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PRACTICE WEAPON FOR A CARRIED RECOILLESS ANTI-TANK WEAPON

The present invention relates to a practice weapon for a hand-held recoilless anti-
armour weapon. Such weapons take the form either of expendable one-shot anti-
5 armour weapons or of assault rifles, and they are in use in many countries, includ-
ing Sweden. The expendable one-shot anti-armour weapon and the assault rifle are
equivalent types of weapon from the point of view of their field of use and effect but
the assault rifle is reloadable. In Sweden they are represented by the 84 mm light
anti-armour weapon AT4 (in Sweden called pansarskott 86) and the RCL Carl-
10 Gustav M2 (in Sweden called the m/48 Carl-Gustav) respectively.

When practice firing these weapons the infantryman cannot fire many full-calibre
rounds, if any at all, since inert full-calibre rounds, i.e., rounds without a high explo-
sive (HE) charge, are virtually as expensive as rounds with a high explosive charge.
15 Until now, therefore, practice weapons with a sub-calibre barrel mounted within the
weapon have been used. In the case of the expendable recoilless anti-armour
weapon a special practice weapon with a permanently assembled sub-calibre barrel
for 9 mm ammunition has been used. For the assault rifle the sub-calibre barrel, for
20 mm ammunition, is mounted in a special fixture resembling the live round which
20 is loaded into the weapon in the same fashion as an HE round is loaded.

The marksman fires a sub-calibre round instead of an expensive round and this is
entirely satisfactory for satisfying the marksman's success in hitting the target. He
normally rapidly learns to fire accurately. It has, however, proved to be the case that
25 marksmen who have the opportunity of firing full calibre rounds after successful
training do not succeed as well as is desirable.

The reason for this is that the marksman who has been trained to aim and fire with
his accustomed practice weapon tenses himself and is affected by the powerful
30 disturbance he is subjected to when firing the full calibre round despite the fact that
it is a recoilless weapon. The marksman experiences severe noise and pressure
effects.

Clearly it is necessary for the marksman to have the opportunity of repeated
35 practice to be subjected to these effects.

Weapons with marker charges are previously known from the German patent 2 059
202, the British patent 963 502 and the American patent 3 489 058. None of these

shows, however, a practice weapon which in a simple way can be used both for initial firing practice without marker charge and final practice with such a charge.

5 The present invention solves this problem to a fraction of the cost of firing full calibre rounds by being designed as is evident from the following main claim.

In the following the invention will be described in greater detail with reference to the appended drawings, in which

10 figure 1 shows in principle, mostly in longitudinal cross section, the design of a recoilless anti-armour weapon equipped with a practice fixture according to the invention,

figure 2 shows on an enlarged scale a part of figure 1 with special attention to the breech and a part of the firing mechanism,

15 figure 3 shows a section through a marker charge with distance piece according to one embodiment of the invention,

figure 4 shows one embodiment of the part of the invention called the striker housing as seen from the front.

20 In the present invention a sub-calibre barrel 2 for a sub-calibre projectile, and a marker charge 3 dimensioned to subject the marksman to a realistic effect of firing a full calibre round, is mounted in the barrel 1 of the recoilless anti-armour weapon or the assault rifle.

25 The marker charge is located behind the barrel, as viewed from the direction of fire, and is arranged to be ignited by the jet of flame from the charge of the practice round. To achieve satisfactory function is very important that the jet of flame from the practice round be used in this fashion to ignite the marker charge. Conceivable alternative designs using some form of mechanical transmission of the ignition
30 sequence from one charge to another would be considerably more complicated, have more moving parts and be more expensive.

By the use of the jet of flame from the charge of the sub-calibre projectile to ignite the marker charge the sequence will also be slightly delayed. This is very suitable
35 and desirable, since the duration of the pressure effects of a full calibre round, which is what it is desired to simulate, is comparatively long, of the order of magnitude of 20 ms.

In tests on a practice weapon according to the invention a duration of 7 ms was achieved, which is of an acceptable magnitude. It is not an absolute requirement that the time sequence be as long as for a full calibre round for the marksman to become well accustomed to the noise and pressure effects.

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The barrel 2 and marker charge 3 can be mounted in a similar fashion as is used in well known sub-calibre barrels for training purposes, i.e., in the case of the recoil-less anti-armour weapon directly in the barrel and in the case of the assault rifle in a special fixture resembling an HE round which is loaded into the weapon like an

10 HE shell.

In practice it is suitable to attach the sub-calibre barrel 2 to a cross wall in the barrel such that the cross wall also functions as a breech 4 for the sub-calibre barrel 2.

The marker charge 3 is attached to the other side of the breech 4. This is arranged in one suitable design of the invention by screwing the marker charge 3 via a distance piece 5 firmly into a threaded hole 6 in the breech.

Naturally the opposite procedure is possible, i.e., the distance piece may be screwed onto a threaded tap on the breech.

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It is important that the distance piece 5 be screwed firmly in place, so as to prevent a distance piece coming loose and being thrown out of the weapon and injuring persons beyond the normal risk area of the practice weapon. To ensure this the practice weapon may suitably be equipped with a safety mechanism which senses that the distance piece is screwed sufficiently firmly to the breech.

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One suitable design for such a safety mechanism is to drill a hole in the breech 4 at or near the bottom of the seat 6 for the distance piece 5 allowing a pin to run in the hole in such a fashion that the pin is forced down against a spring loading beneath the distance piece when the latter is screwed in. The pin then frees the firing mechanism.

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In the practical tests carried out for a new practice weapon for the anti-armour weapon AT4 a 20 mm barrel and ammunition, 20 mm tracer practice round m/64, for the training system for the m/48 has been used with a specially fabricated breech and a specially fabricated marker charge. The marker charge contained 110 g barium nitrate.

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The distance piece 5, see figure 3, is tubular and the jet of flame from the charge of the sub-calibre projectile can travel along its bore from the sub-calibre ammunition. In the end of the distance piece that is remote from the ammunition the marker charge 3 is mounted. In one suitable design, as shown in the figure, it is attached to a flange 7 on the end of the distance piece 5 that is remote from the ammunition. The marker charge 3 may be affixed to the flange by some simple means, for example with a bayonet fixing 8.

The marker charge 3 may at the end of the tube be covered by a membrane 9 of paper or other inflammable material or may be covered by some material which is pulverized when the marker charge detonates, so that no one behind the weapon is injured. The marker charge can be covered at other points by a material with similar properties.

The distance piece 5 is provided with extensive holes 10 in order to lead the powder gases from the sub-calibre ammunition past the marker charge 3 and out of the weapon.

The flange 7 can also be provided with holes 11 around its circumference to reduce the surface upon which the powder gases from the marker charge can react to generate a recoil. If this were not done the marker charge could generate a forwardly directed recoil. These holes must be calculated from case to case according to principles well known to the man skilled in the art and based upon powder charge weight, weapon and charge geometry and other relevant factors.

The breech, see figure 2, consists of a main part 12, with a threaded hole 13 for the barrel 2 and another threaded hole 6 for the distance piece 5 of the marker charge 3, and a component 14 to secure the striker housing 15 to the main part. The main part 12 has a hole drilled into it, in which the first pin runs, which participates in causing the firing mechanism to be released. In one suitable design of the invention the hole runs primarily in the longitudinal direction of the weapon.

The release of the firing mechanism is brought about by the fact that the first pin, after it has been pushed back by the distance piece 5, no longer prevents a crossing second pin from being driven down through its hole. This is because the first pin has a notch, which is aligned with the hole for the second pin, when the first pin is depressed.

When the second pin is able to be moved down through its hole, one end of the pin no longer prevents the striker housing 15 from turning away from a first position, where the weapon is not loaded, to a second position, where it is loaded.

5 Furthermore the second pin may suitably be utilized to retain the striker housing in the loaded position by virtue of the fact that this pin too is moved out of engagement against a spring loading, so that, after the striker housing 15 has turned to the loaded position, the pin is forced by its spring loading to engage a locking hole in the bottom of the striker housing.

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The striker housing 15 has, in one proposed design of the invention, a partially threaded cylindrical tap 16, in which the striker pin runs. At a large angle to the striker pin, approximately at right angles, an actuating pin 17 runs, which in its turn can be affected by the trigger mechanism 18. In the same fashion as is the case with the corresponding weapons for firing full calibre rounds, a horizontal displacement of the actuating pin 17 is translated into a vertical displacement of the striker pin causing it to contact a percussion cap, which in turn ignites the sub-calibre ammunition. In an established fashion the actuating pin and the striker pin may be chamfered 45° where they contact one another.

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The tap 16 of striker housing 15 has threads 19 around parts of its circumference and at other parts of its circumference it is without such threads, which constitutes a type of bayonet fixing. The component 14 has a mating hole.

25 When loading, the striker housing 15 is turned to the first position, where it can be lifted out of the component 14. Thereafter the round is pushed into the cartridge seat, whereupon the distance piece 5 with the marker charge 3 is screwed into position. Then, with the striker housing removed, a percussion cap is placed in the recess in the main part 12 of the breech intended for this purpose, the recess being then exposed. Thereafter the striker housing 15 is once again put down into the component 14 and turned to the second position, where it is firmly locked. This turn is, as mentioned above, only possible if the distance piece 5 is fully screwed in. The striker pin is now aimed at the percussion cap and the actuating pin 17 is pointing toward the trigger mechanism 18. The weapon is ready to fire.

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For manufacturing reasons the breech 4 in the example is divided into a main part 12 and a component 14, the latter being intended to secure the striker housing. The component 14 is attached to the main part in an established fashion, for example



by means of screws. It is naturally possible instead to fabricate what has here been called the main part 12 and the component 14 in one piece.

- 5 Finally, for the sake of completeness, it should once again be pointed out that it is possible to use a practice weapon according to the invention without the marker charge 3. It then functions in the same fashion as established practice weapons without the sensations of a full calibre weapon.

Claims:

1. Practice weapon for a hand-held recoilless anti-armour weapon comprising a sub-calibre barrel (2) for a practice projectile mounted in the barrel (1) of the weapon, characterized in that it also comprises a marker charge (3), which is arranged to ignite from the jet of flame from the charge of the practice projectile, and which concerning pressure wave, noise, etc., is arranged to subject the marksman to a realistic sensation of firing a full calibre weapon.
2. Practice weapon according to claim 1, characterized in that a cross wall (4 and 12,14) is fixed within the weapon, on one side of which cross wall the sub-calibre barrel (2) is affixed, for which it functions as the breech, and on the other side of which the marker charge (3) is attached via a distance piece (5).
3. Practice weapon according to claim 2, characterized in that the distance piece (5) is tubular and has holes (10) along its curved surface, such that the jet of flame can pass through the tube and the powder gases from the charge of the practice projectile can, via the holes, be conducted past the marker charge (3) and further out of the barrel (1).
4. Practice weapon according to one of claims 2 or 3, characterized in that the marker charge is attached to a flange on the distance piece.
5. Practice weapon according to one of claims 2 to 4, characterized in that the distance piece (5) is arranged to be screwed into the breech (4 and 12,14) and that there is a safety mechanism sensing if the distance piece is adequately secured to the breech by the breech being provided with a hole, in or near the seat (6) for the distance piece (5), in which hole a pin runs, so arranged as to be depressed by the distance piece, against spring pressure, when the distance piece is screwed into position, thereby freeing the firing mechanism.
6. Practice weapon according to claim 5, characterized in that the safety mechanism further includes a second pin, which, when the first pin is displaced by the distance piece, can be depressed against spring pressure and thereby pass a notch in the first pin, whereupon one of its ends releases the firing mechanism.





7. Practice weapon according to claim 6, characterized in that the firing mechanism includes a striker housing (15), which includes a cylindrical tap (16) which over parts of its circumference is provided with threads (19) and over other parts of its circumference lacks such threads, such that it constitutes a form of bayonet fixing, whereby the tap (16) is arranged to engage with a mating hole in the breech (4 and 12,14), at the bottom of which hole there is a recess for a percussion cap, which percussion cap is arranged to be able to ignite the sub-calibre ammunition, and through a hole in which tap (16) a striker pin runs, that is arranged to be able to be displaced under the influence of an actuating pin (17) substantially at right angles to the striker pin, which causes the striker housing (15) to have two possible angular positions, a first position in which the actuating pin (17) cannot be contacted by the firing mechanism (18) and second in which it can be contacted by the firing mechanism.
8. Practice weapon according to claim 7, characterized in that the second pin, when it is not released by the first pin, prevents the striker housing (15) from being turned from the first to the second position.
9. Practice weapon according to claim 8, characterized in that the second pin, after having enabled the striker housing (15) to be turned to the second position, is arranged to retain the striker housing (15) in the second position.

