

Firing pin in particular for machine guns

The invention relates to a firing pin in particular for a machine gun, with an elongated, essentially cylindrical firing pin shaft, a stop formation and a point (first part of Claim 1).

Similar firing pins are known from DE 570 920 C, DE 3 00 692 C, US 28 42 885 and US 24 25 434.

The firing pin penetrates a bore in the breech block of the breech mechanism or the breech mushroom head e.g. of a machine gun and has the task of striking the priming cap of the cartridge so powerfully that said cartridge is reliably fired.

Usually the firing pin has been designed in such a way that it tapers in the shape of a bottle or conically to the front and ends in a very slim point, which penetrates a bore in the breech block with slight clearance. Due to the slight diameter of the point one obtains there a high surface pressure on the priming cap and thus even in the case of a very slight impact on the firing pin one can expect a reliable firing. Moreover one expects from a bore in the breech block with slight diameter the advantage that one prevents the so-called primer failures or at least makes them as rare as possible. In some cases the copper, tombac or brass plate of the cap bursts open during the shot, so that gas escapes to the rear in the breech mechanism. What is more the sheet metal of the cap can get between the firing pin blown to the rear and the edge of the bore in the breech block. A jamming of at least the firing pin can be the result.



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Primer failures occurred frequently at the end of the 19th century with the first center fire cartridges. At the time people had little experience with the selection of cap sheet metal. In war productions in the case of cartridges with Berdan caps perhaps the primer bores in the cartridges sometimes turned out larger than necessary as well. Today, particularly with Boxer caps, there is hardly any reason to fear primer failures due to primer bores that are too large. The danger of primer failures, however, continues to exist, e.g. when in time of war the production of cartridges is accelerated by the lifting of production inspections, it becomes necessary to use replacement materials for cap sheet metal and the possibility of sabotage must be taken into account in the production of cartridges (for example no primer bore).

Another reason for the described, known firing pin is the fact that such a firing pin, which is offset to the front, cannot under any circumstances protrude from the bore to the front, and then cause breakdowns in reloading. Of course this holds true only for the undamaged firing pin.

However, the price to be paid for this advantage is an offset and thus difficult to manufacture bore in the breech mechanism or breech mushroom head, difficulties in firing when an air cushion forms under the recess, and difficulties in the hardening of the firing pin, which precisely at the root of the slim point tends to break off. This danger is increased by the fact that for example in the case of a machine gun after long series of shots the firing pin becomes quite hot. Moreover, such a bore is difficult to clean.

With submachine guns for example (such as the Soviet PPSH 41) the firing pin has been replaced by a short pin with triangular cross section, in which, as a result of the triangular

shape the air cushion effect cannot occur. Moreover, each weapon was supplemented with a replacement firing pin, so that a broken or bent firing pin could be rapidly replaced in emergencies. However, the shooter didn't benefit much from this feature if the breakdown happened during battle.

Proceeding from this problem it is the object of the invention to improve the firing pin, in particular for machine guns. In particular the firing pin should, even if it exhibits a considerable length, be unbreakable. Additionally, a breech mechanism or breech mushroom head with a simplified bore should be possible.

To solve this problem the initially named, known firing pin will be improved so that the point is formed as a plain point, which directly joins to the cylindrical shaft. The previously available, slim point, usually offset toward the shaft of the firing pin, is discarded without replacement.

The main reason no one ever came up with such a design is that people were afraid of the danger of a primer failure due to the greater contact surface with the cap and moreover in the case of a primer failure too great of a surface influence on the firing pin was thought to be disadvantageous.

However, experiments with invention proved the opposite: the firing pin penetrates less deeply and with a much greater radius into the priming cap; as a result there are significantly fewer primer failures, even if the sheet metal of the cap should be defective or damaged.

However, if the cap does blow out, for example due to a lack of the primer vent hole in the cartridge, then the load of the cap is significantly lower as a result.

Further, the breaking off of the slim point of the firing pin is no longer possible, because the invention's firing pin has no such slim point. In the case of high temperatures there is also no heat build-up in the point of the firing pin. In the case of overloaded cartridges the return of the cap does not cause any breakdowns.

The firing pin type is especially suitable with a shooting breech principle (breech mechanism caught in rear position), since the firing pin here forms one unit with the breech mechanism and the entire breech mechanism mass plus the breech-closing spring can act on the primer during firing.

While earlier the broken off, slim point of the firing pin could wedge and possibly unintentionally trigger a shot, this danger no longer exists.

Firing pins and associated bore in the breech mechanism are simpler and cheaper to manufacture. The risk of a buffering of the firing pin by an air cushion in the case of an oiled up bore ceases to exist.

However, the fact that a fouling of the narrowed bore is no longer possible and that cleaning is possible e.g. by means of a wick or a thick pipe cleaner without further difficulties is of particular importance.

In total the invention's firing pin is much more mechanically and thermally stable than the known, initially described firing pin and has therefore a significantly higher service life. The manufacturing of firing pin and guide bore is simpler and cheaper. Breakdowns caused by fouling and ammunition defects practically no longer have an effect.

To even further improve the precise manufacturing and the protection from fouling, as is known, along the

shaft at least one slightly thickened guide section is arranged. The guide section acts as a support against transverse vibrations and as a piston ring which ensures a cleaning of the bore.

In the process it is preferable that the simple point cuts the or a guide section (Claim 1). As a result of this the point gets the greatest possible radius, while on the other hand the shaft is not too thick and thus the firing pin is not too heavy. This results in a weight reduction and a more rapid firing.

The following measurements have proved to be particularly expedient: the length of the shaft 60 to 100 mm, 75 to 85 mm better, approximately 80 mm best of all and the diameter of the shaft or the thickening(s) approximately 3 mm (Claim 2). The diameter of the point amounts to nearly the same as the diameter of the priming cap, if necessary minus the sheet thickness of the cylindrical priming cap border and the tolerances for the concentric arrangement of cartridge and breech mechanism bore.

The object of the invention will be explained in greater detail using the drawing in an embodiment. The drawing shows the following:

- Fig. 1 diagrammatic representation of the front part of a breech mushroom head for a conventional machine gun,
- Fig. 2 shows the invention's firing pin, and
- Fig. 3 shows the invention's firing pin built into a breech mushroom head.

Figure 1 shows a diagrammatic representation of a conventional mushroom head 1 of a breech of a machine gun in longitudinal view. This mushroom head 1 of a breech exhibits a median axis 21, which is aligned with the axis of the bore of the weapon. A breech block 3 is centrally arranged with regard to the axis of the bore 21 on the front side of the median axis, said breech block which is fitted to hold the bottom of a cartridge. Further a central bore 5 for holding and

guiding of a firing pin 7 is provided, said bore 5 which ends in breech block 3. The joining end of bore 5 has a narrowing 9, which can only be manufactured with great effort and expense. In particular it is difficult to manufacture a bore 5 with narrowing 9 in good surface finish.

A firing pin 7 is movably arranged in this bore 5. This firing pin 7 has a tapered, slim point 11, which is dimensioned in such a way that it penetrates the narrowing 9 and can protrude out of it a distance when the firing pin 7 is in its foremost position.

During firing the slim point hits the priming cap of the cartridge and ignites it. If one fires the weapon without a cartridge, then the firing pin 7 is held by a stop or a compressed spring in the area of its left end, not shown here.

Even in the case of a replacement firing pin 7 which is not manufactured until a long time after the manufacturing of the machine gun, this stop must be toleranced in such a way that the machine gun fires reliably every time. From this it follows that in the case of unfavorable tolerances the transition of the of the firing pin 7 hits between its shaft and its slim point 11 at the narrowing 9 of the bore when no cartridge has been fired. There is a possibility here that the firing pin 7 could break.

To check this opportunity for error, the slim tip 11 has been designed longer than absolutely necessary, whereby there is the risk that vibrations could occur during the impact, which could also cause the firing pin to break.

The invention's firing pin 17 is shown in Figure 2. The scale of reproduction is smaller than that of breech mushroom head 1 of Figure 1. The breech mushroom head is cylindrical over the greater part of its length and has slightly projecting guide sections 13

which guide it into its bore. The end has a thickening 15, which if necessary in cooperation with a firing pin spring, causes a stop.

The front end however is not offset and slim, as is the case with known firing pins, but rather is equipped with a plain point 19, which provides for a reliable firing of the priming cap of a cartridge. Preferably it forms the end of a guide section 13.

As can be seen without further ado, the firing pin requires a continuous cylindrical bore in the breech mushroom head 1, which exhibits no narrowing 9 whatsoever and therefore can be manufactured cheaply, quickly and also with high precision, since it can be finished to gauge easily by means of re-reaming.

The length of this firing pin of the invention amounts to about 85 mm, the diameter in the area of the guide sections is about 3 mm. This measure is 2 or 3 times that of conventional firing pins. There is no need to fear the formation of an air cushion, since any oil residues from the firing pin 17 are forced out of its bore. The same holds true for any dirt that could possibly penetrate, which cannot gather at the narrowing 9.

Figure 3 shows the firing pin 17 of Figure 2, which is built into the breech mushroom head 1 of Figure 1.

Patent Claims

1. Firing pin (17) provided for integration in a cylindrical bore, in particular for a machine gun, with an elongated, essentially cylindrical firing pin shaft, in a stop formation (15) and a tip (11), whereby the tip is designed as a plain point (19), which directly joins to the cylindrical shaft, characterized by the fact that

- along the shaft at least one slightly thickened guide section (13) is arranged and
- that the plain point (19) cuts one or a guide section (13).

2. Firing pin (17) according to Claim 1, characterized by the fact that the diameter of the shaft or the thickening(s) amounts to approximately 3 mm.

Figure 3