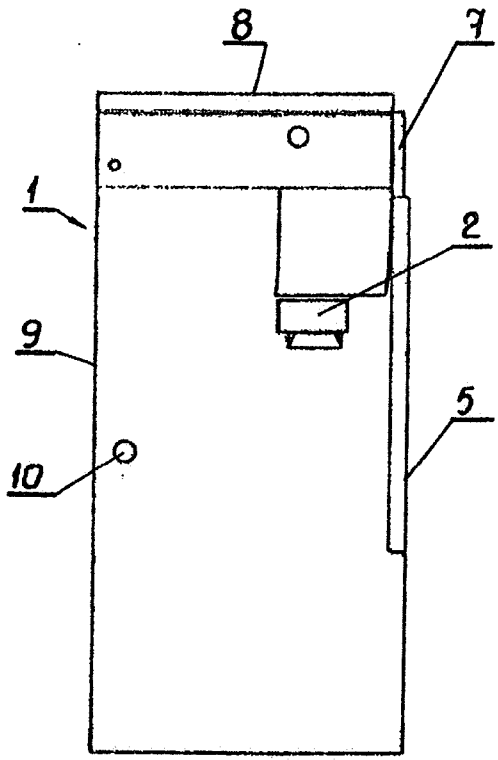


Fig. 1A

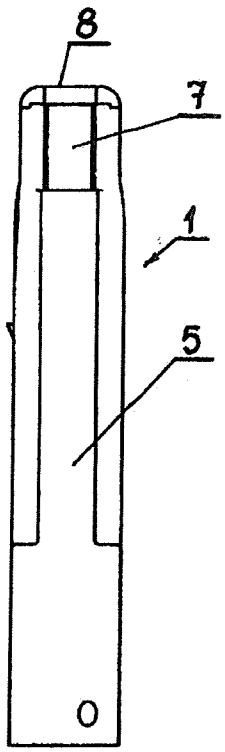


Fig. 1C

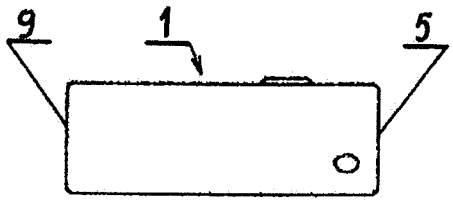


Fig. 1D

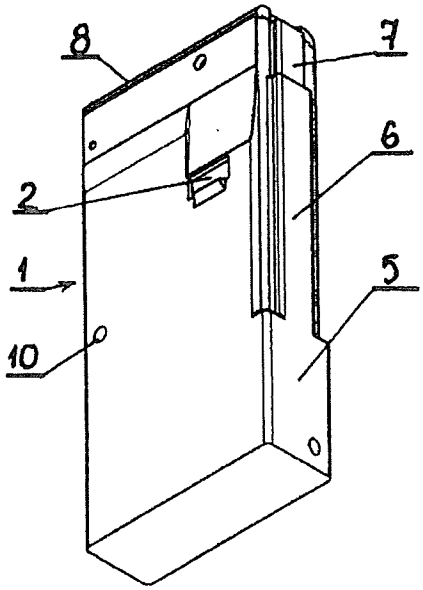


Fig. 2A

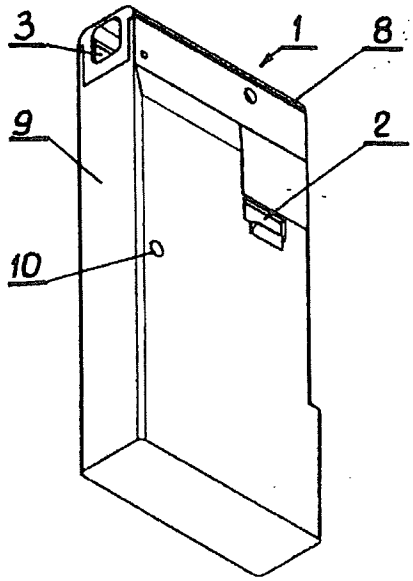


Fig. 2B

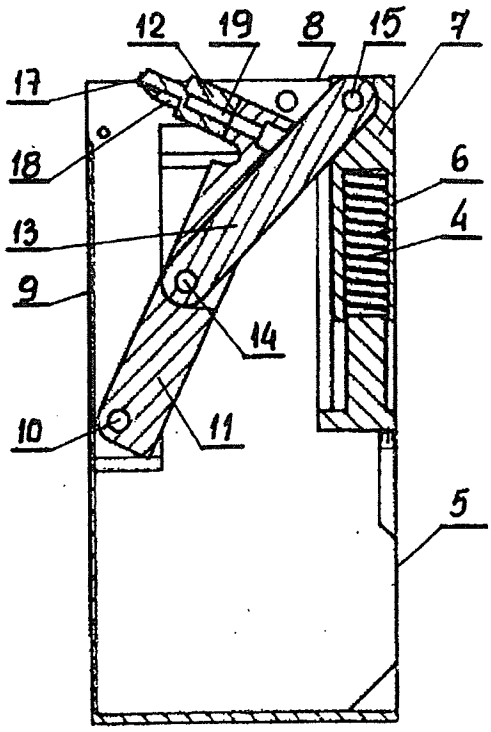


Fig. 3A

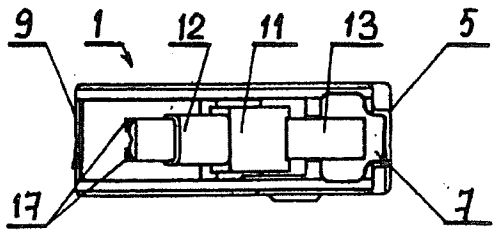


Fig. 3B

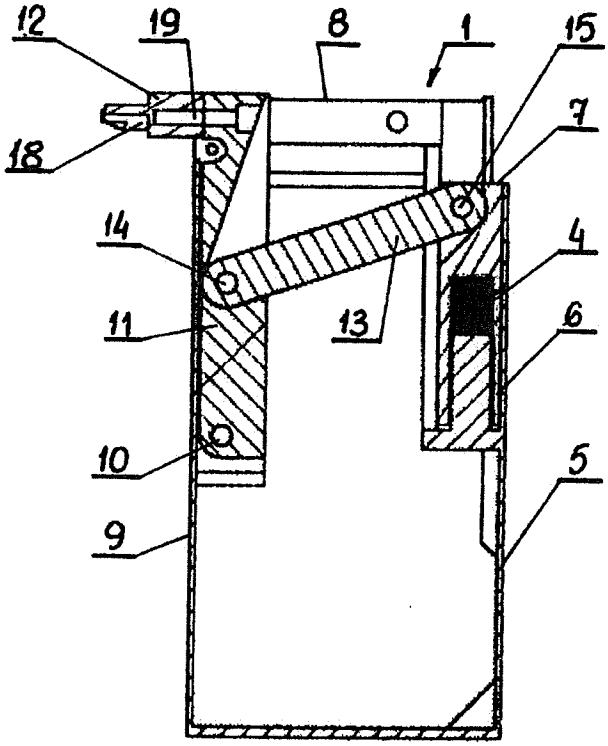


Fig. 4A

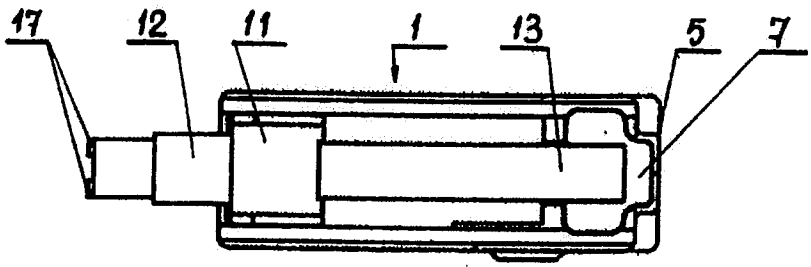


Fig. 4B

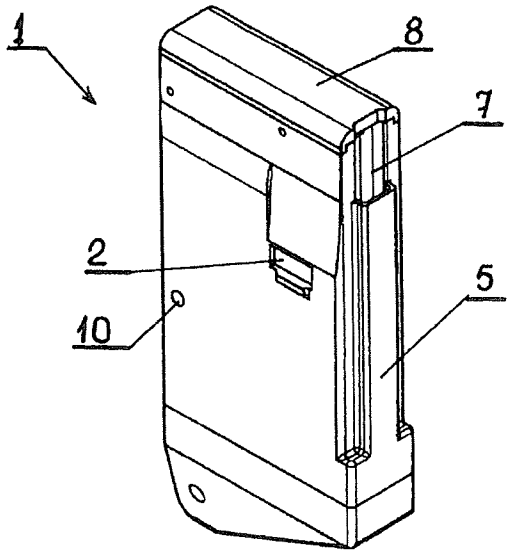


Fig. 5A

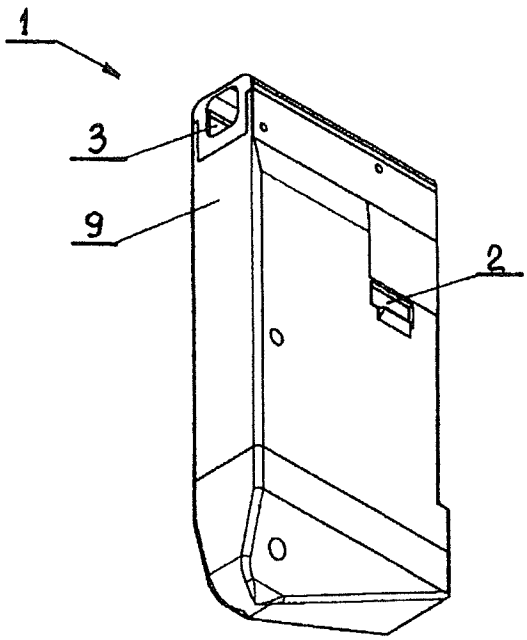


Fig. 5B

INTERNATIONAL SEARCH REPORT

International application No
PCT/PL2024/000029

A. CLASSIFICATION OF SUBJECT MATTER
INV. F41A17/44 F41A9/53
ADD.

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)
F41A

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)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 709 496 A (JOHNSON DAVID A [US]) 1 December 1987 (1987-12-01) abstract column 4, line 48 - column 5, line 60 figures	1-5
A	US 4 619 062 A (JOHNSON DAVID A [US]) 28 October 1986 (1986-10-28) abstract column 4, line 30 - column 5, line 41 figures	1-5
A	US 10 563 947 B2 (SAWICKI MICHAEL [US]) 18 February 2020 (2020-02-18) abstract claims 1,9,10,11 figures	1-5

-/--

[x] Further documents are listed in the continuation of Box C.

[x] See patent family annex.

* Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 September 2024	07/10/2024

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Vermander, Wim

3

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INTERNATIONAL SEARCH REPORT

International application No
PCT/PL2024/000029

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 10 422 601 B2 (HARRIS JAMES [US]) 24 September 2019 (2019-09-24) abstract column 5, line 37 - column 6, line 11 figures -----	1-5
A	US 10 018 438 B2 (CLIPFORT L T D BV [NL]) 10 July 2018 (2018-07-10) abstract column 7, line 4 - column 7, line 57 figures -----	1-5

3

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/PL2024/000029

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4709496 A	01-12-1987	NONE	
US 4619062 A	28-10-1986	NONE	
US 10563947 B2	18-02-2020	NONE	
US 10422601 B2	24-09-2019	NONE	
US 10018438 B2	10-07-2018	US 2017146310 A1	25-05-2017
		US 2018321006 A1	08-11-2018