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FIREARM HAVING CHAMBER MEMBER INTEGRAL WITH RECEIVER

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This invention relates to firearms and has for its object the provision of an improved barrel therefor, and means in combination therewith for connecting the barrel to the receiver of the gun. More particularly, the invention provides a chamber member integral with the receiver and a light-metal barrel removably connected to the chamber member.

The invention provides a chamber member which is integral with the receiver, and means for removably connecting the barrel to the chamber member with the bore of the barrel coextensive with the chamber. The chamber member may be connected more or less permanently to the receiver as with fine full threads or it may be a unitary part of the receiver. The chamber member is in effect a sub-barrel of sufficient strength to be capable of containing the pressure generated by a fired cartridge. The chamber member withstands the force of the explosion, thus permitting the use of relatively lightweight barrels, preferably barrels formed of light-metals such as magnesium, aluminum, and titanium and their base alloys. The invention, accordingly, comprises a lightweight barrel which need not have the usual high strength properties of conventional steel barrels, and interior lining means including the chamber for withstanding the force of the explosion, the said lining means also effecting the immediate or direct connection with the receiver.

The barrel may be removably connected to the receiver in any suitable way; for example, it may be connected by threads on the exterior of the chamber member. It is preferred to connect the barrel directly to the chamber member with half-threads for quick take-down purposes. It is important to form a shoulder on the barrel which makes abutting contact with a shoulder or flat face on the receiver in order to insure proper positioning of the barrel with respect to the chamber member.

These and other objects of the invention will be better understood after considering the following discussion taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a side elevation, partly in cross-section, of one embodiment of the invention,

Fig. 2 is a side elevation, partly in cross-section, of another embodiment of the invention;

Fig. 3 is a longitudinal, sectional view of a shotgun barrel of the invention.

As shown in Fig. 1, the invention comprises a light-metal shotgun barrel 1 connected by half-thread sections 2 and 3 to complementary half-thread sections of the chamber member 4 which is integral with the receiver 5, the chamber member and receiver being unitary. The receiver and chamber member are preferably formed of a metal having a high elastic limit. The barrel has an end shoulder 6 which makes abutting contact with the flat face 7 of the receiver, and the set screw 8 locks the barrel in position when it is threaded to tight abutting position against the receiver.

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The chamber member has a relatively thick-walled section 10 surrounding the chamber 11 which is capable of containing the force of the explosion, thereby relieving the barrel of internal strains in the vicinity of the chamber. The forward end or neck 12 of the chamber member extends into the barrel some distance beyond the chamber, say, at least 1 inch and is reduced in the wall thickness at the end 13 to an amount that will expand into sealing contact with the surrounding barrel. The exterior of the neck is preferably in such close fit with the barrel that the metal can expand only within its elastic limits in making sealing contact, and then contract after the pressure has returned to normal, leaving the barrel relatively free for quick take-down purposes.

The modification illustrated in Fig. 2 has a light-metal shotgun barrel 16 connected by half-threads 17 and 18 to the chamber member 19. The chamber member is integral with the receiver 20, being connected thereto by the fine full threads 21. The barrel has a shoulder 22 which makes abutting contact with the flat face 23 of the receiver. In order to secure the barrel in position on the chamber member, a locking-pin assembly 24 is mounted on the extension 25 of the receiver comprising a pin 26 which is urged upward into a recess in the barrel by spring 27, a retaining nut 28, and a knurled knob 29 which can be pulled down with the fingers to free the barrel. The chamber member of Fig. 2 has a chamber 30, a thick-walled section 31 surrounding the chamber and a neck 32 similar to comparable parts of the chamber member of Fig. 1.

Since the invention is applicable to any type of firearm such as single shot, repeating or semi-automatic it will be understood that various types of receivers may be used.

In the embodiment illustrated, the receiver and chamber member, or either of them, may be constructed of any suitable high strength alloy steel such as plain nickel steel, nickel-vanadium steel, and stainless steel, or beryllium bronze. The chamber member has the capacity to withstand, without rupturing, the gas pressure developed by the cartridge to be used depending upon its type and size. The specific firearm construction used to particularly demonstrate the invention herein is a shotgun. The interior of the chamber member is formed to standard dimensions in the usual manner to receive a standard shot shell. The wall thickness, the outside diameter and the length of the chamber in the chamber member will vary with the gauge or size and length of shot shell to be used. Extending forwardly of the shell receiving portion of the chamber member is the neck portion of reduced outside diameter and wall thickness for purposes hereinafter described.

It will be apparent from the foregoing description that, while the main portion of the chamber member has sufficient strength to contain the pressure of explosion, the neck portion of the forward part formed with thin side walls will expand in proportion to its thinness within its elastic limits and return to its original position. This expansion of the neck portion tends to seal the joint between the chamber member and barrel and thus prevent gas leakage and dirt deposit between the two members. Depending upon the characteristics of the metal, this reduced section can be thicker or thinner and it may be gradually tapered towards the end, the proportions being such that a seal is made between the neck and barrel without injurious expansion of the light-metal barrel.

The barrel may be constructed of any suitable light material such as a high tensile strength magnesium alloy, aluminum alloys, or titanium and its alloys. We may use a barrel as in Fig. 3 formed in part of a high strength aluminum alloy 35, such as 75S-T, having a cladding 36

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of relatively pure aluminum on the inside, and a similar cladding 37 on the outside to minimize shattering. The cladding may be used only on the inside or the outside. A barrel formed of an aluminum alloy with the foregoing chamber member construction has been successfully fired many times. The areas surrounding the chamber can be more or less cylindrical having an outside configuration approximating the usual steel barrel. The barrel bore surrounding the thick walled section of the chamber may have a reasonable clearance, while the bore surrounding the thin walled neck portion is in snug but freely slidable contact whereby on expansion of the neck portion a sealing contact is made with the barrel.

The aluminum barrels may be anodized both inside and outside, the inside anodic coating giving a harder surface, while the outside anodic coating is receptive to dyes and can be colored to simulate a blued steel barrel.

We claim:

1. The improvement in firearms comprising a receiver, a chamber member integral with the receiver, a barrel mounted over the chamber member and removably but operatively connected thereto at a fixed position, the chamber member including a wall section defining a chamber for an explosive shell, said wall section being of sufficient thickness and strength to contain the force of an explosion of a shell therein, and a neck portion at

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the forward end of the chamber member, said barrel surrounding said neck portion and extending backward therefrom and over at least the major portion of said chamber, said neck portion having a reduced outside diameter and being sufficiently thin and lying sufficiently close to the barrel that on an explosion of a shell within said chamber it will expand within its elastic limits into sealing contact with the barrel.

2. The improvement according to claim 1 in which the barrel is formed of aluminum and the chamber member is steel.

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