

Title: System for communicating data to a detonating fuse of a firearm.

-----

DESCRIPTION

5 The present invention relates to a system for communicating data to a detonating fuse of a firearm. In particular, the present invention relates to a system for data communication to a detonating fuse of munitions, adapted to transfer to the fuse itself and  
10 in particular to an electronic unit for managing fuses, the necessary information for the correct reaching of the target.

It is known that programmable fuses are available, inside which electronic system for driving the  
15 projectile are present, determining the trajectory of the same, in order to correctly reach the target. Such systems can be based on heat sensors, for detecting the heat radiated by the target, or on radio-frequency sensors, which detect the position of the target, in  
20 order to drive the projectile towards it. Other systems are based, for example, on GPS detectors, which drive the projectile towards the position of the target, known from its GPS coordinates.

The program for inserting the driving system contained  
25 in the fuses must be stored in the fuse itself, before the projectile being ejected from the firearm.

A system used in the known technique provides that such

transfer occurs in an electro-magnetic way inside the  
firearm. A suitable writing device sends an electro-  
magnetic codified signal to an antenna, comprised in  
the fuse, which is decoded by an electronic unit of  
5 management of the system.

Another known system for programming the fuse is of a  
mechanical type, in which by means of moving flanges or  
sleeves, associated to the fuse itself, the programming  
parameters are set. In this case, the programming is  
10 made before the insertion of the projectile in the  
firearm.

The programming made in an electromagnetic way in the  
firearm is often difficult, because for obvious  
reasons, the ambience is greatly noisy, and there are  
15 many factors which can influence the electromagnetic  
waves.

---

~~The present invention obviates to the cited drawbacks,~~  
by providing a system for communicating data to the  
fuse, in which the unloading of the program for  
20 inserting the fuse occurs in an electric way, by means  
of electric conductive elements, realized on the fuse  
itself, on a front capsule in which the fuse is housed,  
in order to be driven in the barrel of the firearm, and  
to create an electric conductive path from a central  
25 electronic unit, controlling the firearm, to the  
electronic processing unit present in the fuse.

An aspect of the present invention refers to a system for data communicationcommunicating data to a fuse of a firearm, having the characteristics of the annexed claim 1.

5 Further characteristics of the system are contained in the following dependent claims.

Further scopes and advantages of the present invention will be clear from the following description and from the annexed drawings, given here for example only, in a  
10 exemplary and non limiting way, in which:

- Figure 1 schematically represents in an exploded view a detonating fuse inserted in a so-called front "sabot", according to the present invention;
- 15 - Figure 2 shows an electronic circuit for communicating the front sabot with the fuse  
-----according to the present invention;-----
- Figure 3 shows the front sabot according to the present invention;
- 20 - Figure 4 shows a fuse according to the present invention;
- Figure 5 partially shows a projectile provided with the fuse according to the present invention.

25 With reference to the cited figures, the system according to the present invention applies to a firearm

of the type comprising a barrel, from which projectile P is shot, and to a charging mechanism, which provides for the insertion of the projectile in the barrel itself.

5 In this kind of firearm, the sizes of the projectile are normally lower than the diameter of the barrel. In these cases it is known as "under-calibre" ammunitions, for which, in order to correctly insert the projectile in the barrel, an adaptor is used, formed by some kind  
10 of front capsule 2 (front sabot), having an outer diameter substantially corresponding to that of the barrel which is fitted on the projectile. The projectile with capsule 2 is fitted on its fuse 3, and in such a way it is correctly and easily inserted in  
15 the barrel.

In the phase just before the insertion of the  
~~projectile in the barrel, fuse 3 is charged, by~~  
discharging the insertion in the same.

Such operation is advantageously made after having  
20 fitted capsule 2 on the projectile.

According to the present invention, the program of an electronic processing unit present in the fuse, with which the corrected data transfer to the same, occurs in an electronic way. In particular, the system  
25 comprises electrically conductive elements, realized on the fuse, on the front capsule, and for a mutual

communication, in order to create an electrically conductive path from a central electronic unit, which controls the firearm, to such processing unit on the fuse.

5 Such electrically conductive elements comprise a plurality of electrical contacts 21, positioned on the lateral surface of capsule 2, and permitting to create an electric continuity from the outside to the inside of the fuse itself.

10 Such electric contacts 21 are preferably realized as mutually overlapped annular portions.

On the fuse a connector 31 is present, which electrically connects the processing unit placed inside the fuse itself with the outside. An electronic

15 connection board 4 between connector 31 and contacts 21 is housed inside the capsule, in such a position to

~~adhere a plurality of conductive tracks 41, realized on~~

the same, with contacts 21 of the capsule, and to permit the insertion of a pin 42 in connector 31 of the

20 fuse.

Advantageously, such capsule 2 comprises an aperture 22 realized in the position corresponding to that of connector 31 of the fuse, when this latter is inserted in the capsule, such to permit in a visible way the

25 connection between it and pin 42.

The electric connection between the central control

unit of the firearm and the capsule can be made by means of comb contacts (not shown), disposed on a mobile support in advancement and by controlling contacts 21 for the time necessary for programming the  
5 fuse.

Preferably, on such connection board 4 a connection circuit 43 between tracks 41 and pin 42 can also be present. Such connection circuit can in turn comprises a decoding circuit or generally for processing signals  
10 received from the central unit of the firearm.

---

The invention claimed is:

1. System for communicating data to a detonating fuse of a projectile of a firearm, for sending said data to a processing unit inserted in said detonating fuse, said projectile being under-calibre with respect to the size of the barrel, for which inserting the projectile correctly into the barrel, said system comprising:
  - a cap and an adaptor formed by the cap, the cap fitting on the projectile, having an external diameter substantially corresponding to that of the barrel,
  - electrically conductive elements provided on the detonating fuse and on the cap for connection between the elements, to create an electrically conductive path from a central electronic unit, which controls the firearm, to said processing unit on the detonating fuse;
  - wherein said electrically conductive elements comprise:
    - a plurality of electrical contacts positioned on a lateral surface of the cap, the contacts creating electrical continuity from the outside to the inside of the cap;
    - a connector on the detonating fuse, the connector electrically connecting the processing unit within the detonating fuse with the outside of the cap; and
    - an electronic connection board, set between the connector and the contacts, the board being positioned within the cap, in a position to provide engagement of a plurality of conductive paths provided thereon with the contacts of the cap and to enable insertion of a pin into the connector of the detonating fuse.
2. System according to claim 1, wherein said electrical contacts are made as annular portions set on top of one another on the lateral surface of the cap.
3. System according to claim 1, wherein said cap comprises an opening provided in the position corresponding to that of the connector of the detonating fuse when the detonating fuse is inserted in the cap in such a way as to enable the connection to be made between the connector and the pin.
4. System according to claim 1, wherein present on said connection board is a connection circuit for connection between the tracks and the pin.
5. System according to claim 4, wherein said connection circuit comprises a circuit for decoding or processing the signals received from the central unit of the firearm.