SPECIFICATION

Fuse head for a hand grenade

The invention relates to a fuse head for a hand grenade fuse, comprising a head member and a safety lever, which safety lever, in a secured position in which it is held on the head member by a safety pin having a pull ring, holds a striker member of the fuse head in a stressed condition, and which has holding means of a hook-like curved configuration whereby it is pivotally and releasably engaged with a support pin of the head member.

Various forms of fuse heads of this kind are known from USA Patent Specification No 2562 928; Austrian Patent Specifications Nos 253 987, 323 606 and 347 298; German Published Specification No 2 031 940, and ensure sufficient safety when properly handled. For the purposes of throwing the hand grenades, the hand grenades are placed in the hand in such a way that the lever bears against the palm of the hand so that the safety pin extends substantially in the direction of rearward movement of the second hand of the thrower, which second hand grasps a pull ring on the safety pin. Holding the hand grenade in this way is necessary so that, after the safety pin has been pulled out, the lever is still held against the body of the hand grenade and is not released, which would cause the grenade to explode prematurely. When the grenade is not properly handled however, it may occur that, without the hand grenade being thrown and the safety lever being released, the striker member may strike over and the delay-action charge may be fired.

In that case, because the safety lever is still on the hand grenade, the thrower may believe that the hand grenade is still in a secure condition, whereas that is not the case. The grenade will explode after about four seconds, while still in the thrower's hand.

Reasons for premature triggering of the grenade are as follows:–

a) The hook-like holding means of the safety lever, which opens, is released from the support pin of the head body and the safety lever is "pushed" our of the hand. This process can surprise at least an unskilled thrower so that the delay time of the firing charge is no longer sufficient, under some circumstances, for the thrower to throw the live hand grenade sufficiently far away. This unintentionally release of the hook-shaped holding means is made perhaps even easier by its being bent, broken off or torn by outside forces, so that it no longer properly engages around the support pin.

b) In the construction disclosed in Austrian Patent Specification No. 232 606, the pull ring in a safety position thereof is disposed substantially parallel to the palm of the hand of the thrower, and has to be turned through about 180° in a forward direction, so as to be moved into the pull-out position. This means that, when the ring is turned, the position of the hand of the thrower on the grenade has to be changed, or the hand of the thrower has to be turned into an unnatural position in order to release the ring. Both these actions mean that the thrower is tempted to hold the hand grenade in his hand in a different way than in the position which does not give rise to any danger to him, in order to facilitate releasing the ring.

c) Nowadays, head members of fuse heads are generally made of a plastics material, whereas the safety levers are produced by press shaping from a metal sheet. Two side wall flanges of the safety lever bear against the side faces of the head member, in the secured position. The free end of the safety pin, which end is spread open, projects at one side, while an eye of the holding ring projects at the other side. The free projecting end of the safety pin may be pushed back into the fuse head due to negligence, for example if it is dropped, or the like, thereby compressing the free end of the pin from its spread-apart position, and, as the side wall flanges of the safety lever are very thin, one side wall flange can become no longer supported on the pin. As a further consequence, it will be readily appreciated that it may easily happen that the pin is pulled completely out.

According to the invention, there is provided a fuse head for a hand grenade comprising a head member and a safety lever, which safety lever, in a secured position thereof in which it is held on the head member by a safety pin having a pull ring, holds a striker member of the fuse head in a stressed condition, and which has holding means of a hook-like curved configuration whereby it is pivotally and releasably engaged with a support pin of the head member, wherein a guide surface which is curved so as to correspond to the curvature of the hook-like holding means is provided on the head member and guides the safety lever during pivotal movement thereof when it moves to a released position after removal of the safety pin, and wherein the guide surface bears against the face of the hook-like holding means of the safety lever which is remote from the support pin.

The hook-like holding means of the safety lever is guided in a slot between the support pin and the guide surface, the slot having the configuration of a part circular arc and corresponding to the curvature of the holding means. The hook-like holding means may no longer lift radially away from the support pin, but may perform only a rotary movement around the support pin. Moreover, the holding means no longer projects freely as it is protected by the guide surface so that it cannot be bent by external forces, or bent up if the

safety lever is repeatedly pivoted but without exceeding the angle of pivot which allows release of the striker member to occur, which can possibly happen if the thrower "toys" with the grenade in his hand, intentionally or due to nervousness on the part of the unskilled thrower.

Preferably the support pin is disposed on a central support web which projects from the head member and the guide surface is formed in two parts, with a respective part on each side of the support web formed as a lateral projection from the support web. This can ensure lateral protection for the hook-shaped holding means as the entire width of the guide surface at least corresponds to or preferably extends beyond the overall width of the hook-shaped holding means.

Advantageously, the support pin and the fuse head have a common upper contact plane and the upper edge of the guide surface and the upper face of the support web are at a spacing below said common upper contact plane. Therefore, between the tops of the head body and the support pin there is a recess which extends over the entire width. This makes it possible for the two members or claws of the hook-shaped holding means, which are formed on the left and on the right of the support web, to be restricted to the length which is absolutely necessary for engaging around the support pin, as the end region of the safety lever, which provides the hook-shaped holding means, may be rounded off or bevelled over the entire width. This also provides for stiffening of that region and the hook-like holding means. As, in the known designs, the top of the support web is aligned with the top of the head member, the two claws of the hook-like holding means had to be considerably longer than actually required.

Another of the above-mentioned disadvantages can be avoided by providing the pull ring, in a secured position thereof, to extend substantially perpendicularly to the safety pin and by providing at least one clamping means for the pull ring on a side face of the head member.

By virtue of this lateral arrangement of the clamping means for the pull ring, when the hand grenades is gripped in the proper manner, the pull ring is disposed substantially perpendicularly to the direction in which the safety pin is pulled out, and thus also perpendicular to the normal direction of rearward movement of the second hand of the thrower which pulls the pin out. The pull ring which preferably extends substantially forwardly from the thrower, can be gripped and released very easily by the second hand. For rotating the pull ring through about 90° into the pull-out position, there is no need for the thrower to change the position of his hand, or to turn the hand into an unnatural position. Release of the pull ring is thereby facilitated even when the thrower is hampered by wearing gloves.

It may occasionally occur that a hand grenade which is in a secured safety condition may be dropped to the ground from a considerable height. In order to ensure that the pull ring which is fixed in the clamping means does not at least partially pull out the safety pin upon impact due to a lever effect, thereby causing premature firing, at least one support surface may be arranged on the head member and/or on an adjacent region of the body of the hand grenade which is along the peripheral line of the pull ring. This arrangement can provide at least a three-point bearing. It will be appreciated that more than one support cam may be provided, thereby producing a bearing support at more than three points.

The same effect can also be achieved if more than one clamping means is provided on the fuse head for the pull ring.

An embodiment of fuse head which can eliminate the third of the disadvantages referred to above, has, at least on one side and preferably on both sides of the fuse head, a sleeve which extends the through opening in the head for the safety pin and is provided at a spacing from the side face of the head member thereby forming a slot in the region of the through opening, the width of the slot corresponding at least to the thickness of a flange of the safety lever, which engages in the slot in the secured position of the safety lever and has an aperture therein through which the safety pin passes.

The sleeve or sleeves can be produced in one working operation with the head member, without any difficulty. The bore of one sleeve can be enlarged in a funnel-like configuration at its outer end, so that the end of the pin can be spread open. In a preferred embodiment in which a respective sleeve is arranged on each of the two sides, the second sleeve may serve as a slide guide means when the safety pin is pulled out crookedly, in order to avoid friction between the pin and the safety lever and to prevent tilting thereof, or it may also serve as a support means for the eye of the pin, which carries the pull ring, so as also to prevent the pin from being pushed further in, which could again cause the spread end to project out of the other sleeve. Furthermore, it is thereby also possible for the pin to be inserted from either side.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:–

Figure 1 is a side view of a hand grenade with a fuse head according to the invention;

Figures 2 to 5 show different views of the fuse head of Fig. 1, on an enlarged scale;

Figure 6 shows a front view of the safety lever shown in Fig. 1;

Figure 7 shows a view in longitudinal section of the upper part of the safety lever; and

Figure 8 shows a front view of a further embodiment of a fuse head according to the invention.

Referring to the drawings, a fuse head comprises a head member 1 which is made from plastics material and a safety lever 2 which is pivotally and releasably engaged on the head member. The safety lever 2 is provided with hook-like holding means which, in the embodiment illustrated in Figs. 1 to 7, comprises two claws 15 which are in the shape of part-circular arcs and which extend over an angular range of about 90°. The claws 15 engage under a support pin 9 which is arranged on a laterally projecting support web 6 (Figs. 3 and 4) of the head member 1. The support web 6 has a respective lateral projection 7 on each side, each projection 7 forming a guide surface 5 for the hook-like holding means 3. The guide surface 5 follows the curvature of the claws 15 of the hook-like holding means 3 and therefore lies agains the side 4 thereof which is remote from the support pin 9 (Fig. 7). Therefore, a guide slot for the claws 15 is formed between the projections 7 and the support pin 9, the slot on the one hand preventing the safety lever from lifting radially away and on the other hand also preventing the claws 15 from being bent. The hook-like holding means 3 also does not project at either side beyond the side faces of the head member 1 so that even external forces do not have any adverse effect on the shape of the hook-shaped holding means 3.

It will be seen from Figs. 2 and 3 that an upper boundary line 10 of the guide surface 5 is at a spacing *a* below a contact plane 8 in which the top face of the head member 1 and the top face of the support pin 9 are disposed. As the boundary line 10 is aligned with the top of the support web 6, a recess 11 is formed, which extends over the entire width of the head member 1. The end region of the safety lever 2, which carries the hook-like holding means 3, may therefore have a bevelled or rounded portion 16 (Figs. 6 and 7) which projects into the recess 11, this also substantially contributing to stiffening thereof. The length of the hook-like holding means 3 or the claws 15 is therefore restricted to the dimension required.

A bore 17 for the mounting pin for the spring-loaded striker member (not shown) is also provided in the head member 1.

The head member 1 is also provided, on at least one side wall 26 thereof, with a clamping means 12 in the form of two clamping jaw members. A pull ring 19 of a safety pin 20 can be fixed between the two clamping jaw members, and the safety pin 20 is engaged in a through opening 13. The fact that the pull ring 19 is secured in a lateral direction permits the pull ring to be released in accordance with the normal sequence of operation, and for the safety pin 20 to be immediately thereafter pulled out of the through opening 13, without any need for undue twisting of the hand holding the grenade. If the safety lever 2 faces towards the inside surface of a hand, upon release of the pull ring 19, it is turned through about 90° into the direction in which it is pulled out. The clamping means 12 and the through opening 13 are disposed substantially diametrically opposite to each other with respect to the pull ring 19. The pull ring 19 is also arranged in such a way that its upper edge does not project upwardly beyond the contact plane 8. This avoids unintentional release of the pull ring 19 due to snagging on twigs or branches in the countryside. A further advantage of this embodiment is that the hand grenades can be transported in the ammunition boxes which have been used hitherto and which could perhaps no longer be closed if the pull ring 19 were projecting upwardly.

Formed at the lower edge of the fuse head 1 are support surfaces 14 on which the pull ring 19 bears in the safety position. This arrangement thus provides a three-point bearing arrangement, which is of particular advantage if the hand grenade is unintentionally dropped to the ground as in that case there is no possibility of a lever effect and at least partial removal of the safety pin 20. The illustrated embodiment has two support surfaces 14. However, the desired effect may also be achieved with one or more than two support surfaces. There are various possible configurations in regard to the support surfaces 14. The support surfaces (or one of the support surfaces 14) could possibly also be formed as clamping means, similarly to the clamping means 12, or may have such a clamping means.

Formed on the lower part of the head member 1, at a spacing from the side walls 26 of the upper part of the head member 1, are respective sleeves 24 and 25, thereby forming respective slots 22. The sleeves 24 and 25 each have a bore which extends in line with the through opening 13 in the head member 1 and through which the safety pin 20 extends in the secured position. The safety lever 2 can be fitted into the slots 22, by means of side flanges 21 thereof which also each have a respective bore, so that the width of the slots 22 at least corresponds to the thickness of the flanges 21 of the safety lever 2 which engage thereinto, the safety lever 2 being pivotally and releasably mounted on the support pin 9 of the head member 1.

In the illustrated embodiment which is designed for insertion of the safety pin only from the side shown in Fig. 1, the clamp means 12 and the support surfaces 14 are formed only on that side. The sleeve 24 therefore only serves as a guide for the pull-out movement of the safety pin 20, and for supporting the eye of the safety pin 20, and therefore has a

cylindrical bore. On the other side however, the sleeve 25 may be provided with a funnel-shaped enlarged portion in its bore, in which the ends of the safety pin 20 can spread apart, without projecting therefrom. It will be appreciated that the sleeve 24 may also be of the same configuration. It will be appreciated that the depth of the slots 22 is to be such that the flanges 21 of the safety lever 2 can be inserted therein to such a distance that the bores thereof are in alignment with the through opening 13.

Fig. 8 shows a front view of a second embodiment of a fuse head. In this embodiment, the hook-like holding means comprises only a central claw-like extension of the safety lever 2, which engages around the support pin 9. In this embodiment, the support pin 9 is arranged between two laterial support flanges or webs 18 and the guide surface 5 is formed between the two support webs 18, in the centre. The rest of the design of this embodiment is the same as that of the embodiment shown in Figs. 1 to 7. This embodiment also has a recess 11 into which the rounded or bevelled portion 16 of the safety lever 2 projects.

If a hand grenade with a fuse head according to the invention is armed by removing the safety pin, and the safety lever is moved within the range of the angle of opening in which over-striking of the striker member does not occur, the safety lever 2 will rotate precisely in the guide slot which is formed between the support pin 9 and the guide surface 5, and its hook-shaped holding means 3 will not be radially bent or distorted.

CLAIMS

1. A fuse head for a hand granade comprising a head member and a safety lever, which safety lever, in a secured position thereof in which it is held on the head member by a safety pin having a pull ring, holds a striker member of the fuse head in a stressed condition, and which has holding means of a hook-like curved configuration whereby it is pivotally and releasably engaged with a support pin of the head member, wherein a guide surface which is curved so as to correspond to the curvature of the hook-like holding means is provided on the head member and guides the safety lever during pivotal movement thereof when it moves to a released position after removal of the safety pin, and wherein the guide surface bears against the face of the hook-like holding means of the safety lever which is remote from the support pin.

2. A fuse head according to claim 1, wherein the guide surface extends through an arc subtending an angle of about 90°.

3. A fuse head according to claim 1 or claim 2, wherein the support pin is disposed on a central support web which projects from the head member, and the guide surface is formed in two parts, with a respective part on each side of the support web formed as a lateral projection from the support web.

4. A fuse head according to claim 3, wherein the support pin and the head member have a common upper contact plane and the upper edge of the guide surface and the upper face of the support web are at a spacing below said common upper contact plane.

5. A fuse head according to any one of claims 1 to 4, wherein the pull ring, in a secured position thereof, extends substantially perpendicularly to the safety pin and at least one clamping means for the pull ring is provided on a side face of the head member.

6. A fuse head according to claim 5 when appendant to claim 4, wherein in its secured position, the pull ring is disposed below said common upper contact plane of the head body.

7. A fuse head according to any one of claims 1 to 6, wherein at least one support surface is arranged on the head member and/or on the region of a body of the hand grenade which is adjacent the fuse head, along the peripheral line of the pull ring.

8. A fuse head according to any one of claims 1 to 7, wherein a sleeve which extends a through opening in the head member for the safety pin, is provided at a spacing from one side face of the head member, at least on one side and preferably on both sides, said spacing forming a slot, in the region of the through opening for the safety pin, and wherein the width of the or each slot is at least equal to the thickness of a flange of the safety lever which has an aperture therein to receive the safety pin in the secured position of the safety lever so that said flange can engage in the slot.

9. A fuse head for a hand grenade substantially as hereinbefore described and illustrated with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd.—1982.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

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If a hand grenade with a fuse head according to the invention is armed by removing the safety pin, and the safety lever is moved within the range of the angle of opening in which over-striking of the striker member does not occur, the safety lever 2 will rotate precisely in the guide slot which is formed between the support pin 9 and the guide surface 5, and its hook-shaped holding means 3 will not be radially bent or distorted.

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3. A fuse head according to claim 1 or claim 2, wherein the support pin is disposed on a central support web which projects from the head member, and the guide surface is formed in two parts, with a respective part on each side of the support web formed as a lateral projection from the support web.

4. A fuse head according to claim 3, wherein the support pin and the head member have a common upper contact plane and the upper edge of the guide surface and the upper face of the support web are at a spacing below said common upper contact plane.

5. A fuse head according to any one of claims 1 to 4, wherein the pull ring, in a secured position thereof, extends substantially perpendicularly to the safety pin and at least one clamping means for the pull ring is provided on a side face of the head member.

6. A fuse head according to claim 5 when appendant to claim 4, wherein in its secured position, the pull ring is disposed below said common upper contact plane of the head body.

7. A fuse head according to any one of claims 1 to 6, wherein at least one support surface is arranged on the head member and/or on the region of a body of the hand grenade which is adjacent the fuse head, along the peripheral line of the pull ring.

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