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(54) **A device for arming a fuze for a projectile.**

(57) The present invention relates to a pressure-sensitive device for arming a fuze for a projectile.

It is previously known to mount on projectiles various kinds of diaphragms or pistons with sealing piston rings for this purpose. However these devices often have an unsatisfactory function.

The invention involves a solution to the problem by having a piston mounted in the projectile wall, in sealing contact with a sleeve made of softer material than the piston. When exposed to a high outer gas pressure the piston is pushed into the sleeve and deforms it during which a very good sealing is maintained. The movement of the piston is used to carry out a predetermined arming measure.

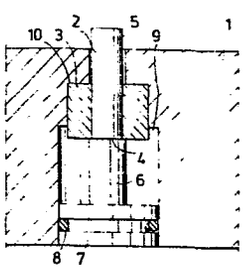

Fig.1

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A device for arming a fuze for a projectile

The present invention relates to a pressure-sensitive device for arming a fuze for a projectile.

It is previously known to mount on projectiles various kinds of diaphragms which are caused to be deformed by the gas pressure in the bore of a weapon or in the cartridge of the projectile and in doing so to affect a fuze. These devices often have an unsatisfactory function. It is further known to have a piston mounted in a hole in the projectile wall, sealed with a piston ring, affect a fuze. Such a device has, however, great disadvantages as the sealing is too insufficient. The pressure on the piston often amounts to about 800 bar. That means that with a safety margin the device must be tight against a pressure of 1500 bar, which previous pistons did not manage satisfactory.

The present invention solves this problem by the arming device being made in the way that is evident from the accompanying claims.

In the following the invention will be further described with reference to the accompanying drawings on which

fig. 1 shows a pressure-sensitive piston and, in section, a sealing sleeve mounted in a projectile wall, also in section.

fig 2 and 3 show the arming device in a combination

with a piston that can be moved under influence of the acceleration. In fig. 2 the device is put at safety, in fig. 3 it is armed.

According to the invention a piston 2 is mounted in an opening in a projectile wall 1. At the firing the piston is exposed to a high gas pressure in the cartridge of the projectile or the bore of its weapon. The piston 2 is then pushed into the projectile and carries out some predetermined arming movement. This can be of different kinds depending upon which type of fuze that is used. The fuze can e.g. be of the customary type that comprises a rotor, which can complete an igniter train by a rotation, usually under the influence of a spring The present invention can then be used to release a safety device which prevents the rotation.

A combination with other devices to give an increased safety is also possible. Fig. 2 and 3 which will be described in greater detail below show such a combination.

As the piston 2 is to be affected by the gas pressure at the firing the piston 2 is placed either in the back wall of a projectile or in the case of mortar projectiles or other projectiles with a driving band somewhere behind this.

According to the basic idea a sleeve 3 and, in sealing contact against it, a piston 2 are mounted in an opening in a wall 1 of a projectile. The sleeve 3 is made of softer material than the piston 2. When the gas pressure increases on the piston 2 it is pushed into the sleeve 3 and deforms it, at which an extremly good sealing is maintained between them. The movement of the piston 2 into the projectile is used to carry out some predetermined arming movement.

According to a prefered embodiment of the invention the piston 2 is made with an abrupt change 4 in its cross section. The narrower part 5 of the piston is directed against the interior of the projectile and inserted into the sleeve 3 so that the edge of the broader part 6 of the piston which is turned inwards, that is the change 4 in cross section, bears upon the edge of the sleeve 3. In this way a very good sealing between the piston 2 and the sleeve 3 is achieved which just becomes better when the piston 2 is pushed into the sleeve 3 and deformes it.

It is normally suitable to make the outermost part 7 of the piston with still larger cross section than the cross section of the previously mentioned broader part 6. Hereby a larger surface is obtained for the gas pressure to act upon. The opening in the projectile wall 1 is suitably made with an edge 10 upon which the sleeve 3 can bear and which prevents it from being displaced into the projectile when exposed to pressure. If one makes the piston 2, the sleeve 3 and the opening rotational symmetric, which among other things for reasons of manufacturing technique often is suitable, the opening can for instance by drilling easily be given three diameters changed step-by-step.

As an extra precaution measure one can provide the outermost part 7 of the piston with a piston ring 8, an O-ring, in a groove as an additional sealing.

When the piston 2 is moved the air in the outer part of the opening between the sleeve 3 and the outermost part 7 of the piston is prevented from leaking inwards by the sealing of the sleeve 3 and outwards by the high outer pressure. In order to make the device function well it is suitable to make the sleeve 3 extend a little into the outer part of the opening so that an annular

space 9 is formed in the outer part located outside the sleeve 3 as seen from the longitudinal axis of the piston 2. In this space the air can be compressed during the movement of the piston.

A possible combination of the present invention with a piston 11, which under the influence of the acceleration during the firing tends to move, is shown in fig. 2 and 3. The piston 11 can move backwards in the projectile under the influence of the acceleration after a blocking ball 12 has been moved. This can only happen after the piston 2, which moves against the direction of the acceleration, has moved a determined distance. Consequently one gets a device that will not arm the fuze until first the piston 2 has moved under the influence of the gas pressure and then another piston 11 under the influence of the acceleration. The device gives a high degree of safety.

The present invention can of cause also be used in a variety of other embodiments and in combination with other arming or safety devices.

Claims

1. A device for arming a fuze for a projectile characterized in that the device comprises a piston (2) mounted in an opening in the projectile wall (1), which piston (2) lies in sealing contact against a sleeve (3) made of softer material than the piston (2), which sleeve (3) is also mounted in said opening, and in that the piston (2) is pushed into the sleeve (3) and thereby deforms it, as a result of the gas pressure that is developed in the case of the projectile or the bore of the weapon during the firing of the projectile, at which the movement of the piston is used to carry out a predetermined arming measure.

2. A device according to claim 1 characterized in that the piston (2) is made with an abrupt charge (4) in its cross section and that the narrower part (5) of the piston (2) is directed against the interior of the projectile and inserted in the sleeve (3) so that the edge of the broader part (6) of the piston which is turned inwards, the change (4) in cross section, bears upon the edge of the sleeve (3).

3. A device according to claim 2 characterized in that the outermost part (7) of the piston has a still larger cross section than said broader part (6) of the piston.

4. A device according to claim 3 characterized in that a piston ring (8) is mounted in the outermost part (7) of the piston in order to seal against the opening in the projectile wall (1).

5. A device according to claim 3 or 4 characterized in that the opening in the projectile wall (1) is made with an outer, broader part and an inner, narro-

wer part and that most of the sleeve (3) is sealingly inserted in the inner part of the opening but extends out into the outer part of the opening so that an annular space (9) is formed in the outer part, located outside the sleeve (3), as seen from the longitudinal axis of the piston.

6. A device according to anyone of the previous claims characterized in that the piston (2), the sleeve (3) and the opening is rotational symmetric.

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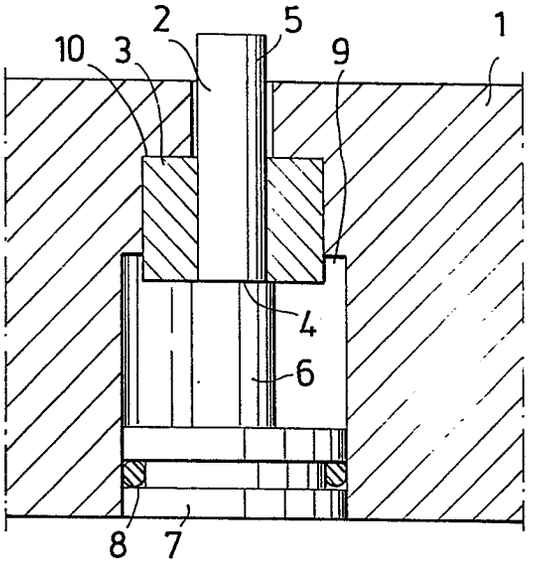

Fig. 1

Fig. 2

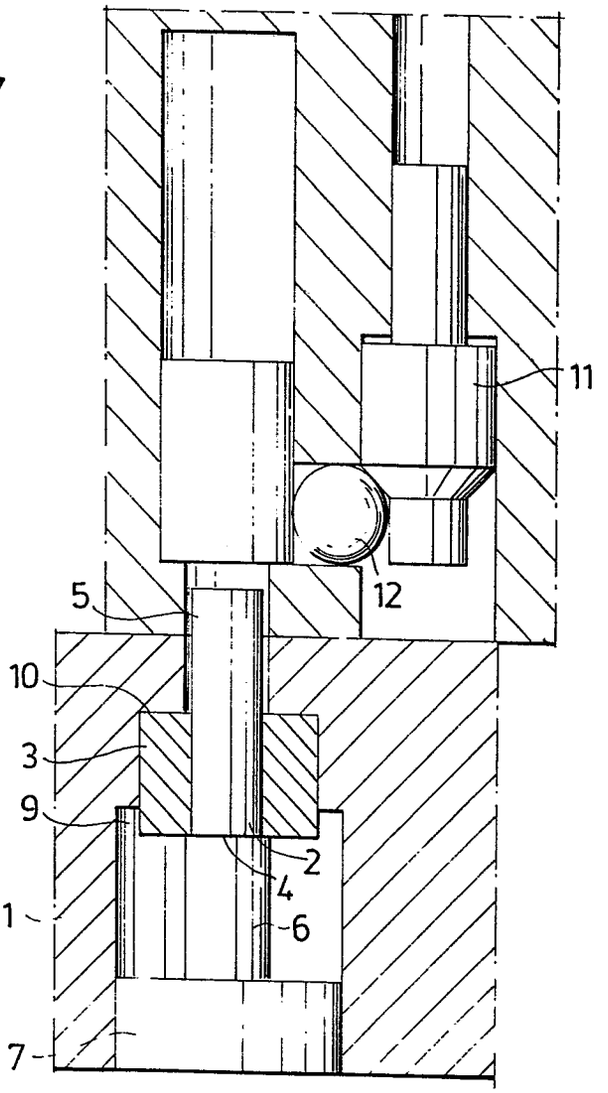

Fig.3