

### **Catch, Triggering Mechanism and Handle Piece for a Weapon**

The invention relates to a catch for a triggering mechanism, in particular in the handle piece of a firearm exhibiting a breech block and a securing device, in particular of a rapid fire weapon, wherein the catch can be moved between a position blocking the breech block and a position not blocking the breech block.

Positional terms such as “above” “below”, “left”, “right”, “front” and “back” apply for a weapon in normal firing position from the point of view of the marksman, said weapon firing horizontally toward the “front”.

Rapid fire weapons, such as automatic pistols or machine guns, which are equipped for the emission of sustained fire, have a rather simple triggering mechanism, of which in the following a representative example is described with the help of Figures 13 and 14:

Below the path of motion of the breech block (not shown) there is a handle piece, in which a trigger (a) is pivotably mounted. Its transverse pivot axis is located in the upper central region of the trigger, so that the rear, upper trigger part travels a curved path upon actuation of the trigger. This rear, upper part of the trigger acts on the front end of a catch (f) which for its part, is mounted so as to be pivotable around a transverse axis in the weapons housing or in the handle piece. The rear end of the catch (f) is configured as a sear arm (s). When the trigger (a) is swiveled by a spring in its idle position toward the front, then the front end of the catch (f) – likewise under spring action – swivels downward and its rear end swivels upward with the sear arm (s). This position of the sear arm is the locking position (see Figure 8). The trigger (a) and catch (f) can each be cushioned or pre-stressed from a separate or from a common spring and are pressed by said spring to their resting position (trigger) or their locking position (catch).

If now the breech block is pulled back from its front resting position, then it moves the sear arm (s) with its underside and with this moves the rear end of the catch (f) downward, while it runs over the sear arm (s). When a sear catch, which is configured on the underside

of the breech block, has run across the sear arm (s), then said sear arm snaps upward and leaves the sear catch. The weapon is now cocked and ready to fire.

When the trigger (a) is actuated, then the sear arm (s) lowers until it releases the sear catch; the breech block is released and the weapon begins sustained fire. When the trigger (a) released, then the sear arm (s) springs upward again to its locking position, leaves the sear catch and thus keeps the breech block in its ready to fire position (rear position). As a result the sustained fire terminates.

Often a pure trigger safety is used as a safety, said trigger safety to be sure excluding the unintentional actuating of the trigger, but not a yielding of the sear arm for example on the basis of acceleration force, when for example the loaded, cocked and machine gun with the safety on falls off a truck.

For this reason there are also safeties (w) which additionally or alone fix the catch (f) to a safety finger (i) in its blocking position. However, this has the disadvantage that the breech block in the case of a secured weapon cannot be pulled back over the locked catch (f) or can get jammed on the catch (f), because said catch cannot dodge. Figure 13 shows a safety roller (w) which with its peripheral area shelters a safety finger (i) of the catch (f). A weapon with such a safety (w) cannot be cocked and have the cylinder rotated when secured.

Fully automatic weapons, which work in accordance with the above described functional principle, are being employed increasingly in so-called weapons stations. The weapons mounted on gun carriages are remotely oriented via actuators in said weapons stations and actuated via actuators acting on trigger and securing device (e.g. electromagnetically). In order to offer the greatest possible security here as well, these actuators are designed in such a way that in the case of malfunctions (e.g. power failure) the trigger actuation is interrupted and regardless of the state of the weapon the securing device is set to "safety".

Along with the above described problem (no cocking and rotating of cylinder in the case of secured weapon), here an additional malfunction can occur that the weapon even in the case of interrupted trigger actuation continues firing unchecked. High actuating forces of the actuator for the securing device

can result in the safety jamming the safety finger (i) in the catch (f) in such a way that the sear arm (s) remains out of engagement with the sear catch on the breech block. This malfunction can occur when the breech block is back on its way forward immediately after trigger actuation and a power failure results in the trigger simultaneously being released and the actuator, which acts on the safety, pushes said safety into its "Securing" position. In this weapon state the catch (f) and the sear arm (s) are in their releasing position and the safety finger (i) plunges into the safety recess on the securing device (here the safety roller (w)). If the actuator now sets the safety roller (w) in the direction of "safety on", the safety finger (i) blocks its travel distance and the flank of the safety recess is under circumstances pressed so firmly against the safety finger (i) that the catch (f) in spite of spring action cannot move to its blocking position. The catch (f) is jammed over the safety finger (i) and the breech block moves unobstructed back and forth until the ammunition supply is interrupted (see Figure 9).

Proceeding from this problem there are trigger devices in which case the sear arm is configured on a sear pivotable on the catch (see e.g. DE 101 63 003 A1) and US 2004/0194615 A1 or US 6,907,813 B2). In the case of a retreating breech block this sear is swiveled from its blocking position against the force of a spring into a swerving position, in which it can be overrun by the breech block. In the case of an advancing breech block the sear arm of the sear falls into the sear catch under spring action and is then additionally held in this blocking position by the breech block. A securing element is additionally provided on the sear which cooperates in such a way with the securing device (for example a safety roller) that said securing device always – regardless of the position of the breech block or of the catch – can be brought to its secured position. In the process the securing device can act both on the trigger and on the catch.

In the case of this triggering mechanism an additional spring element is required in order to ensure the locking function, and the sear and its swivel suspension must absorb the full force of the advancing breech block. In the process the comparatively small sear and its suspension are exposed to high dynamic stresses. A fracture or a failure of the sear, its suspension in the catch and/or of the spring element in the worst case impact the weapon function in such a way,

that the weapon continues firing regardless of the position of the safety and the trigger until its entire ammunition has been fired. In addition the actuating force of the spring element must be precisely coordinated to the spring action acting on the catch. Otherwise the breech block running over the sear also presses the catch downward into the handle piece. In the process under circumstances the cooperation of the securing element with the safety roller can be impaired.

The invention, by way of contrast, provides an improved catch, to be precise with the subject matter of the present Claim 1, thus with a catch with the initially named features, in which case the catch exhibits a securing element which can be moved relative to the catch between a releasing and securing position.

The securing element occupies its releasing position when the retreating breech block engages on the catch and exerts an actuating effect on the securing element in a rearward direction. In this position (releasing position) the securing element does not engage on the securing device, even when said device occupies its securing position, and the catch can be moved to its non-blocking position. That is, the catch after the firing – due to recoil – or for the purpose of cocking and rotating the cylinder can be moved to the rear unhindered via the lowering catch.

The securing element on the other hand occupies its securing position in the case of the breech block advancing to the catch or adjoining said breechblock, when the breech block exerts an actuating effect on the securing element in a forward direction and moves to the securing position. In this position (the securing position) the securing element engages the securing device, when said securing device simultaneously occupies its securing position, and fixes the catch itself in its blocking position.

In the case of this solution the functions “locking of the breech block by the catch” and the actual security function “fixing of the catch in the blocking position” are constructively independent from one another, so that each component or part (here: the catch and the securing element) can be optimally configured and designed for its task.

The catch can be designed robust and stable for the high stresses which occur in the case of interaction with the breech block, while the securing element does not have to bear any high mechanical stress through the breech block, but rather above all can be designed with regard to the reliable interaction with the securing device.

At the same time this arrangement permits an actuation of the securing device in any random function state of the weapon, without components of the securing element and of the actual securing device colliding with one another.

Furthermore the latch function of the stable sear arm on the catch is not impaired in the case of a malfunction of the securing element. That means the risk of an unchecked continuously firing weapon when the trigger is not actuated is to a great extent ruled out, at least significantly released in comparison to known solutions from the state of the art.

Finally a weapon with such a catch can also be cocked and have its cylinder rotated in the secured state, and the securing device of the weapon can be actively actuated in any function state.

The improvements in accordance with Claims 2 and 3 increase the functional reliability. Either by ensuring through the action of a spring that the movable securing element occupies its releasing position (as a consequence of the spring action) and under the effect of the forward acting breech block occupies its securing position against the spring action (Claim 2). Or inversely, by ensuring through the action of a spring that the movable securing element occupies its securing position (as a consequence of the spring action) and under the effect of the retreating breech block against the spring action occupies its releasing position (Claim 3). Undefined intermediate positions, which potentially impair the function, are in this way prevented.

The embodiment in accordance with Claim 2 has the advantage that the securing element only occupies its securing position when the breech block abuts from the rear on the catch and with this on the securing element. In other words, the catch is freely movable in all other positions of the breech block and there is no danger whatsoever of malfunctions: For

example the above discussed jamming of the breech block on the catch. The solution in accordance with Claim 3 has the advantage that the catch, in the case of the securing device occupying its securing position, can only be lowered by means of the retreating breech block by having the breech block move the securing element from its securing position to its releasing position and thus make the catch movable.

The securing element has a first actuating element which interacts with the breech block and via which it can be moved to its securing position, and a securing part which engages on the securing device. The first actuating element and securing part can thus be designed and arranged in accordance with requirements for their respective function (Claim 4).

In accordance with Claim 5 the securing element is arranged in the region of a sear arm configured on the catch, engaging engaged on the breech block in the blocking position. Such a sear arm is particularly suitable for stable engage on the breech block. Through the arrangement of the securing element in this region the breech block can bring about, with the same active areas which make possible its locking on the sear arm or on the catch, the movement of the securing element to the securing position.

Through the improvement in accordance with Claim 6 the functional reliability of the securing element is increased once again by reducing the stress of the first actuating element actuating element. This is managed as a result of the fact that the first actuating element in the case of an adjoining breech block lies within the sear arm profile. In the process the blocking or locking function on the breech block is exerted exclusively via the sear arm; the securing element does not experience any additional loads and in particular does not absorb any applied loads through the breech block spring via the breech block to the catch or the sear arm.

In the improvement in accordance with Claim 7 a second actuating element is provided on the securing element, said element being drivable by the retreating breech block and as a result the securing element being moveable itself to its releasing position, so that a securing part also in the case of occupied securing position of the securing element lies outside the active area of the securing device. Here too an advantageous functional separation is realized in which the first actuating element and the second actuating element assume different functions. In addition a functional separation is also realized between the

depressing of the catch (for which relatively great forces are necessary) and the deflection of the securing element to its releasing position. As a result the second actuating element can be actuated comparatively low in load and precisely by the retreating breech block.

In accordance with Claim 8 in the process the second actuating element is configured as a control cam, which interacts with a corresponding control profile on the breech block. control cam and control profile can in the process be strictly coordinated to one another, in order for example to guarantee that the emergency and auxiliary locking functions of the breech block on the catch remain uninfluenced. In addition a corresponding control profile can also be mounted subsequently on already available breech block elements, in particular can be milled in.

The configuration of the securing element as a slide in accordance with Claim 9 permits a functionally reliable, shielded arrangement of the securing element in the catch. Preferably the sliding direction in the process proceeds somewhat in the barrel direction of the breech block, as a result of which the stress of the securing element in the case of actuation by the breech block can be kept as low as possible.

Claims 10 through 13 relate to an embodiment in which case the securing element is configured as a pivot lever.

The pivot axis proceeds in the process transversely to the barrel direction of the breech block (Claim 10). With this the actuation direction for the pivot lever also runs corresponding to the barrel direction of the breech block.

Through the configuration as a two-armed pivot lever in accordance with Claim 11 the actuation direction (of the advancing breech block) can be redirected to another running safety direction of the second lever arm. For this purpose the two lever arms can for example form an angle to one another. Thus specific constructive marginal conditions, which under circumstances are given by the securing device, can be flexibly considered.

If the lever arms are different in length, as specified in Claim 12, the travel distance and safety distance can also be different in length. In particular whenever the

first lever arm exhibiting the actuating element is configured shorter than the second lever arm exhibiting the securing part, the travel distance can be comparatively short and the required safety distance can be designed so long through the corresponding selection of the lever proportions that sufficiently large distances are available in order to exit the active area of the securing device or to reach said active area. With this the securing part can also be configured correspondingly large in area or stable with regard to the required active areas and its mechanical stress.

The pivot axis can in one embodiment also be the focal point of the pivot lever, thus said pivot lever is dynamically balanced, i.e. lateral accelerations acting on the weapon can not move the pivot lever from its securing position.

The self locking design of the active areas on the securing part or the corresponding counter surface on the securing device relevant for the securing action further increases the securing action. It prevents – even in the case of a high load of the sear arm against the securing action – the active area of the securing part and the counter surface of the securing device from sliding from one another and thus disturbing the security function. Such loads can for example occur in the case of high dynamic stresses (blows) on the weapon or, if the trigger is supposed to act with high force against the securing action on the catch, for example when the trigger is actuated by motor against the securing device.

Claim 13 relates to a triggering mechanism with an inventive catch.

Claim 14 relates to a handle piece with an inventive triggering mechanism which for example in the case of the corresponding design can be exchanged for a conventional handle piece without the specified security function. It is provided with one or more interfaces via which the trigger or the securing device can be coupled directly or indirectly with an actuating element for its actuation. A weapon with such a handle piece is particularly suitable for a so-called weapons station.

Claim 15 relates finally to a weapon with an inventive catch, an inventive triggering mechanism or an inventive handle piece.

Exemplary embodiments of the present invention will be described with the help of the drawings. The figures show the following:

- Figure 1 shows a schematic lateral view of a handle piece (partially cutaway) with an inventive trigger device, in which case the securing element is configured as a slide,
- Figure 2 shows a schematic lateral view of a handle piece with another inventive trigger device, in which case the securing element is configured as a pivot lever, the catch in its blocking position with caught breech block and the securing device in the "Safe" position A,
- Figure 3 shows the triggering mechanism from Figure 2, in which case the securing device is in the "Fire" position B,
- Figure 4 shows the triggering mechanism from Figure 2, in which case the breech block is released, the trigger is actuated and the securing device is in the "Fire" position B,
- Figure 5 shows the triggering mechanism from Figure 4, in which case the trigger is released, the release catch is locked into position with the catch and the safety device is in the "Safe" position A,
- Figure 6 shows the triggering mechanism from Figure 5, in which case the retreating breech block has moved the catch to its blocking position by actuation of the release catch,
- Figure 7 shows the triggering mechanism from Figure 6, in which case the retreating breech block has deflected the catch engaged on the sear arm from the blocking position and the securing device is in the "Safe" position A,

- Figure 8 shows a schematic lateral view of a handle piece (partially cutaway) with an inventive catch, in which case the securing element is configured as a pivot lever and in its blocking position the catch with caught breech block and the securing device is in its securing position,
- Figure 9 shows a schematic lateral view of the triggering mechanism from Figure 8, in which case the catch is shown in its non-blocking position with retreating breech block and the securing device is in the securing position,
- Figure 10 shows a schematic lateral view of a further exemplary embodiment of an inventive trigger device, in which case the security function and the trigger function takes place via remote actuated guide bars and the securing device is in the fire position B,
- Figure 11 shows the triggering mechanism from Figure 10, in which case the securing device is in the safe position A,
- Figure 12 shows a perspective view of the configuration shown in Figure 10,
- Figure 13 shows a conventional triggering mechanism in a sectional representation, in which case a safety roller is in the "Safe" position and
- Figure 14 shows the triggering mechanism from Figure 8, in which case the catch is shown jammed in the safety roller via its safety nose.

The structure and function of the inventive catch 21 or of the triggering mechanism will be explained with Figure 1 (First exemplary embodiment), 2 through 7 (second exemplary embodiment), 8 and 9 (third exemplary embodiment) and 10 through 13 (fourth exemplary embodiment) with the help of four exemplary embodiments. Identical reference numerals apply to identical or identically functioning components.

In accordance with Figure 1 the handle piece 1 is mounted on a housing of a weapon not shown in the figure, in which housing a path of motion is defined for the partially shown breech block 3. The path of motion of the breech block runs along the axis of the bore 5.

The handle piece exhibits on its front side a trigger guard 7, into which from above the handle piece 1 a trigger 9 plunges, said trigger being pivoted around a trigger axis 11 in the handle piece 1 running transversely to the axis of the bore 5. A torsion spring 13, whose two legs encompass a cross pin 17, and said torsion spring being thus fixed in the handle piece 1, presses with its lower spring leg 15 the trigger 9 forward. The upper spring leg 19 presses a two-arm catch 21 engaged on its rear lever arm 23 counter-clockwise upward to its blocking position. The front lever arm 25 runs above the trigger axis 11 and a release roller 27, which is seated on the trigger 9. The catch 21 itself is pivoted on a lever axis 29 transverse to the axis of the bore 5 in the handle piece 1.

If the trigger 9 is actuated and in the process swiveled against the force of the torsion spring 13 counter-clockwise, then the release roller 27 raises the front lever arm 25 against the force of the torsion spring 13 and lowers the end of the rear lever arm 25 (this position is shown in Figure 4 in conjunction with the second exemplary embodiment). On the rear end of the rear lever arm 23 a sear arm 31 is shown, which leaves a sear catch 33 on the breech block 3 and holds said sear catch in its cocked, ready-to-fire position (Figure 1). In the case of the lowering of the sear arm 31 through the trigger movement the breech block 3 is released, after that moves forward in the weapons housing under the influence of the breech block spring not shown in the figure, feeds the ammunition and finally ignites (with the help of the firing pin not shown in the figure) the propellant (see Position Figure 4).

In the case of the lowering of the rear end 23 of the catch 21 its front end 21 is raised and gripped from below on a latching catch 51 provided there by a release catch 53. The release catch 53 is pivotably suspended on the trigger 9 around a pin 54 against the force of a catch spring 55. After the release of the trigger 9 the release catch 53 holds the rear end 23 and the sear arm 31 of the catch 21 outside the path of motion of the breech block (Figure 5).

Not until the breech block 3 runs rearward does it meet the release catch 53 and swivel said release catch clockwise against the force of the catch spring 55 and release the latching catch 51 on the catch 21, said catch springs counterclockwise with its rear end 23 in the path of motion of the breech block 3 (see Figure 6). In the process the sear catch 33 of the breech block 3 overruns the sear arm 31, which plunges elastically downward into the handle piece (see Figure 7) until the forwardmost sear catch 33 on the breech block 3 has completely overrun the sear arm 31, the catch 21 occupies its blocking position and the sear arm 31 engages the sear catch 33 and thereon engaged can keep the breech block in the rearmost position.

In the case of the triggering mechanism of the first exemplary embodiment (Figure 1) a slide 101 is arranged in the rear end of the rear lever arm 23, whose rear abutting surface 103 forms an actuating element on which the adjoining sear catch 33 can engage. In its idle position (II) the slide 101 protrudes under the effect of a spring arrangement 104 running in the interior of the rear lever arm 23 by the amount D to the rear from the rear lever arm 23.

The sear catch 33 of the breech block pressing from the rear against the rear abutting surface 103 of the slide 101 moves the slide 101 against the effect of the spring arrangement 104 in the direction of the axis of the bore 5 by the amount D to the rear lever arm into the securing position I of the slide. In this position its rear abutting surface 103 ends with the rear abutting surface of the sear arm 31, so that the actuating element lies completely within the sear arm profile. The rear abutting surface of the sear arm 31 in the process prevents the breech block from moving further forward when the sear arm 31 is in its blocking position (see Figures 1, 2 and 3). Simultaneously in this way it is ensured that the slide 101 itself is only slightly strained by the advancing or adjoining breech block 3. The load of the slide 101 itself results only from the restoring force of the spring arrangement 104, which must overcome the advancing breech block 3. On the other hand the sear arm 31 or the catch 21 experiences the essential load and stress through the breech block 3. With this the risk of an overload or a malfunction of the slide 101 is minimized.

The slide 101 exhibits a finger 105 running downward proceeding from the actuating element (here: its rear abutting surface), said finger forming a securing part and interacting with a

securing device 40. The represented securing device 40 comprises a safety roller 41 which is provided with a recess 43. Rotationally fixed to the safety roller 41 are a latching lug 45 and an actuating lever protruding from the housing (not shown in the figure), via which the safety roller 41 can be rotated between the "Safe" and the Fire position. These two positions are defined by two recesses 49 on the latching lug 45 and a stationary spring-loaded catch arrangement 47, each of which engages into one of the two recesses 49.

In addition the latching lug 45 exhibits a safety lug 46. When the securing device is in its "Safe" position (position in Figure 1), the safety lug 46 leaves a corresponding safety extension 10, which protrudes from the trigger 9 to the rear into the housing 1.

The slide 101 interacts via its finger 105 in the following way with the securing device 40:

- In the case of a cocked weapon with rotated cylinder the breech block 3 adjoins with its sear catch 33 at the rear abutting surface of the sear arm 31 and the rear abutting surface 103 of the slide 101, said slide occupying the Safe position (Position I). The finger 105 is located here in the active area of the securing device 40. The recess 43 in the safety roller 41 is in the "Safe" position (Position A). The finger 105 adjoins with its active area 105a at the exterior peripheral area of the safety roller 41. With this the slide 101 supports the rear lever arm 23 and with it the sear arm 31 downward against the safety roller 41. The sear arm cannot be moved from its blocking position; not even if the additional trigger safety which is formed by the safety lug 46 and the safety extension 10 were to be omitted and the trigger 9 were pressed.
- If now the securing device is moved to its "Fire" position by rotating the safety roller 41, the recess 43 occupies position B and is in the region of the finger 105; simultaneously the safety lug 46 occupies a position lying outside the active area of the safety extension 10 (not shown in Figure 1, see Figure 3).

- If now the trigger 9 is actuated, the front lever arm 25 of the catch 21 is pressed upward clockwise via the trigger roller 27 and the rear lever arm 23 with the sear arm 31 and the slide 101 is swiveled downward into the housing 1. In the process the finger 105 enters into the recess 43 in the safety roller 41, the breech block 3 is released and moves forward (see Figure 4).
- In the process the front lever arm 25 is caught with the latching catch 51 in the release catch 53 so that the catch 21 with the sear arm 31 remains within the handle piece 1 in the case of released trigger 9 (this position is shown analogously in Figure 5).
- The slide 101 occupies its idle position, in which its rear abutting surface 103 protrudes to the rear from the sear arm 31 and the finger 105 runs outside of the active area of the securing device 40 (Position II, shown drawn through in Figure 1).
- In the case of normal weapon function the breech block moving forward feeds a new round, is then launched to the rear again by the recoil occurring during firing and in the process triggers the release catch 53, which releases the latching catch 51. As a result – under the influence of the upper spring leg 19 of the leg spring 13 the catch 21 moves upward with its rear lever arm 23. The retreating breech block 5 in the process moves the rear lever arm 23 downward again to be precise via correspondingly configured oblique contact members 32, which run up to the rear somewhat obliquely from sear catch edge. In the process the breech block spring is cocked until the movement of the breech block 3 reverses again and the sear catch 33 adjoins the rear abutting surface of the sear arm 31 and in the process moves the slide 101 to its rear abutting surface 103 forward into the left lever arm 23.
- In the case of a malfunction (misfire, malfunction when advancing etc.) the breech block 3 does not retreat, but rather remains between the trigger arrangement and chamber. Also in this case the securing device 40 can be actuated, since the finger 105 is in its idle position II outside of the active area of the safety roller 41. The slide 101 does not hinder the actuation of the securing device 40. The securing device 40 can be moved from the “Fire” to the “Safe” position.

- In order to remedy the malfunction, the breech block is manually returned (cocked with the cylinder being rotated). In the case racking likewise the release catch 53 is actuated and the rear lever arm 23 dips with the sear arm 31 from the housing profile upward to the path of motion of the breech block. The racking is also possible in the "Safe" position of the securing device 40, since the slide 101 with the finger 105 is in its idle position II outside of the active area of the securing device 40 and the lowering movement exerted on the rear lever arm 23 by the safety roller 41 in the case of cocking and rotating the cylinder is not hindered.
- After the racking the sear arm 33 of the breech block 3 again adjoins the sear arm 31 of the catch 21, after previously moving the slide 101 at the rear abutting surface 103 engaging into the catch 21 to its securing position. The finger 105 (shown in dashed lines in its securing position in Figure 5) is located in the active area of the securing device 40 and the weapon is immediately in secured state.
- Now all necessary tasks can be carried out without risk in the front region of the weapon, without the breech block 3 being triggered by accidental actuation of the trigger 9.
- Via the slider 101 which can be moved relative to the sear arm 31 with the finger 105 engaging the securing device 40 the following is ensured: For one thing the weapon can be racked also in secured state, since the slide 101 with the finger 105 is not in the active area of the securing device 40 until the breech block 3 with its sear catch 33 has moved the rear abutting surface 103 of the slide 101 into the catch 21 so far that said catch is flush with the rear abutting surface of the sear arm 31 and the sear catch 33 hence adjoins the sear arm 31. For another thing, the weapon can be secured in any state, even if the breech block 3 is in front of the handle piece and the rear lever arm 23 is lowered in the handle piece 2, since the slide 101 in its idle position with the finger 105 runs outside of the active area of the securing device 40.

In the second exemplary embodiment shown in Figures 3 through 7 instead of the slide 101 a tow-armed pivot lever 201 is provided, which is arranged around a pivot axis 202 running transversely to the axis of the bore 5 in the rear lever arm 23 of the catch 21. An upper lever arm 203 of the pivot lever 201 in the process forms with its rear abutting surface the actuating element at which the sear catch 33 in the case of the breech block 3 adjoining the sear arm 31 moves the pivot lever 201 against the force of a spring arrangement 204 to the securing position so that a lower lever arm 205 of the pivot lever 201 moves as a securing part into the active area of the securing device 40 (see Figures 2 and 3). In this position the upper pivot lever arm 203 plunges completely into the profile of the sear arm 31.

If the breech block 3 with its sear catch 33 does not adjoin the sear arm 31, the pivot lever 201 occupies its idle position under the effect of the spring arrangement 204, in said position which the lower lever arm 205 lies outside of the active area of the securing device 40 and the upper lever arm 203 partially protrudes to the rear from the profile of the sear arm (Figures 4 through 7).

The functionality of this securing device is analogous to the securing device described in conjunction with the first exemplary embodiment. With the pivot lever 201 however very short travel distances of the upper lever arm 203 can be realized, by constructing the lower lever arm 205 longer than the upper lever arm 203. A short pivoting path of the upper lever arm 203 in the process produces a long pivoting path of the lower lever arm 205.

The travel distance can be so short that the overlap with the sear catch 33 of the retreating breech block 3 only extends minimally to the rear vis-à-vis a catch (f) without pivot lever 21 – as shown in Figures 13 and 14. With this the breech block arrangement in accordance with Figures 2 through 9 can be exchanged for the breech block arrangement represented in Figures 13 and 14 without further adaptations. Conveniently, for this purpose only the handle piece must be exchanged.

Figures 8 and 9 show a further exemplary embodiment of a handle piece 1 which in its structure and in its function corresponds essentially to the one shown in Figures 2 through 7. However, a pivot lever 301 is provided here at

whose lower lever arm 305 a spring arrangement 304 engages (in the rear end 23 of the catch 21). This spring arrangement 304 presses the pivot lever 301 counter-clockwise to its securing position. This means that the catch 21 – regardless of the position of the breech block 3 – will always be held in its blocking position when the securing device 40 occupies its securing position (See Figures 8 and 9).

So that the retreating breech block is not hindered by the catch 21 thus fixed in its blocking position, the following is provided: On the pivot axis 302 of the pivot lever 301 a second actuating element 306 configured here as a control cam is arranged together with the first actuating element 303. The first and second actuating elements 303, 306 are jointly pivotable around the pivot axis 302. That is, the pivot lever 301 can be diverted by the second actuating element 306. If this takes place clockwise, the lower lever arm 305 goes out of engagement with the securing device 40 and releases the catch 21, so that its rear end 23 or the sear arm 31 can be lowered. In the shown exemplary embodiment this takes place via a control profile 307 constructed on the breech block 3, said control profile's contour being adapted to the course of the sear catch profile (of the sear catch 33) on the underside of the breech block 3. Figure 9 shows a breech block position in which case the retreating breech block 3 (in the direction of the arrow) engages with the control profile 307 on the control cam (the second actuating element 306) and deflects the pivot lever 301 clockwise against the spring arrangement 304 and moves the pivot lever 301 to its release position (II) in which it does not engage the securing device 40 with its lower lever arm 305. Simultaneously the sear catch 33 presses the rear end 23 of the catch downward.

The breech block 3 travels so far back until the second actuating element 304 (the control cam) falls into a recess 307a of the control profile 307. Simultaneously the catch 31 is pressed upward with its rear end 23 under the effect of the trigger spring (torsion spring 13). The sear arm 31 falls in before the sear catch 33 and blocks the advancement of the breech block 3. The pivot lever 301 resumes its securing position and the catch 21 is blocked in its blocking position as long as the securing device 40 is in its securing position. In addition to the spring arrangement 304 the front edge of the sear catch 33 also presses on the upper pivot lever arm 303 and presses said pivot lever arm into the profile of the sear arm 31 (compare the second exemplary embodiment represented in Figures 2 through 7).

The second actuating element (of the actuating cam 306) makes possible in the case of this exemplary embodiment a reliable control of the pivot lever 301 also without the spring arrangement 304 (Figures 8 and 9) or the spring arrangement 204 (Figures 2 through 7). For the pivot lever 301 is reliably brought to its releasing position by the control profile 307 in the case of the retreating breech block 3 (Figure 9) and in the case of an advancing breech block via one of the sear catches 33, which engages on the first actuating element 303 (upper pivot lever arm), and brings the securing element 301 (pivot lever) to its securing position. This means, the desired securing function is reliably guaranteed without spring arrangement 304 or 204 or also in the case of malfunctions (broken springs). A similar compelled guidance by the breech block 3 can also be realized in the slide 101 (Figure 1).

In the above described exemplary embodiments the securing device is configured as a rotatable safety roller 41 with corresponding recesses 43. There are other embodiments in which the securing device is configured as a slide safety in which case a corresponding securing profile is configured either to the axis of the bore 5 or also parallel to the axis of the bore 5. Such a securing slide then exhibits a corresponding securing profile with recesses and active areas which, analogous to the described safety roller 41 interacts with the securing element arranged on the catch 21 (for example a slide 101 or a pivot lever 201). Such a securing slide can also be directly coupled to a corresponding actuator which for example controls the weapon in a weapons station. There are also embodiments in which case separate interfaces are provided on the trigger 9, at which such actuators can be arranged.

Figures 10 through 12 show a fourth exemplary embodiment of a handle piece 1 with an inventive catch 21. Here it is a matter of a so-called machine handle piece which for example is inserted into a weapon which can be used in a so-called weapons station. The trigger 109 is formed by a bracket 109a fixed on an actuating bar 109c with a trigger element 109b hinged thereon. The catch 21 and pivot lever 201 correspond in their function – with slightly transformed geometry – to the exemplary embodiment represented in connection with Figures 2 through 7. However the safety roller 40 is replaced here by a

securing slide 140 which can be actuated via a securing bar 141. Figure 10 shows the handle piece 1, in which case the securing device 40 occupies its Fire position (safety off). In the case of the movement of the actuating bar 109c in the direction of the arrow said actuating bar pulls via the bracket 109a on the trigger element 109b and raises the catch 21 over the release roller 27 on its front end, so that the rear end 23 is lowered in known manner and a (not shown in the figure) trigger 3 is released.

In Figures 11 and 12 the securing device 140 occupies in its securing position and shelters the pivot lever 201 or its lower lever arm 205, when the breech block 3 adjoins on the rear end of the catch 21 and brings the pivot lever 201 to the position shown drawn through. It is not possible to fire. If the breech block 3 does not adjoin the rear end 23 of the catch 21, the spring arrangement 204 moves the pivot lever 201 to the position shown in dot-dashed lines (Figure 11) and the lower end 205 of the pivot lever 201 can plunge past the securing slide 140 downward into the handle piece 1, even if the securing slide 140 occupies its secured position. A retreating breech block 3 is not hindered. The securing bar 141 and the trigger bar 109c are coupled here to corresponding actuators (not shown in the figure), via which said actuators they can be actuated.

The actuators and the securing bar 141 and the trigger bar 109c are controlled so that in the case of a malfunction (power failure, cable break, other malfunction) the trigger bar 109c is moved counter to the direction of the arrow (Fire setting) and the securing slide 140 is brought to the securing position shown in Figures 11 and 12. this is always possible through the inventive catch 21, without having to pay attention to the breech block position or movement. Malfunctions and the position of the trigger bar 109c of the securing bar 141 or of the securing bar 140 can be registered by sensors and corresponding signals can be processed in a control system.

Further embodiments and variations of the present invention arise for the person skilled in the art within the scope of the claims.

**We Claim**

1. Catch (21) for a triggering mechanism of a firearm exhibiting a breech block (3) and a securing device (40; 140), in particular of a rapid fire weapon, wherein the catch (21)
  - can be moved between a position blocking the breech block (3) and a position not blocking the breech block and
  - exhibits a securing element (101; 201; 301) which
    - can be moved relative to the catch (21) between a releasing position (II) and a securing position (I),
    - occupies its releasing position (II) in the case of a breech block (3) engaging on the catch (21) when the retreating breech block (3) exerts an actuating effect on the securing element (101; 201; 301) in a rearward direction and does not engage the securing device (40; 140) in the releasing position (II), even if said securing device simultaneously occupies its securing position, and the catch (21) cannot be brought to its non-blocking position,
    - and/or occupies its securing position (I) in the case of a breech block (3) advancing on the catch (21) when the breech block (3) exerts an actuating effect on the securing element (101; 201; 301) in a forward direction and in the securing position (I) engages the securing device (40; 140) when said securing device simultaneously occupies its securing position and fixes the catch (21) itself in its blocking position.
2. The catch (21) according to Claim 1, in which the securing element (101; 201; 301) can be moved against a spring force from its releasing position (II) to the securing position (I).
3. The catch (21) according to Claim 1, in which the securing element (101; 201; 301) can be moved against a spring force from its securing position (I) to the releasing position (II).
4. The catch (21) according to Claim 1, 2 or 3, in which the securing element (101; 201; 301) exhibits a first actuating element (103; 203; 303) such that it can be carried along by the advancing breech block (3) and as a result the securing element

(101; 201; 301) to its securing position (I), and a securing part (105; 205; 305) which in the case of occupied securing position of the securing element (101; 201; 301) lies in the active area of the securing device (40; 140).

5. The catch (21) according to any one of Claims 1 through 4, in which the securing element (101; 201; 301) is arranged in the region of a sear arm (31) configured on the catch (21) engaging on the breech block (3) in the blocking position.
6. The catch (21) according to any one of the preceding claims, in which the first actuating element (103; 204; 304) lies within a sear arm profile in the case of an adjoining breech block (3).
7. The catch (21) according to any one of the preceding claims, in which the securing element (301) exhibits: a second actuating element (306), such that it can be carried along by the retreating breech block (3), as a result of which the securing element (301) can be moved in its releasing position (II) and a securing part (305) which in the case of occupied securing position of the securing element (301) lies outside of the active area of the securing device (40; 140).
8. The catch (21) according to Claim 7, in which the second actuating element (306) is configured as a control cam protruding into the path of motion of the breech block, which in the case of a retreating breech block (3) can be moved by means of a control profile (307) arranged on the breech block (3).
9. The catch (21) according to any one of the preceding claims, in which the securing element (101) is configured as a slide, whose slide direction preferably proceeds in correspondence to a barrel direction of the breech block (3).
10. The catch (21) according to any one of Claims 1 through 8, in which the securing element (201; 301) is configured as a pivot lever which is in pivoting arrangement in the catch (21) around a pivot axis (202; 302) running transversely to the barrel direction of the breech block (3).

11. The catch (21) according to Claim 10, in which the pivot lever (201; 301) is configured with two arms, whose first lever arm (203; 303) comprises the actuating element and whose second lever arm (205; 305) comprises the securing part.
12. The catch (21) according to Claim 11, in which the first lever arm (203; 303) is configured to be shorter than the second one (205; 305) and the length ratio between the first and second lever arm is preferably 1:2 to 1:3.
13. A trigger mechanism with a catch (21) according to any one of the preceding claims.
14. A handle piece (1) with a trigger mechanism according to Claim 12, with at least one interface (109c, 141), via which the trigger (9; 109) or the securing device (40; 140) can be coupled to an actuating element for the purpose of its actuation.
15. A weapon with a catch (21) according to any one of Claims 1 through 11, with a trigger mechanism according to Claim 12, or with a handle piece (1) according to Claim 13 or 14.