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Description

The invention relates to a device for fastening ballistic protective elements and additional mounting parts on an object that is in particular to be protected from the effects of weapons or the effects of mines, said device comprising a welded cam that can be fastened to the object and the base region of said welded cam that is facing the object can be connected via a welded connection to the object, and said welded cam comprises a threaded hole and it is possible to screw a screw into said threaded hole from the outside.

A fastening device of this type is disclosed by way of example in the documents DE 20 2005 000 198 U1 and DE 10 2010 018 486 A1. It has proven disadvantageous when using these known devices that when fastening both a ballistic protective element as well as a mounting part to the same welded cam it is not possible to mount these parts independently with respect to time. Moreover, when using the known welded cam in general it is not possible using different torques to screw the ballistic protective element and the additional mounting part onto the welded cam and therefore on the object that is to be protected. However, since it is necessary to fasten the protective elements using a lower torque than is prescribed for the mounting parts by means of corresponding norms, a standard screw connection of the mounting parts onto the welded cam is frequently not possible.

DE 40 17 167 C1 forms a starting point for the preamble of claim 1 and describes a tank armour module that receives an inert matrix between a front and a rear active plate and operating elements that can be initiated under pressure are arranged in said matrix, wherein the module is arranged spaced from a main armour, wherein the operating elements on the side of the main armour are sealed in groups or in part by means of segments and the rear inactive plate is arranged spaced with respect to the segments, wherein screws are provided in order to fasten the module onto the main armour and means for absorbing vibrations to the main armour are provided in the operating region of

said screws, and wherein the vibration absorbing means are means that absorb high frequency vibrations or are components of the screw.

5 The object of the invention is to provide a device of the type mentioned in the introduction in which a ballistic protective element and a mounting part can be fastened to the same welded cam using different torques.

This object is achieved in accordance with the invention by virtue of the features of claim 1. Further particularly advantageous embodiments of the invention are disclosed in the
10 dependent claims.

The invention is based essentially on the idea of using a welded cam having an inner thread and an outer thread. The respective ballistic protective element is screwed on by means of a clamping nut that can be screwed on to the outer thread of the welded cam
15 using a first predetermined torque. The clamping nut comprises for this purpose a through-going hole having an inner thread. It is possible to connect the respective mounting part to the inner thread of the welded cam by means of this through-going hole. Since the mounting part lies against the clamping nut and not on the ballistic protective element, said mounting part can be fastened to the welded cam using a second, standard
20 torque without damaging the ballistic protective element.

A further advantage of the device in accordance with the invention resides in the fact that the ballistic protective elements and the mounting parts can be fastened independently of one another with respect to time on the object that is to be protected.

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In order to fasten the welded cam on to the object that is to be protected, the welded cam can comprise on its base side a circumferential bevel that can be welded via a fillet weld to the object. However, it is also possible to use a welded cam having a band that protrudes on the base side of said welded cam and said band can either be welded on its edge-side via a

fillet weld or via a hole welding process to the object.

Moreover, it has proven advantageous if a centering spigot is provided on the underside of the welded cam and said centering spigot fits in a hole that is provided on the object that is
5 to be protected and consequently predetermines the exact position of the cam.

In order to transfer the tightening torque when fastening the ballistic protective element, the clamping nut can be provided with holes in the band (with the result that by way of example a two-holed nut or a capstan nut is provided) and a suitable special tool can
10 engage into said holes so as to rotate the clamping nut.

However, it can also be provided that in order to transfer the tightening torque, the band of the clamping nut is provided on the circumferential side with two opposite-lying flat surfaces.
15

Further details and advantages of the invention are disclosed in the following exemplary embodiments that are explained with reference to figures. In the figures:

Fig. 1 illustrates the longitudinal section through a device in accordance with the invention
20 that includes a welded cam and a clamping nut and is arranged on an object that is to be protected, said device having a ballistic protective element that is fastened to the object that is to be protected;

Fig. 2 illustrates a view corresponding to Fig. 1, wherein a further mounting part is
25 fastened to the device in addition to the ballistic protective element;

Figs. 3-5 illustrate longitudinal sections of different embodiments of welded cams of the device in accordance with the invention;

Figs. 6 and 7 illustrate two plan views of the bands of two different embodiments of clamping nuts.

In Fig. 1, a device in accordance with the invention is referred to as 1 and said device
5 comprises a welded cam 2 having a central threaded hole 3 and an outer thread 4 (cf. also Fig. 4). The welded cam 2 is fastened on an object 5 that is to be protected (by way of example the dome of an armoured vehicle) and for this purpose comprises a band 6 on the side that is facing the object 5 and said band is welded on the edge-side to the object 5.

10 A clamping nut 7 having a through-going hole having an inner thread 8 is screwed onto the outer thread 4 of the welded cam 2 and a band 9 is provided on the side of said clamping nut that is remote from the object 5 that is to be protected and the dimensions of said band are selected in such a manner that when the device 1 is in the assembled state (Fig. 1 and Fig. 2) a ballistic protective element (additional armour) 10 is fastened between the band 9
15 of the clamping nut 7 and the band 6 of the welded cam 2.

Fig. 2 illustrates the view corresponding to Fig. 1, wherein a further mounting part 11 in addition to the ballistic protective element 10 is fastened to the device 1. For this purpose, the mounting part 11 is placed on the upper side 12 of the clamping nut 7 and is fastened
20 in a non positive-locking manner to the welded cam 2 using a screw 13 that can be screwed into the threaded hole 3 of the welded cam 2.

Figs. 3-5 illustrate longitudinal sections of different embodiments of welded cams of the device in accordance with the invention. In Fig. 3 the welded cam 2' comprises on its base
25 side a circumferential bevel 14 that can be welded via a fillet weld to the object 5 that is to be protected.

In Figs. 4 and 5, the welded cam 2 or 2'' comprises on its base side a band 6, 6' and the edge-side circumference can be welded via a fillet weld to the object 5 that is to be protected

(Fig. 4 and also Fig. 1 and 2) or two holes 15 extend axially through said band (Fig. 5) with the result that a hole welding process can be used to fasten the welded cam 2" to the object 5 that is to be protected.

- 5 As is indicated using dashed lines in Figs. 3-5, the welded cams 2-2" comprise in each case a centering spigot 16 on the side of said welded cam that is facing the object (5) that is to be protected and said centering spigot fits in a hole that is provided on the object 5 that is to be protected and consequently predetermines the exact position of the welded cam 2-2".
- 10 In order to transfer the tightening torque when fastening the ballistic protective element 10, the clamping nut 7 can be configured by way of example as a two-holed nut (Fig. 6), in other words two opposite-lying holes 17 are located in the band 9 of the clamping nut 7 and a suitable special tool can engage in said holes in order to rotate the clamping nut 7.
- 15 However, it can also be provided that in order to transfer the tightening torque, the band 9' of the clamping nut 7' is provided on the circumferential side with two opposite-lying flat surfaces 18 (Fig. 7).

List of reference numerals

	1	Device
	2-2"	Welded cam
5	3	Threaded hole
	4	Outer thread
	5	Object
	6, 6'	Band (Welded cam)
	7, 7'	Clamping nut
10	8	Through-going hole having an inner thread
	9, 9'	Band (clamping nut)
	10	Protective element
	11	Mounting part
	12	Upper side
15	13	Screw
	14	Bevel
	15	Hole
	16	Centering spigot
	17	Hole
20	18	Flat surfaces

Patentkrav

1. Indretning til fastgørelse af ballistiske beskyttelseselementer (10) og yderligere monteringsdele (11) på en genstand (5), der i særdeleshed skal beskyttes mod våben- eller minepåvirkninger, nævnte indretning omfatter en svejsekam (2-2"), der kan fastgøres til genstanden (5), der skal beskyttes, og bundområdet af nævnte svejsekam, der vender mod genstanden (5), kan forbindes via en svejseforbindelse til genstanden (5), og nævnte svejsekam omfatter en gevindboring (3) i hvilken det er muligt at skrue en skrue (13) ind i fra ydersiden, hvor svejsekammen (2-2") er forsynet med et udvendigt gevind (4), og hvor indretningen (1) omfatter en klemmemøtrik (7; 7') med et gennemgående hul med et indvendigt gevind (8), hvilket indvendige gevind kan skrues på svejsekammen (2-2"), **kendetegnet ved, at** en krave (9; 9') er tilvejebragt på den side af klemmemøtrikken (7; 7') der vender væk fra genstanden (5), der skal beskyttes, hvor dimensionerne af nævnte krave er valgt på sådan en måde, at når indretningen (1) er i den samlede tilstand kan det respektive ballistiske beskyttelseselement (10) blive fastgjort kraftsluttende mellem klemmemøtrikkens (7; 7') krave (9; 9') og genstanden (5), der skal beskyttes, samt den tilsvarende monteringsdel (11) kan blive fastgjort kraftsluttende mellem skruens (13) skruehoved og klemmemøtrikkens (7; 7') krave (9; 9').

2. Indretning ifølge krav 1, **kendetegnet ved, at** svejsekammen (2') på bundsiden omfatter en periferisk affasning (14), der kan svejses via en kantsøm til genstanden (5), der skal beskyttes.

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3. Indretning ifølge krav 1, **kendetegnet ved, at** svejsekammen (2) på bundsiden omfatter en krave (6), hvis kantside-omkreds kan svejses via en kantsøm til genstanden (5), der skal beskyttes.

30 4. Indretning ifølge krav 1, **kendetegnet ved, at** svejsekammen (2") på bundsiden omfatter en krave (6') gennem hvilken mindst én boring (15) strækker sig aksialt, således at fastgørelsen af svejsekammen (2") til genstanden (5), der skal beskyttes, kan udføres som et propsøm.

5. Indretning ifølge et hvilket som helst af kravene 1 til 4, **kendetegnet ved, at** svejsekammen (2-2") omfatter mindst én centreringstap (16) på den side af nævnte svejsekam, der vender mod genstanden (5), der skal beskyttes.
- 5 **6.** Indretning ifølge et hvilket som helst af kravene 1 til 5, **kendetegnet ved, at** mindst to borer (17) er anbragt i klemmemøtrikkens (7) krave (9) i hvilke huller et egnet specialværktøj kan indgribe for at rotere klemmemøtrikken (7).
- 7.** Indretning ifølge et hvilket som helst af kravene 1 til 5, **kendetegnet ved, at**
- 10 klemmemøtrikkens (7') krave (9') er forsynet på den periferiske side med to modsatliggende flade overflader (18).

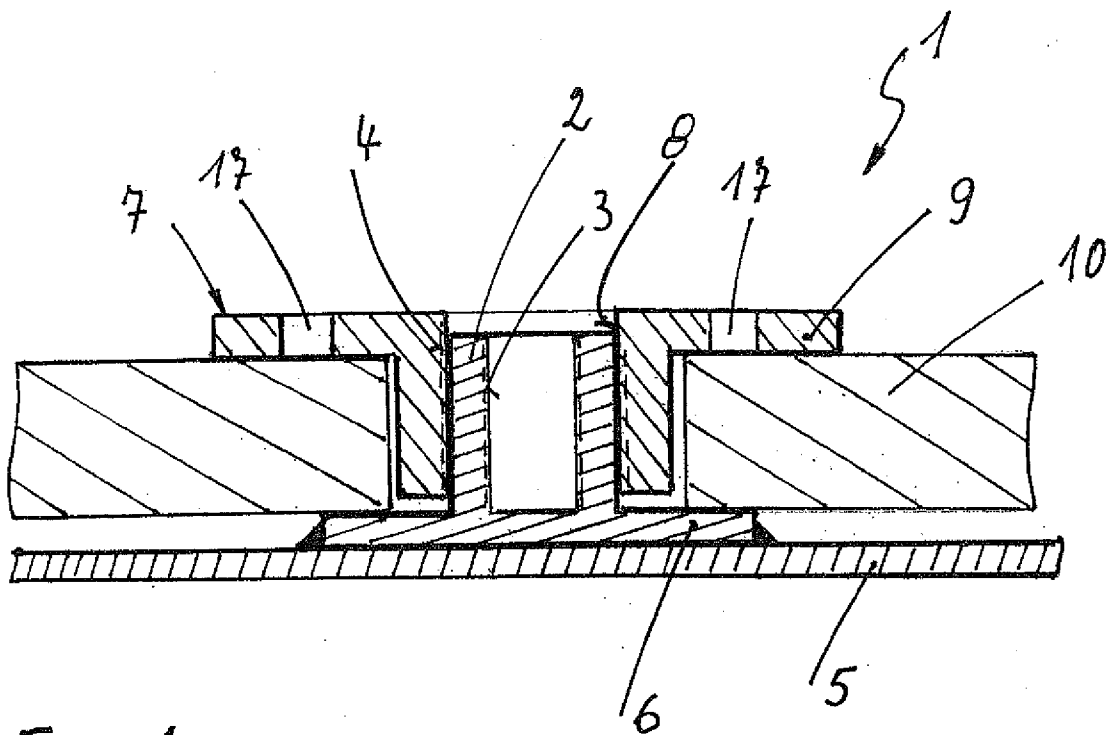


Fig. 1

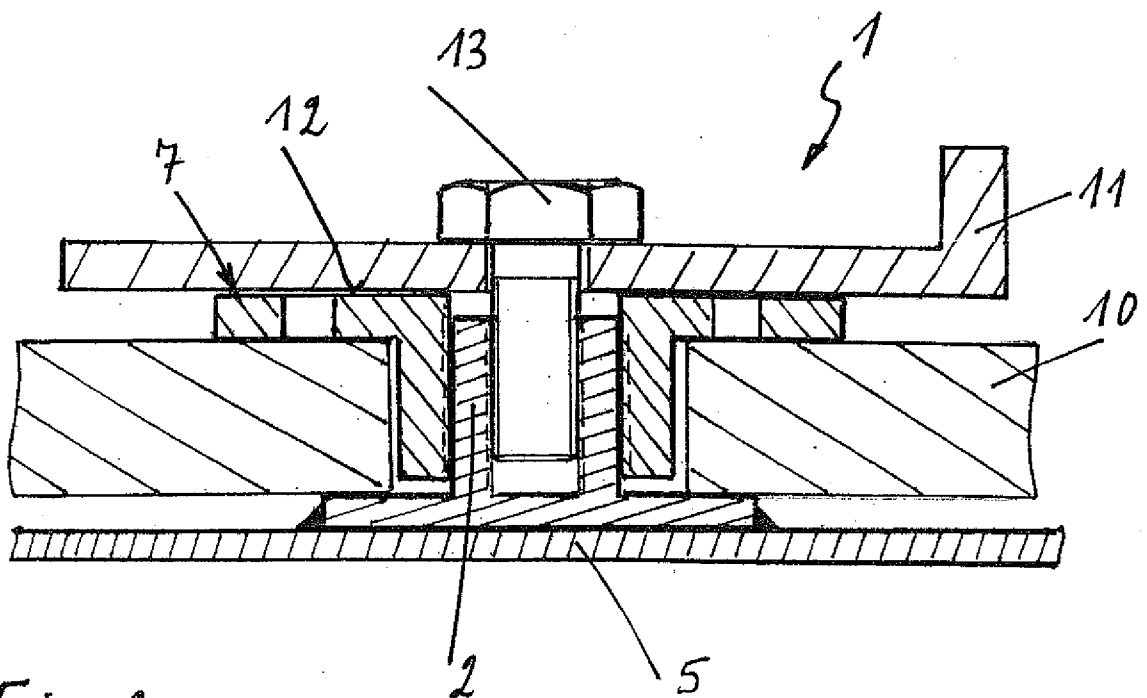


Fig. 2

Fig. 3

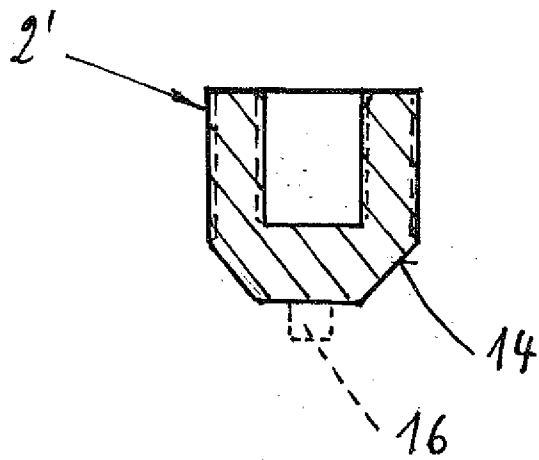


Fig. 4

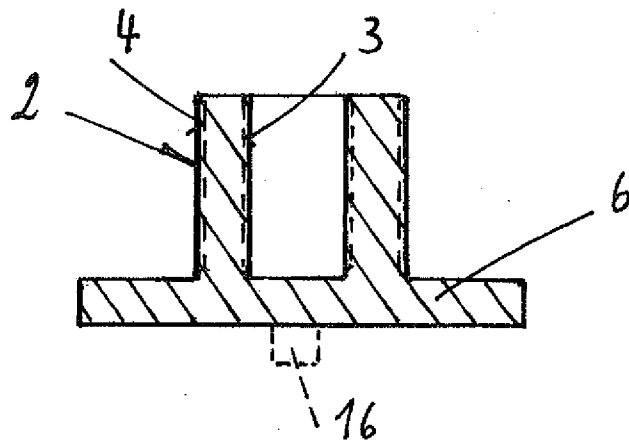
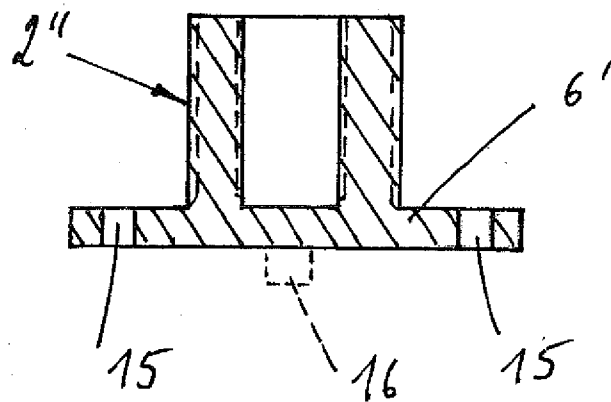


Fig. 5



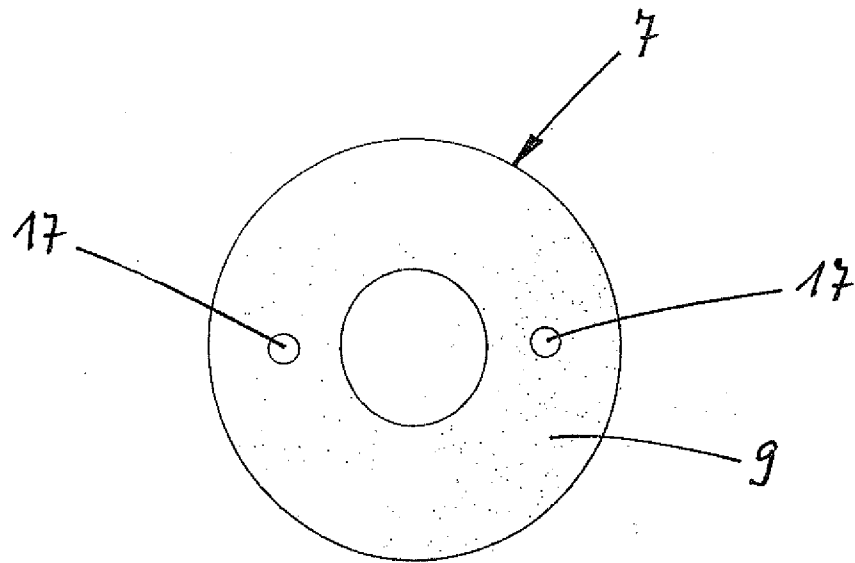


Fig. 6

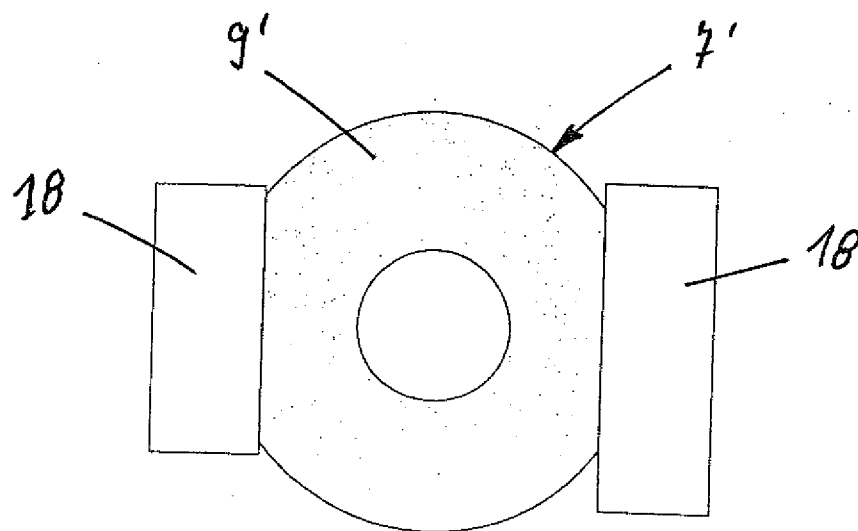


Fig. 7