



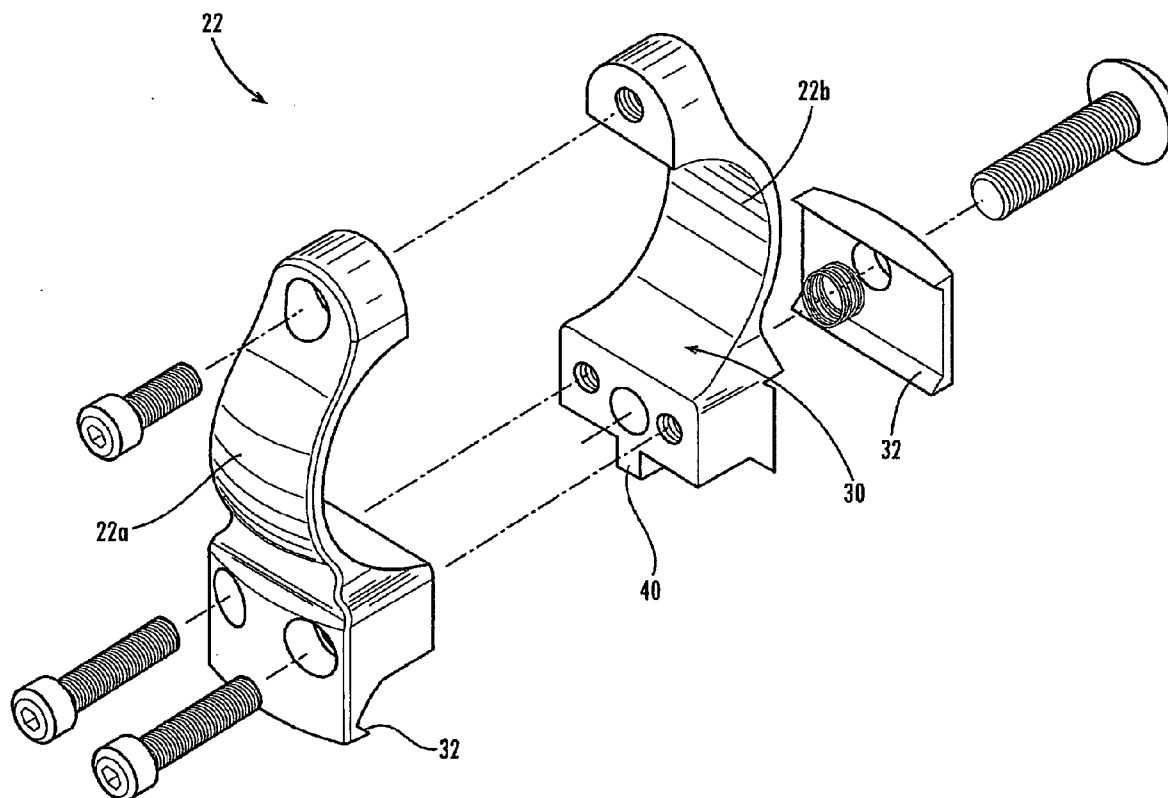
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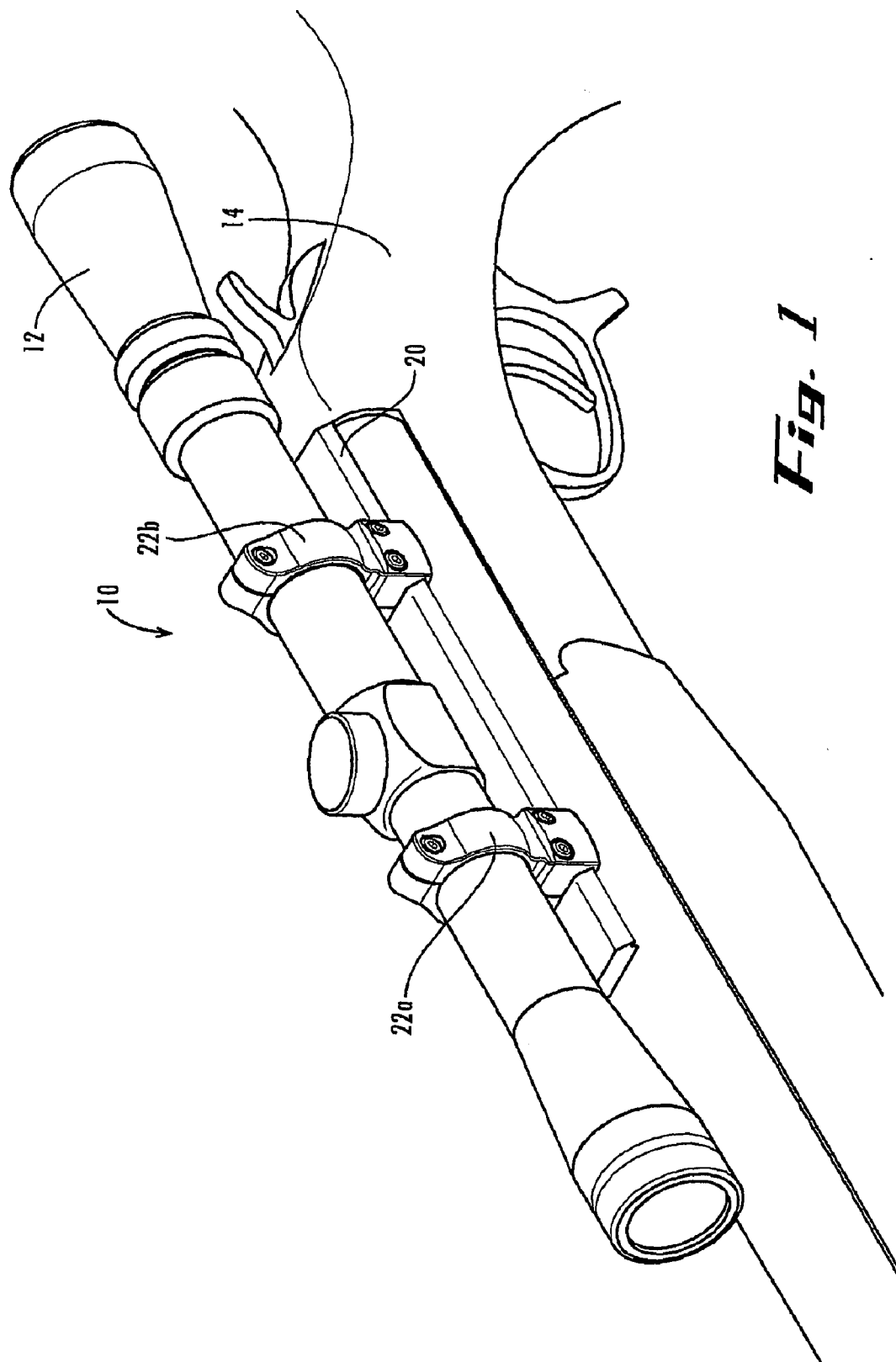
(19) **United States**(12) **Patent Application Publication**
Williams et al.(10) **Pub. No.: US 2010/0043271 A1**(43) **Pub. Date: Feb. 25, 2010**(54) **SCOPE MOUNTING SYSTEM****Related U.S. Application Data**(75) Inventors: **Dean N. Williams**, Griffin, GA
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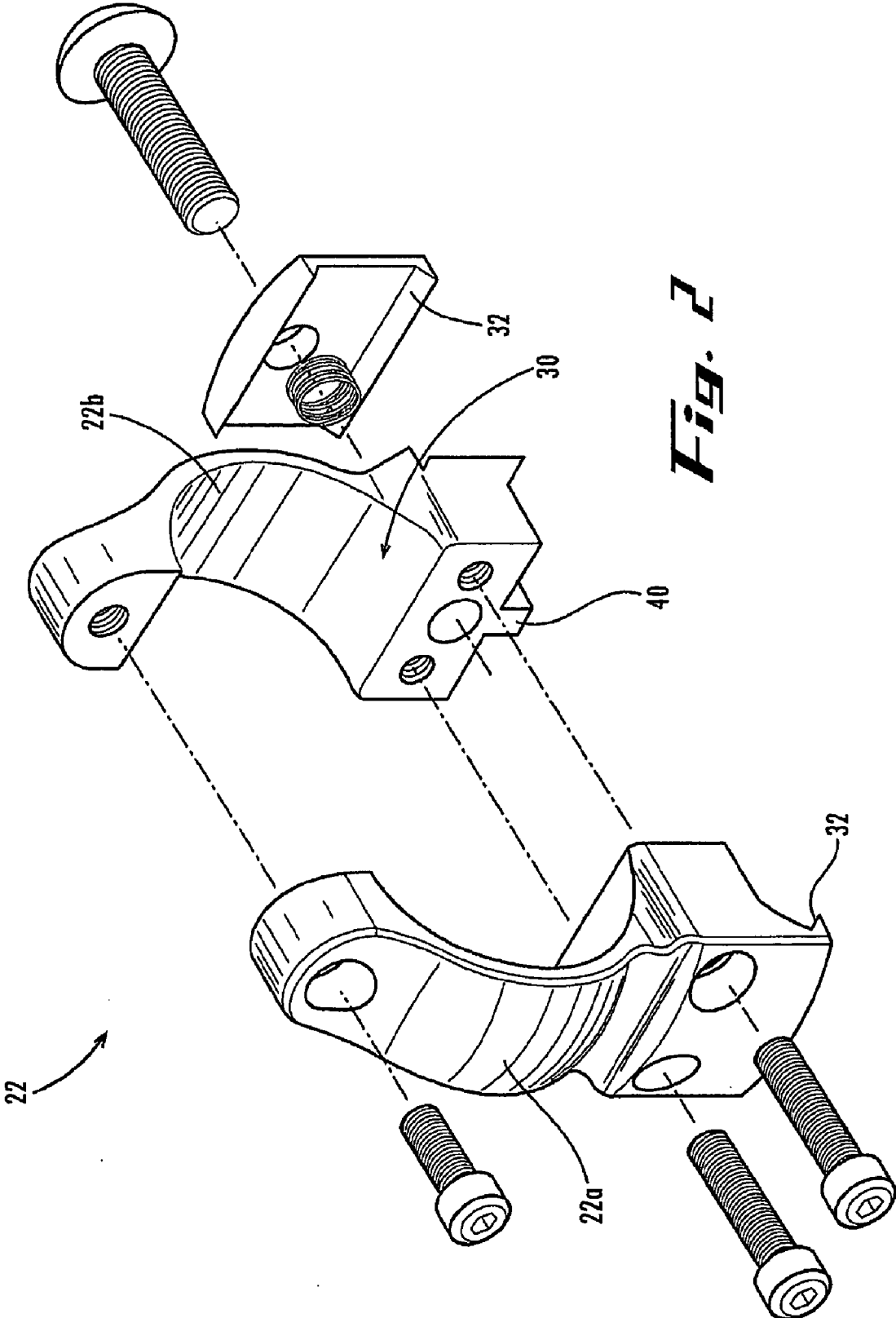
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INC., Norcross, GA (US)(57) **ABSTRACT**(21) Appl. No.: **11/909,248**(22) PCT Filed: **Mar. 21, 2006**(86) PCT No.: **PCT/US2006/010257**§ 371 (c)(1),
(2), (4) Date:**Oct. 27, 2009**

A scope mounting system having one or more components formed of a zinc alloy, preferably an alloy of zinc, aluminum, magnesium and copper. In one form, the component is formed of an alloy of zinc with about 3.5 to 4.3 weight percent aluminum, about 0.02 to 0.05 weight percent magnesium, and about 2.5 to 3.0 weight percent copper. The scope mounting system preferably includes one or more components, such as a base and/or rings, at least one of the components being formed by casting.







SCOPE MOUNTING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application Ser. No. 60/664,061, filed Mar. 22, 2005, which is hereby incorporated herein by reference in its entirety for all purposes.

TECHNICAL FIELD

[0002] The present invention relates generally to firearms accessories, and more particularly to rings and mounts for affixing a telescopic sight ("scope") to a firearm.

BACKGROUND OF THE INVENTION

[0003] Telescopic gun sights ("scopes") are often used in connection with firearms to improve shooting accuracy. A scope is typically mounted to the receiver, barrel, or other portion of a rifle or other type of firearm using a mounting system including one or more (typically two) scope mounting rings and, optionally, a mounting base.

[0004] Traditionally, the components of commercially-available mounting systems fall within two general categories: higher-end systems formed of machined steel and lower-end systems formed of aluminum extrusions. Steel mounting components are typically relatively expensive, largely due to higher labor and material costs. For example, steel's hardness renders machining and finishing of components more difficult and time consuming than aluminum components. Steel also has the disadvantage of its tendency to rust and corrode over time.

[0005] Aluminum components, while providing better resistance to corrosion than steel, have a number of shortcomings as well. For example, threaded bores in aluminum components tend to strip more easily during assembly, and cracking of the components sometimes occurs due to aluminum's lower stress tolerance. Aluminum typically is also more susceptible to fatigue failure and stress concentration failure than steel. Also, the extrusion processes typically used to fabricate aluminum components place limitations on the component geometries that can be produced. For example, components produced by extrusion processes typically have flat contours and limited detailing, and are considered less appealing by many consumers. The relatively light weight of aluminum also contributes to consumers' perception of these components as being of inferior quality and/or durability. Thus it can be seen that needs exist for improved scope mounting systems for firearms.

SUMMARY OF THE INVENTION

[0006] The present invention relates to improved scope mounting systems for firearms meeting these and other needs. In example forms, the present invention includes a mounting system including one or more scope mounting rings and, optionally, a mounting base or bases, providing improved performance and characteristics relative to previously known mounting systems. The mounting system of the present invention provides many of the advantages of both steel and aluminum components, while avoiding many of the disadvantages of each material. In addition to mounting of telescopic sights, the present invention may be adapted for mounting laser-aiming systems and/or other accessories and hardware to a firearm.

[0007] For example, in one aspect, the invention is a mounting system for mounting to a firearm, the mounting system being fabricated of a material having greater strength, durability and weight per unit volume than aluminum; and improved corrosion-resistance, cost and workability relative to steel. In example forms of the invention, one or more components of the mounting system are formed of a zinc alloy, preferably an alloy of zinc, aluminum, magnesium and copper.

[0008] In another aspect, the invention is a method of fabricating a scope mounting system, wherein one or more components of the system are formed by casting. Casting scope mounting components has been found to enable production of component geometries, detailing and finish, that are more appealing to many consumers than previously utilized production methods. In example forms of the invention, one or more components of the mounting system are cast from a zinc alloy, preferably an alloy of zinc, aluminum, magnesium and copper.

[0009] In another aspect, the invention is a system for mounting an accessory to a firearm, the system including at least one component formed of an alloy of zinc with about 0.002 to 4.3 weight percent aluminum, about 0.02 to 0.08 weight percent magnesium, and about 0.1 to 3.0 weight percent copper.

[0010] In another aspect, the invention is a system for mounting a telescopic gunsight to a firearm. The system preferably includes a base for mounting to the firearm, the base having at least one opening for receiving a fastener to secure the base to the firearm, and a dove-tailed external surface feature. The system preferably also includes a pair of mounting rings, each having opposed jaws for engaging the dove-tailed external surface feature of the base, and a channel for receiving and engaging the telescopic gunsight therein. Preferably, at least one of the base and the mounting ring components is/are formed of an alloy of zinc with about 0.002 to 4.3 weight percent aluminum, about 0.02 to 0.08 weight percent magnesium, and about 0.1 to 3.0 weight percent copper.

[0011] And in still another aspect, the invention is a system for mounting a scope to a firearm, the system including at least one scope ring for directly and/or indirectly coupling the scope to the firearm, the scope ring preferably being formed by a casting process.

[0012] In another aspect, the invention is a system for mounting an accessory to a firearm, the system including at least one component formed of an alloy of zinc with about 3.5 to 4.3 weight percent aluminum, about 0.02 to 0.05 weight percent magnesium, and about 2.5 to 3.0 weight percent copper.

[0013] These and other aspects, features and advantages of the invention will be understood with reference to the drawing figures and detailed description herein, and will be realized by means of the various elements and combinations particularly pointed out in the appended claims. It is to be understood that both the foregoing general description and the following brief description of the drawings and detailed description of the invention are exemplary and explanatory of preferred embodiments of the invention, and are not restrictive of the invention, as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a perspective view of a scope mounting system, including mounting rings and a base, according to an example form of the invention.

[0015] FIG. 2 is a detailed assembly view of a scope mounting ring component of the mounting system of FIG. 1.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

[0016] The present invention may be understood more readily by reference to the following detailed description of the invention taken in connection with the accompanying drawing figures, which form a part of this disclosure. It is to be understood that this invention is not limited to the specific devices, methods, conditions or parameters described and/or shown herein, and that the terminology used herein is for the purpose of describing particular embodiments by way of example only and is not intended to be limiting of the claimed invention. Also, as used in the specification including the appended claims, the singular forms “a,” “an,” and “the” include the plural, and reference to a particular numerical value includes at least that particular value, unless the context clearly dictates otherwise. Ranges may be expressed herein as from “about” or “approximately” one particular value and/or to “about” or “approximately” another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent “about,” it will be understood that the particular value forms another embodiment.

[0017] With reference now to the drawing figures, a mounting system 10 for affixing a telescopic sight 12 to a firearm 14 generally comprises a base 20 and one or more mounting rings 22 (a pair of mounting rings are depicted). The base 20 typically has one or more bores extending therethrough, and is secured to the receiver, barrel, or other portion of the firearm by screws or other attachment means installed through the bores of the base and into threaded bores in the firearm. The base 20 can comprise a unitary component, or optionally comprises two or more base sections separately mounted to the firearm. In example embodiments, the bores of the base are matched to corresponding bore size and spacing of the mounting bores of a particular make and model of firearm. Alternatively, a universal base includes multiple bores of size and spacing corresponding to bore size and spacing of different types of firearms; and/or includes an interchangeable insert permitting adaptation of the base to different types of firearms, as shown for example in U.S. patent application Ser. No. 11/178,811, which is incorporated by reference herein. In alternate forms, the firearm includes an integral base, and the mounting system only comprises rings. The base typically includes a dove-tailed or grooved external cross-sectional geometry, to which the rings are secured by clamping using one or more bolts, screws, couplings or other connection means.

[0018] Each ring 22 generally comprises first and second opposed halves 22a, 22b, which when engaged together define a generally circular channel or opening 30 for receiving and securing the tube of a scope therein. In the depicted embodiment, the opposed halves 22a, 22b of each ring 22 are split vertically, but in alternate embodiments of the invention, the rings are split horizontally, or otherwise segmented. A lower portion of each ring half preferably comprises a jaw 32 having a rib or edge projecting inwardly therefrom, and having an internal jaw configuration corresponding to the external dove-tail or grooving of the mounting base 20 or firearm 14, for cooperative engagement with the base or the firearm.

Alternatively, a separate clip component is affixed against one or both of the ring-halves, which clip component(s) comprise (s) the rib or edge of the jaw(s). One or more scope rings 22 of the system preferably also comprise an integral recoil lug 40 projecting downwardly from its lower surface, the recoil lug configured to be received within a cooperating slot in the base 20 or between base segments, to resist recoil-induced movement of the scope/ring assembly relative to the firearm/base assembly. Optionally, each ring further comprises a lower channel or opening between the scope-receiving channel 30 and the jaw 32, to permit sighting therethrough using open sights affixed to the firearm. In other alternate forms, the rings 22 optionally comprise a hinge mechanism permitting the scope to pivot out of the line of sighting using open sights. One or more screws or other coupling means preferably engage the ring halves 22a, 22b together to permit selective tightening to securely clamp the scope within the scope-receiving channel 30 of each ring and/or to securely clamp the opposed jaws 32 of the ring halves onto the base 20.

[0019] In example forms of the present invention, one or more components of a scope mounting system are formed of a zinc alloy, preferably an alloy of zinc, aluminum, magnesium and copper. In example forms, the component comprises an alloy of about 0.002 to 4.3 weight percent aluminum, about 0.02 to 0.08 weight percent magnesium, and about 0.1 to 3.0 weight percent copper, with the balance comprising zinc (and possibly containing trace amounts—e.g., no more than about 0.1 weight percent—of other materials, such as iron, lead, cadmium, tin, and/or materials).

[0020] In particularly preferred embodiments, at least one component of the system comprises an alloy of about 3.5 to 4.3 weight percent aluminum, about 0.02 to 0.05 weight percent magnesium, and about 2.5 to 3.0 weight percent copper, with the balance comprising zinc (and possibly containing trace amounts—e.g., no more than about 0.1 weight percent—of other materials, such as iron, lead, cadmium, tin, and/or materials).

[0021] The at least one zinc alloy component of the system preferably has a density of about 0.24 lb/in³ (6.6 g/cm³), an ultimate tensile strength of at least about 50,000 psi (pounds per square inch) (359 MPa), a yield strength (0.2% offset) of at least about 40,000 psi (283 MPa), and a shear strength of at least about 45,000 psi (317 MPa). A commercially available zinc alloy known as ZAMAK (Z-zinc, A-aluminum, M-magnesium, K-copper) No. 2 or Kirsite No. 2 has been found to produce components having acceptable characteristics.

[0022] Mounting system components according to the present invention formed of such material advantageously provide improved economics and performance, as compared to previously known mounting systems. For example, the mounting components of the present invention provide superior resistance to rust and corrosion than do components of steel, and yet are considerably less expensive to produce than traditional steel components. Components according to the present invention are considerably stronger than traditional aluminum components, and provide superior resistance to cracking and stripping of threaded connections as compared to aluminum components.

[0023] The present invention also enables fabrication of scope mounting system components by casting, which allows production of more complex and/or commercially appealing part geometries (for example, three-dimensional surface curvature) and enhanced detailing, as well as close control of

manufacturing tolerances, in comparison to extruded scope mounting components. Also, the workability of the components facilitates fine detailing and part finishes, further enhancing aesthetic and consumer appeal. The casting process also enables the provision of an integral recoil lug on the scope ring of the present invention, which is less prone to wear, breakage or loss than a separate keyed piece as found on previously known mounting systems.

[0024] For example, and as shown in FIG. 2, the exterior side surfaces of a scope ring according to the present invention may comprise a three-dimensional convex curvature (generally approximating a spherical section surface) adjacent its scope-receiving channel 30, smoothly transitioning into three-dimensional concave surface portions at its upper and/or lower extremities. In this manner, example forms of the present invention enable the provision of component geometries and configurations heretofore typically necessitating more expensive machining to produce, but at a more economical cost of production generally on the order of the less commercially desirable inexpensive extruded components.

[0025] Additionally, the relatively heavy weight (i.e., higher density) of mounting components according to the present invention results in a product “feel” that many consumers perceive as indicative of higher quality and value than lighter-weight components such as those of aluminum.

[0026] While the invention has been described with reference to preferred and example embodiments, it will be understood by those skilled in the art that a variety of modifications, additions and deletions are within the scope of the invention, as defined by the following claims.

What is claimed is:

1. A system for mounting an accessory to a firearm, said system comprising at least one component formed of an alloy of zinc with about 0.002 to 4.3 weight percent aluminum, about 0.02 to 0.08 weight percent magnesium, and about 0.1 to 3.0 weight percent copper.

2. The system of claim 1, wherein the at least one component is formed of an alloy of zinc with about 3.5 to 4.3 weight percent aluminum, about 0.02 to 0.05 weight percent magnesium, and about 2.5 to 3.0 weight percent copper.

3. The system of claim 1, wherein the accessory is a telescopic scope, and wherein the at least one component comprises a scope ring for engaging the telescopic sight.

4. The system of claim 1, wherein the at least one component comprises a base for mounting to the firearm and two scope rings each having opposed jaw members for engaging said base.

5. The system of claim 1, wherein the at least one component is formed by casting said alloy in a mold.

6. The system of claim 5, wherein the at least one component comprises a scope ring having exterior side surfaces defining a three-dimensional convex curvature smoothly transitioning into a three-dimensional concave surface portion.

7. The system of claim 5, wherein the at least one component comprises a scope ring having an integral recoil lug projecting therefrom.

8. The system of claim 1, wherein the at least one component has an ultimate tensile strength of at least about 50,000 psi, a yield strength of at least about 40,000 psi, and a shear strength of at least about 45,000 psi.

9. A system for mounting a telescopic gunsight to a firearm said system comprising:

a base for mounting to the firearm, said base having at least one opening for receiving a fastener to secure the base to the firearm, and a dove-tailed external surface feature; and

a pair of mounting rings, each having opposed jaws for engaging the dove-tailed external surface feature of the base, and a channel for receiving and engaging the telescopic gunsight therein;

wherein at least one of the base and the mounting ring components is formed of an alloy of zinc with about 0.002 to 4.3 weight percent aluminum, about 0.02 to 0.08 weight percent magnesium, and about 0.1 to 3.0 weight percent copper.

10. The system of claim 9, wherein the alloy comprises zinc with about 3.5 to 4.3 weight percent aluminum, about 0.02 to 0.05 weight percent magnesium, and about 2.5 to 3.0 weight percent copper.

11. The system of claim 9, wherein the at least one zinc alloy component is formed by casting the alloy in a mold.

12. The system of claim 9, wherein each of said pair of mounting rings is formed by casting the zinc alloy in a mold, and wherein each mounting ring has an exterior side surface defining a three-dimensional convex curvature transitioning into a concave surface portion.

13. The system of claim 9, wherein at least one of said pair of mounting rings comprises an integral recoil lug for engagement with a slot in said base.

14. A system for mounting a scope to a firearm, said system comprising at least one scope ring for coupling the scope to the firearm, said scope ring being formed by a casting process.

15. The system of claim 14, wherein the scope ring is formed of a zinc alloy.

16. The system of claim 15, wherein the zinc alloy consists essentially of zinc, aluminum, magnesium and copper.

17. The system of claim 15, wherein the zinc alloy comprises zinc with about 0.002 to 4.3 weight percent aluminum, about 0.02 to 0.08 weight percent magnesium, and about 0.1 to 3.0 weight percent copper.

18. The system claim 15, wherein the zinc alloy comprises zinc with about 3.5 to 4.3 weight percent aluminum, about 0.02 to 0.05 weight percent magnesium, and about 2.5 to 3.0 weight percent copper.

19. The system of claim 14, wherein the scope ring comprises means for directly coupling the scope ring to the firearm.

20. The system of claim 14, further comprising a mounting base for attachment to the firearm, and wherein the scope ring comprises means for coupling the scope ring to the mounting base and thereby indirectly coupling the scope ring to the firearm.

21. The system of claim 14, wherein the scope ring comprises an exterior side surface defining a three-dimensional convex curvature.

22. The system of claim 21, wherein the exterior side surface defining a three-dimensional convex curvature smoothly transitions into a three-dimensional concave surface portion.

23. The system of claim 14, wherein the scope ring comprises an integrally cast recoil lug.

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