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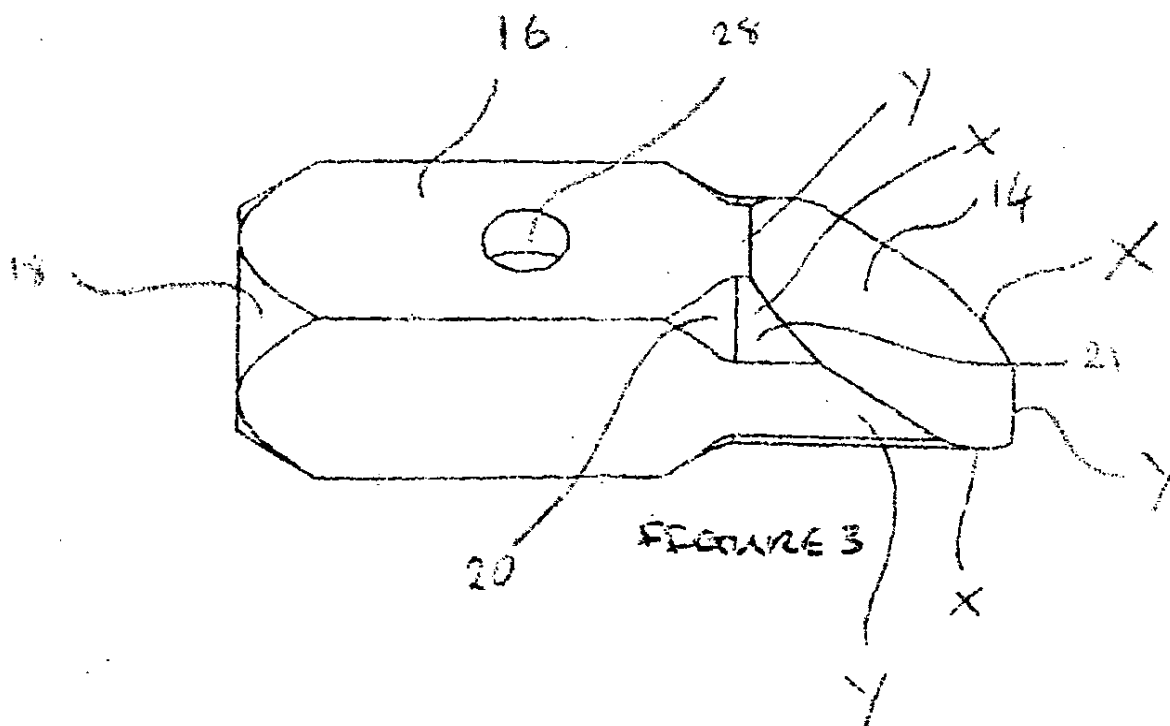
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(54) **An insert for a replica gun**

(57) An insert for a replica gun, the insert having a portion defining at least part of a cartridge chamber for holding a cartridge and a portion defining a blast chamber having a blanked off end.



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## Description

**[0001]** The present invention relates to an insert for a blank firing replica gun and particularly, but not exclusively, a replica self-loading hand gun or semiautomatic pistol.

**[0002]** Under the UK Firearms Act 1968 there exists a statutory requirement for the owner of a firearm, defined under the Act as "a lethal barrelled weapon from which any shot, bullet or other missile can be discharged", to hold a valid firearms certificate in respect of that firearm. This requirement increases the cost of maintaining firearms and places restrictions on their use and storage. As a result a replica gun market has developed allowing gun enthusiasts to purchase blank firing replicas of the live firearms.

**[0003]** The UK Firearms Act 1982 extends the provisions of the 1968 Act to make it an offence to possess a replica (or imitation) firearm that is readily convertible into a live firearm. Under the 1982 Act the term "readily convertible" refers to a replica weapon that can be converted into a firearm without any special skill, and using tools and equipment that are in common use by persons carrying out work in their homes.

**[0004]** The 1982 Act places a requirement on replica gun manufacturers and importers to ensure that the "readily convertible" condition is met by the replica gun. Guidelines on the best method for meeting this requirement have been prepared in consultation with the Association of Chief Police Officers, the Forensic Science Service (a license from whom must be issued for all replica guns manufactured in, and imported into, the United Kingdom) and the Gun Trade Association.

**[0005]** Despite these provisions it has been known for replica handguns to be converted into firearms as follows. A blank firing semi-automatic handgun has a blast chamber for dissipating the pressure generated on firing. This pressure is used to reload the replica with the next blank cartridge. By drilling out the barrel and opening up the blast chamber an open channel is produced from the face of the cartridge to the barrel exit. In this way the replica can be modified to produce a crude firearm.

**[0006]** It is an object of the present invention to provide an insert for a blank firing gun which prevents the blank firing gun from being readily converted into a firearm.

**[0007]** According to the present invention there is provided an insert for a replica gun having a portion defining at least part of a cartridge chamber for holding a cartridge and a portion defining a blast chamber having a blanked off end.

**[0008]** Preferably, the insert will be formed from a material having a hardness comparable to, or in excess of, a common machine tool bit, most preferably over 90 Rockwell C (which corresponds to 1650 Vickers), and ideally a tungsten carbide material.

**[0009]** Advantageously, the blanked off end of the

blast chamber will provide a barrier to the attempted drilling out of the barrel from the direction of the barrel end. The provision of an insert defining at least part of a cartridge chamber and a blast chamber prevents the separation of the blast chamber from the cartridge chamber. In the present invention if the barrel and insert were to be cut from the gun at a position rearward of the insert then there would be insufficient cartridge chamber in which to hold the cartridge during firing.

**[0010]** Preferably, the insert is a unitary member.

**[0011]** Preferably, at least part of the cartridge chamber is of a circular cross section.

**[0012]** Preferably the insert includes a cartridge abutment in the internal profile of the insert.

**[0013]** Preferably, the part of the cartridge chamber defined by the insert has sufficient longitudinal dimension to retain a cartridge prior to and during firing and may be 10 mm in length or longer.

**[0014]** It is a preferred feature of the invention that the external profile of the insert is substantially non-circular, preferably substantially polygonal, for example quadrilateral.

**[0015]** Advantageously, the quadrilateral external profile inhibits the removal of the insert from the main frame of the gun (which may be cast around the insert) by preventing the rotation of the insert with respect to the main frame.

**[0016]** Preferably, the external surface of the blanked off end of the insert is arranged at an acute angle to the longitudinal axis of the insert, for example at an angle of 40 degrees.

**[0017]** Further preferably, the internal end face of the blast chamber is arranged at an acute angle to the longitudinal axis of the insert, for example at an angle of 50 degrees.

**[0018]** In second embodiment of the insert the end face of the blast chamber is defined by an internally facing conical section centrally located about the longitudinal axis of the insert.

**[0019]** These features of the invention have the advantage of inhibiting the drilling out of the insert, either in the direction of the gun barrel onto the external surface of the blanked off end of the insert or from the rear of the gun onto the internal end face of the blast chamber. The angle of these faces reduces the ability of a drill bit to bite into the insert, encouraging the tip of the bit to displace along the surface, laterally relative to the longitudinal axis of the insert, causing the break up of the bit and/or drilling off line.

**[0020]** In a preferred feature of the invention the quadrilateral exterior profile of the insert is tapered at each end.

**[0021]** Advantageously, this feature further inhibits the removal of the insert from the main frame of the gun since the main frame retains the insert in position longitudinally by means of the tapered profiles of the insert.

**[0022]** A further advantage of this feature of the invention is that the tapered profile will break up if the insert

is tampered with, for example upon being struck under attempted removal of the insert from the main frame of the gun.

**[0023]** Preferably the blast chamber of the insert is exposed to atmosphere by a vent disposed in the wall of the blast chamber.

**[0024]** In a second aspect of the invention there is provided a gun sub-assembly having a main frame and an insert in accordance with the present invention in which the insert is substantially encased in the main frame.

**[0025]** Preferably the gun main frame is cast around the insert and further preferably in a zinc alloy, for example Mazac.

**[0026]** Advantageously, this minimises the opportunity for the insert to be removed from the gun since the main frame will retain the insert by means of the outer profile of the insert.

**[0027]** Preferably the main frame defines a lead-in to facilitate the loading of a cartridge into the cartridge chamber.

**[0028]** The invention will now be described by way of example with reference to the following drawings in which:

Figure 1a is a side view of a first embodiment of an insert in accordance with the present invention,

Figure 1b is an end view of the insert of Figure 1a looking in the direction of arrow II of Figure 1a,

Figure 1c is a plan view of the insert of Figure 1a looking in the direction of arrow III of Figure 1b,

Figure 2 is a sectioned side view of the insert of Figure 1a taken at the line 2-2 of Figure 1c,

Figure 2a is a further sectioned side view of part of the insert of Figure 2 and part of an associated gun sub-assembly 1 showing the position of a blank cartridge within the insert,

Figure 3 is a perspective view of the insert of Figure 1a,

Figure 4a is a side view line drawing of a gun sub-assembly in accordance with the present invention showing a second embodiment of an insert in accordance with the present invention where similar parts in Figure 4 carry the same reference numerals as Figure 1,

Figure 4b is an end view line drawing of the gun sub-assembly of Figure 4a looking in the direction of arrow II of Figure 4a,

Figure 4c is a plan view line drawing of the gun sub-assembly of Figure 4a looking in the direction of arrow III of Figure 4b,

Figure 5 is a sectioned side view of the gun sub-assembly of Figure 4a sectioned at the line 5-5 of Figure 4c,

Figure 5a is a sectioned side view of part of the gun sub-assembly of Figure 4a showing the position of a blank cartridge within the sub-assembly,

Figure 6 is a perspective line drawing of a gun sub-assembly in accordance with the present invention showing the insert of Figure 4a,

Figure 7a is a side view of a third embodiment of an insert in accordance with the present invention,

Figure 7b is an end view of the insert of Figure 7a,

Figure 7c is a sectioned side view of the insert of Figure 7a section along line III-III of figure 7b,

Figure 7d is a second end view of the insert of Figure 7a,

Figure 7e is a plan view of the insert of figure 7a, and

Figure 8 is a schematic view of a gun containing the insert of Figure 7a shown in hidden detail.

Figure 9a is a side view of a fourth embodiment of an insert in accordance with the present invention,

Figure 9b is an end view of the insert of Figure 9a,

Figure 9c is a sectioned side view of the insert of Figure 9a section along line III-III of figure 9b, and

Figure 9d is a plan view of the insert of figure 9a.

**[0029]** Figures 1a, 1b and 1c show an insert 10 formed as a single unitary component from a tungsten carbide material. Insert 10 has an open end 12 and a closed end 14 located at either end of a main body 16. The closed end has a closed end face 15 at an angle A to the longitudinal axis of the insert 10 where angle A is typically 40°. The main body 16 is defined by a substantially quadrilateral main body outer profile 17. At the open end 12 of the main body 16 the main body outer profile 17 is tapered to a circular open end outer profile 22 by tapers 18. The main body 16 is tapered at the closed end 14 by tapers 20 to the closed end outer profile 21, defined by arcs X and flats Y (see also figure 3). Arcs X each have a greater radius than the open end outer profile 22.

**[0030]** In Figure 2 the insert is shown having a blast chamber 32 and a forward cartridge region 33 of a cartridge chamber 34 (shown in Figure 2a). The forward cartridge region 33 is cylindrical and is defined by an inner profile 24. The blast chamber 32 is defined by an

inner profile 26 which is generally cylindrical and has an angled internal closed end face 30. A cartridge abutment 25 is defined between the inner profiles 24 and 26. The internal closed end face 30 of the blast chamber 32 is arranged at an angle B to the longitudinal axis of the insert 10. The angle B is typically 50°. There is provided a vent 28 for communication between the blast chamber 32 and atmosphere (see also figure 3).

**[0031]** Figure 2a shows part of a gun sub assembly 1 including a main frame 2. The cartridge chamber 34 is defined by the forward cartridge region 33 and a rear cartridge region 35. The cartridge chamber 35 receives a cartridge 36.

**[0032]** In Figures 4a, 4b and 4c a gun sub-assembly 100 has a main frame 102 and an insert 10'. The main frame 102 has a chamber section 104 which defines a rear cartridge region 35 and retains the insert 10'.

**[0033]** As shown in Figures 5 and 5a the forward cartridge region 33 of the insert 10' and the rear cartridge region 35 of the chamber section 104 define the cartridge chamber 34. The main frame 102 is die cast in a zinc alloy around the insert 10'. A barrel section 108 is arranged longitudinally ahead of the chamber section 104 to provide aesthetic authenticity.

**[0034]** Referring now to Figures 4a and 4b and 5 a lead-in 110 is defined at the rear of the chamber section 104. The lead-in 110 assists the delivery of a cartridge from the magazine to the cartridge chamber 34.

**[0035]** In Figures 4a, 4b, 4c and 5 the chamber section 104 has an aperture 112 aligned with the vent 28 of the insert 10'. This aperture 112 allows for the communication of the blast chamber 32 of insert 10' with atmosphere.

**[0036]** The insert 10' has an end face 30' in the form of an internally facing conical section located on the longitudinal centre line of the insert. Otherwise insert 10' is identical to insert 10.

**[0037]** Under normal operation of the gun the manual action of loading the gun draws a blank cartridge 36 from a magazine via the lead-in 110 to rest in the cartridge chamber 34 as shown in Figure 5a. When the cartridge is in its rest position the front face of the cartridge is arranged at cartridge abutment 25 shown in Figures 5 and 5a.

**[0038]** Firing the weapon causes the pressure to develop in the blast chamber 32. This pressure is dispersed by two mechanisms. Firstly, the discharge of gas to atmosphere through vent 28 of the insert 10' and the aperture 112 of the main frame 102. Secondly, the expansion of the gas creating a piston action to force the spent cartridge from the cartridge chamber 34. Vent 28 is carefully designed and used to ensure a correct split of pressure between venting and ejection of the spent cartridge.

**[0039]** Main frame 2 is identical to main frame 102 and thus sub assembly 1 differs from sub assembly 100 only by virtue of containing different inserts.

**[0040]** Figure 7 shows a third embodiment of the in-

sert 210. In common with the first embodiment the insert 210 has a blast chamber 232 and a forward cartridge region 233 of a cartridge chamber 234. The inside of the cartridge chamber 234 is substantially similar to that of the first embodiment, being defined by inner profiles 224, 226 and abutment 225. There is provided a vent 228 in the upper portion of the insert 210 for communication between the blast chamber 232 and atmosphere.

**[0041]** Forward of the blast chamber 232 are arranged a die hole 250 and a body hole 252. The die hole 250 is for interaction with the die into which the main frame of the gun is cast to locate the insert correctly prior to casting. The body hole receives the main frame cast alloy during casting for retention of the insert therein.

**[0042]** The outer profile of the insert 210 is defined by a main body portion 254 and a lower body portion 256. Main body portion 254 is substantially in the form of a square prism. The lower body portion 256 is defined by a platform 258 and a lug 260. The platform 258 defines two longitudinal grooves 262 (which may be of different sizes) for interaction with a die used to form the main frame of the gun. The lug 260 has a curved outer profile feature 264 for further aiding retention of the insert 210 in the main frame.

**[0043]** The extension of the platform 258 and lug 260 down into the gun body as seen in Figure 8 means that the complete removal of the insert from the main frame of the gun will render the gun inoperable and therefore prevent it from being converted into a live fire arm due to the extensive damage that would be inflicted on the gun body. The external profile of the gun barrel has a height D. The insert has a height d. Typically d is at least half of D, preferably at least two thirds of D. It will be appreciated that the location of the insert is limited at the lower end by the presence of the internal features of the gun, such as the trigger and safety catch.

**[0044]** It is clear that any of the features of the third embodiment of the insert 210 such as:

- a) the platform 258,
- b) the lug 260 and curved features 264 thereof,
- c) the die hole 250,
- d) the body hole 252, and
- e) the longitudinal grooves 262,

may be incorporated into the first or second embodiments of the insert 10 or 110. Likewise features of the first and second embodiments 10 or 110, such as:

- a) the angled internal closed end face 30 of the blast chamber 32
- b) the angled external closed end 14 of the blast chamber 32, and
- c) the external tapers 18, 20

may be incorporated into the third embodiment 210.

**[0045]** In Figures 9a to 9d a fourth embodiment of the insert 310 is shown with features common with the third

embodiment 210 being numbered one hundred greater than the corresponding features in Figures 7a to 7e.

**[0046]** In contrast with the third embodiment the lower portion 366 of the fourth embodiment has a platform 368 and a lug 370 which collectively define a broad I-shaped profile having a waisted portion 372 as shown in Figure 9b. The outer profile of the waisted portion performs a dual function. Firstly, it renders a gun containing the insert inoperable following the removal of the insert, and secondly it allows the retention of the insert during the casting of the gun body around the insert.

**[0047]** In further embodiments the insert can be made from other non tungsten carbide materials that resist attack by commonly available tools.

**[0048]** In further embodiments the insert need not be formed as a unitary component. For example the insert of figure 1 could be formed from a separate top portion and bottom portion. Alternatively the insert could be formed from separate right and left portions (when viewed end on as in figure 1b). Other generally longitudinal split lines could be chosen to create the insert as from 2 or more components. Alternatively, the insert of Figures 7a to 7e could be formed from a first main body portion 254 and a distinct second lower body portion 256.

**[0049]** It is clear that, depending upon the particular installation, the external profile, chamfers, flats, arcuate surfaces, angled surfaces can be significantly varied in form whilst still ensuring the insert prevents ready conversion of the replica gun to a live round firing firearm. For the avoidance of doubt the term gun refers to handguns, pistols, rifles and the like and the term replica gun or imitation gun is to be construed accordingly.

**[0050]** It is within the scope of the invention that further embodiments of the insert are capable of accepting and retaining different sized cartridges. For example, blank cartridges are available in the following sizes: 8mm bore with 20mm length, 9mm bore with 22mm length, 0.22 inch bore long, 0.22 inch bore short and 0.38 inch bore. Whilst the invention, in various embodiments, could hold any of the above cartridges further embodiments could equally be used to accept any variation in the bore or length of the cartridge.

**[0051]** Where there is provided a cartridge chamber having a forward cartridge region defined by an insert and a rear cartridge region defined by a main frame it is preferable that the length of the forward cartridge region is half the length of the cartridge chamber, or more.

## Claims

1. An insert for a replica gun, the insert having a portion defining at least part of a cartridge chamber for holding a cartridge and a portion defining a blast chamber having a blanked off end.
2. An insert in accordance with claim 1 wherein the

insert is formed from a material having a hardness of at least 90 Rockwell C.

3. An insert in accordance with any preceding claim wherein the insert is formed from a tungsten carbide material.
4. An insert in accordance with any preceding claim wherein the insert is a unitary member.
5. An insert in accordance with any preceding claim wherein the insert includes an abutment or other location feature for positioning the cartridge within the cartridge chamber.
6. An insert in accordance with any preceding claim wherein at least a part of the external profile of the insert is non-circular, preferably tapered.
7. An insert in accordance with any preceding claim wherein the insert has a vent disposed in a wall of the blast chamber.
8. An insert in accordance with any preceding claim wherein the blanked off end of the blast chamber has angled internal and/or angled external surfaces.
9. An insert in accordance with any preceding claim wherein the portion defining at least part of a cartridge chamber and the portion defining a blast chamber form collectively a main portion, the main portion taking substantially the form of a square prism.
10. An insert according to claim 9 wherein a lower portion extends from a longitudinal face of the main portion.
11. An insert according to claim 10 wherein the lower portion includes a platform longitudinally arranged on the longitudinal face of the main portion.
12. An insert according to claim 11 wherein the lower portion includes a lug arranged on said platform, preferably the external profile of the lug being curvilinear.
13. An insert according to any preceding claim wherein the insert has at least a first hole arranged in front rear of the blast chamber with respect to the cartridge chamber, the central axis of the hole being arranged in the same plane as a longitudinal access of the blast chamber and at substantially 90 degrees to said axis of the blast chamber.
14. A replica gun sub-assembly including a main frame and an insert according to any preceding claim, the

insert being substantially encased in the main frame.

15. A replica gun sub-assembly in accordance with claim 14 wherein the main frame is cast around the insert. 5

16. A replica gun sub-assembly in accordance with claims 14 or 15 wherein the gun sub assembly defines a cartridge chamber and the main frame defines a lead-in to facilitate the loading of a cartridge into the cartridge chamber. 10

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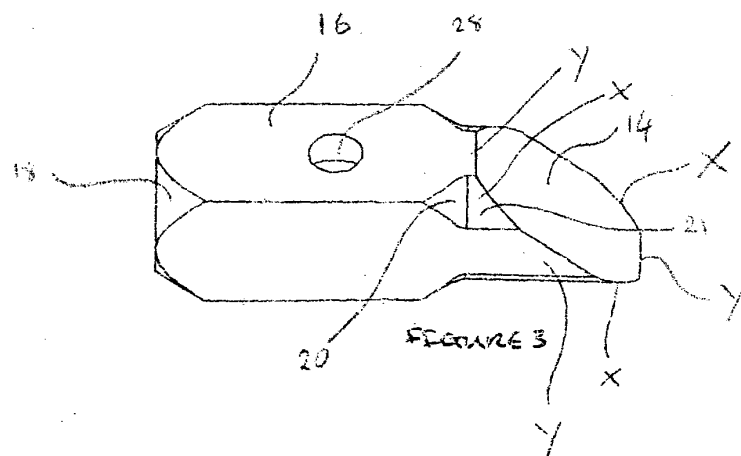
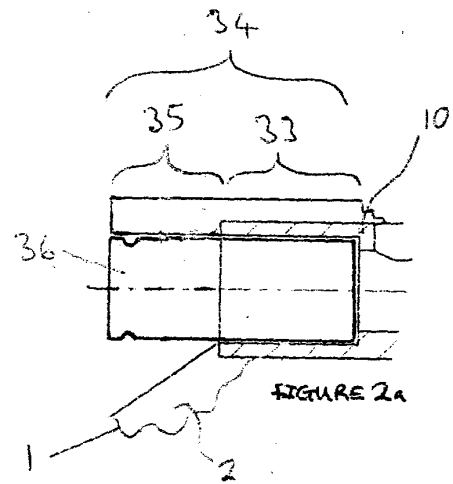
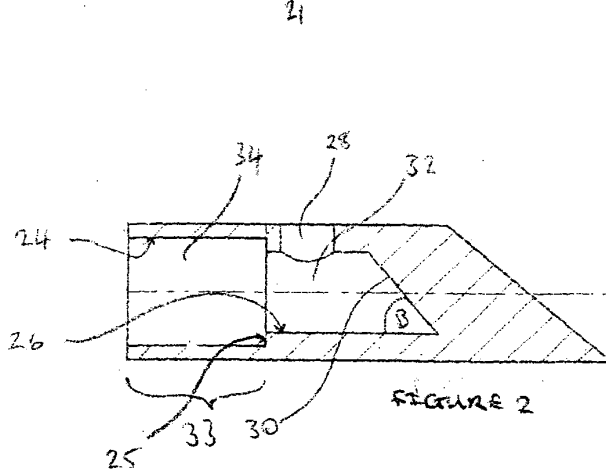
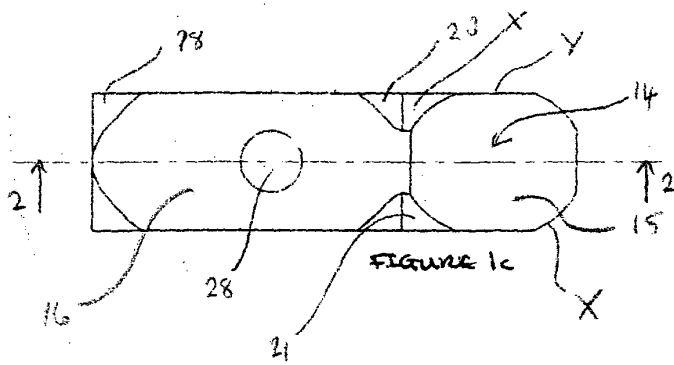
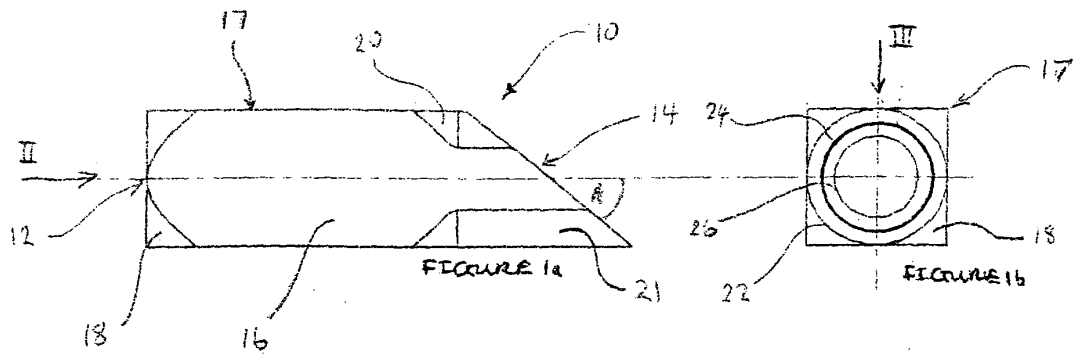
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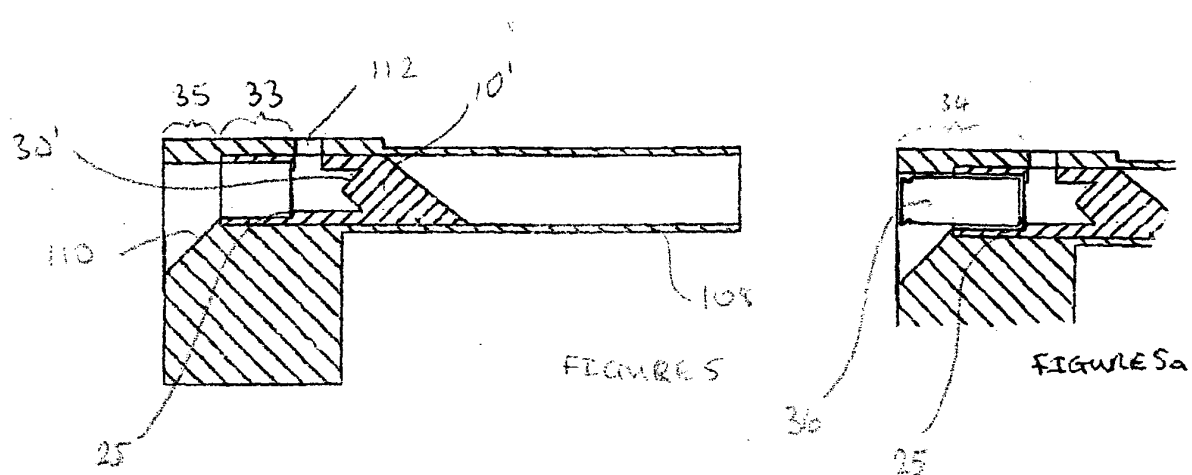
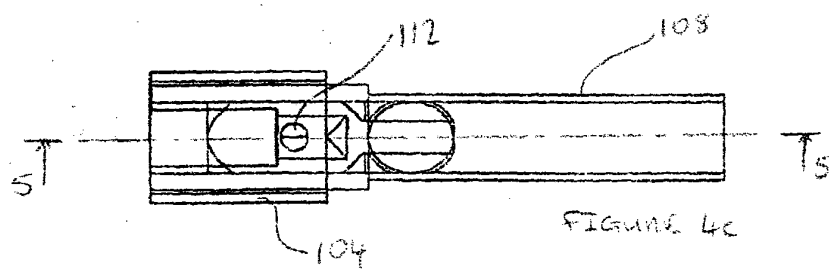
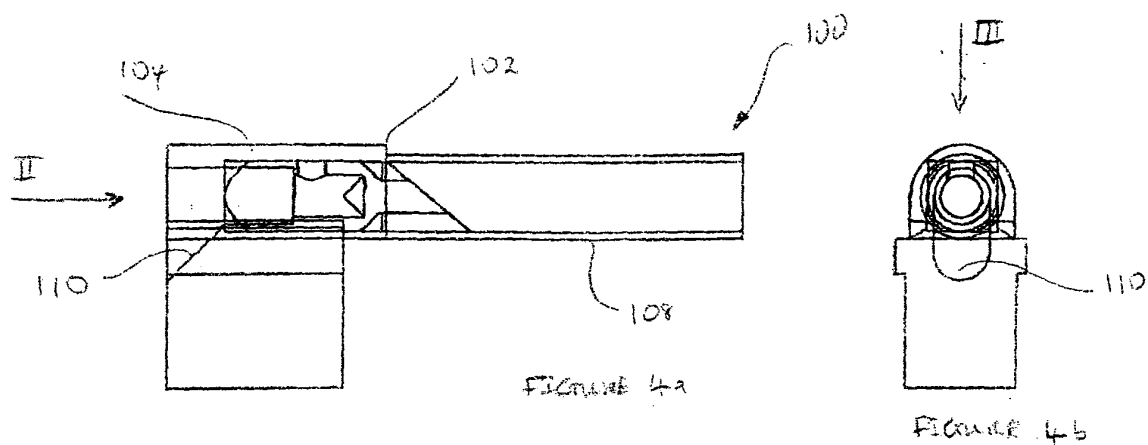
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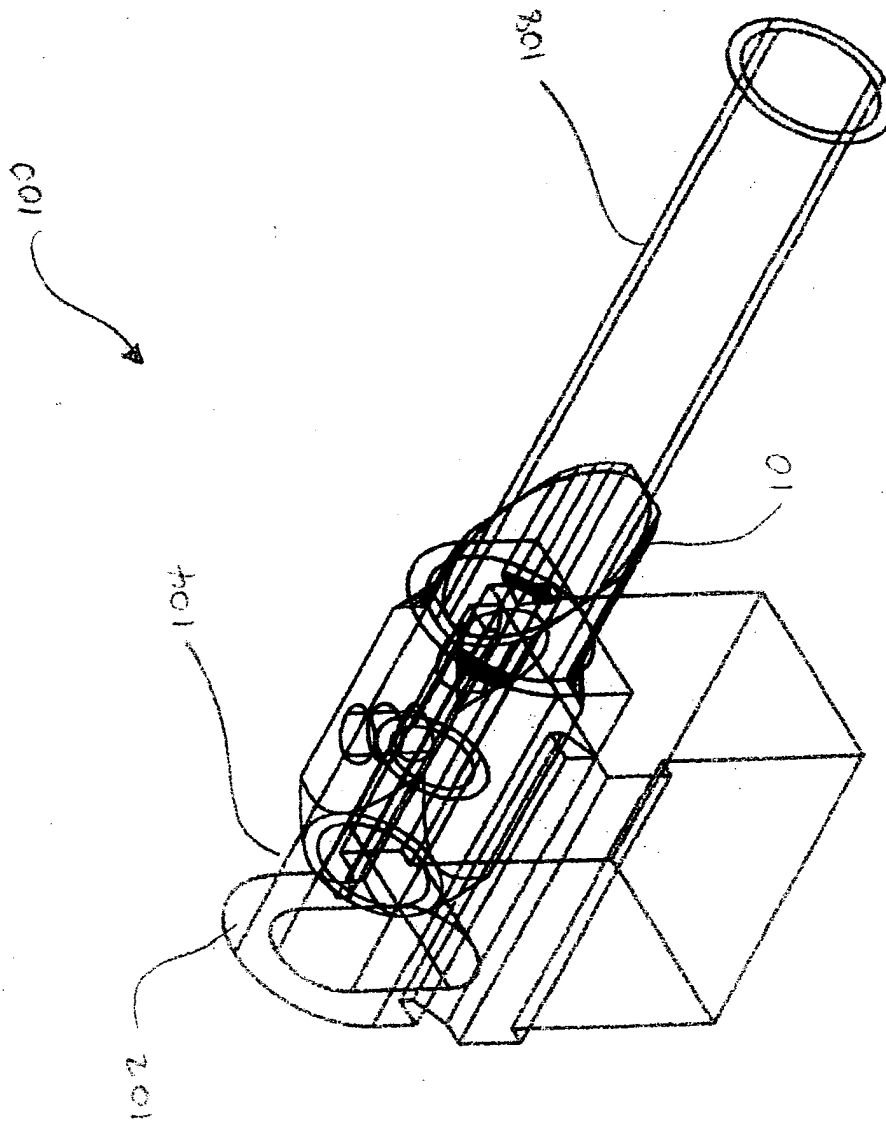
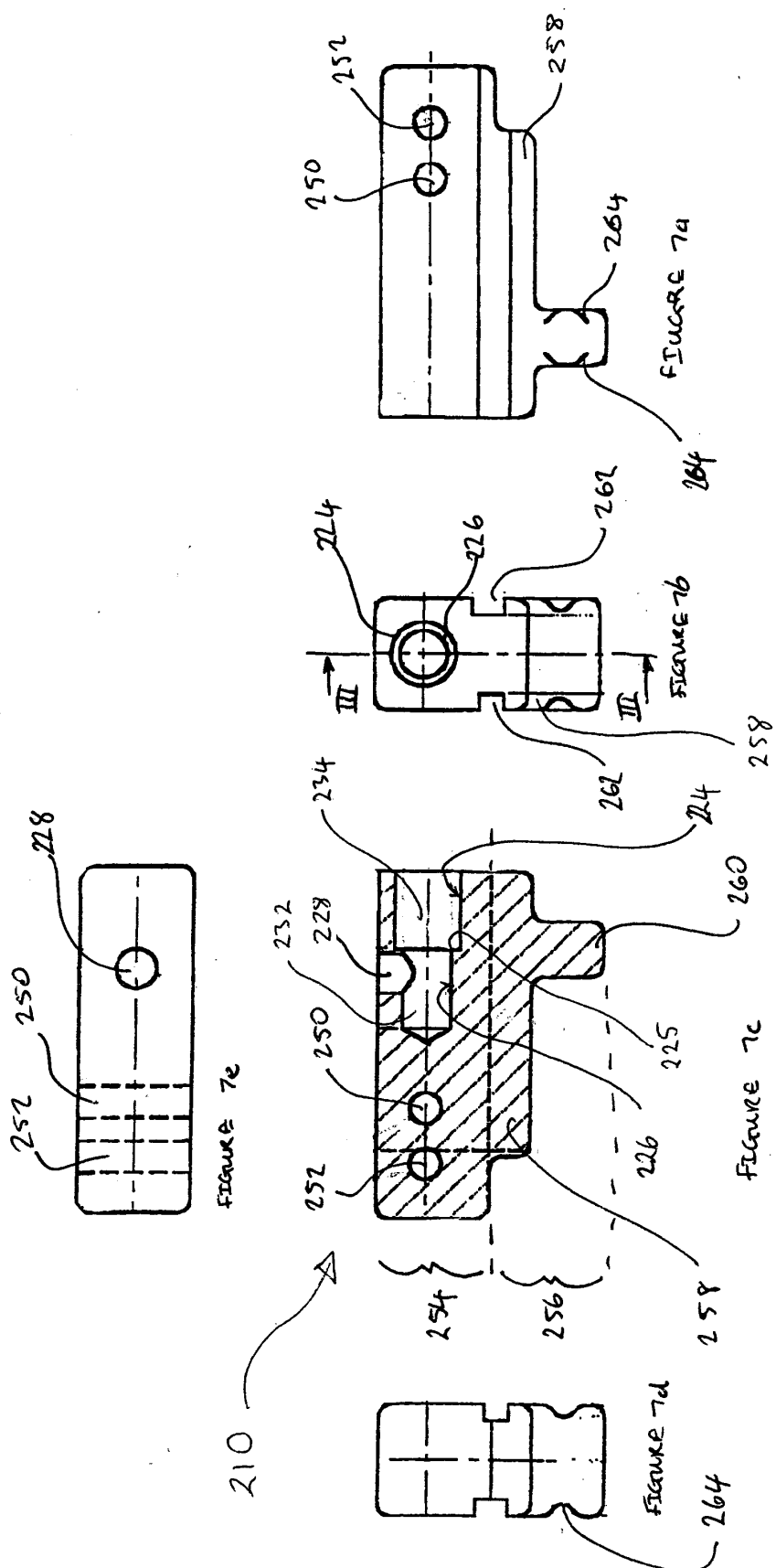
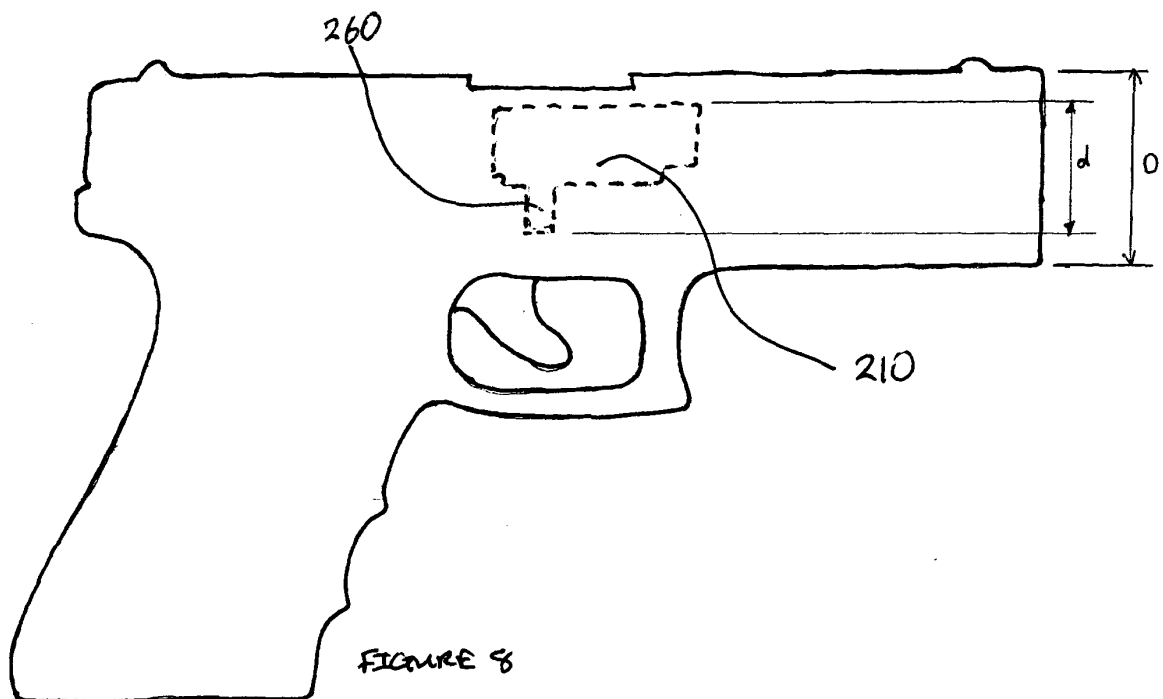
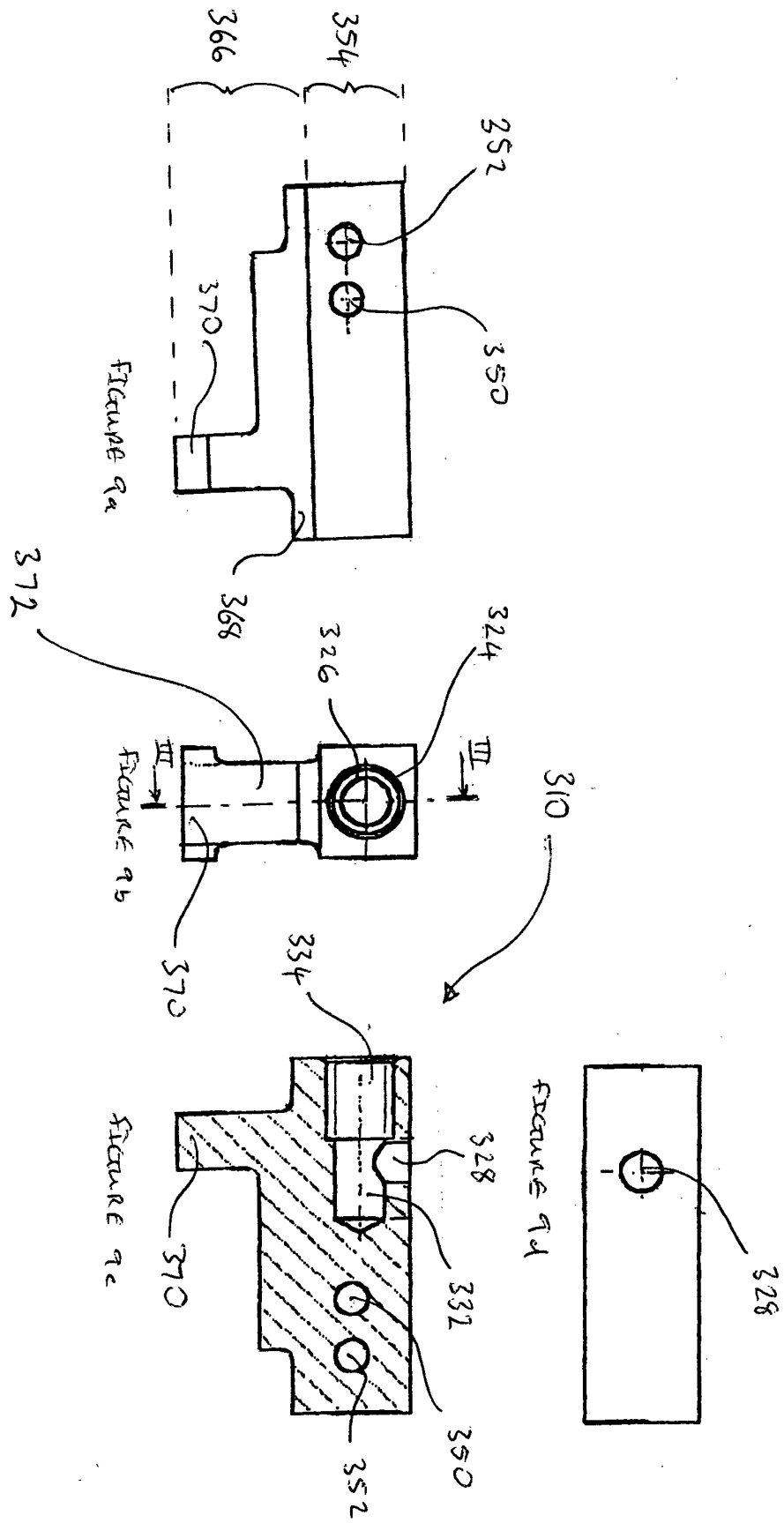


FIGURE 6









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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                   |                                  |                                              |
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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