Accessories Attached to Firearm Using Lateral Mechanism

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Abstract

An apparatus and method to attach accessories to a firearm is provided. In a first aspect, a mounting system to mount accessories to the magazine or magazine baseplate of a firearm is provided. In a second aspect, the attachment means may be integrated into the grip of a revolver. In a third aspect, the connecting components laterally slide together to mate and lock, thereby increasing structural stability of the design. In a fourth aspect, a brace is provided that can attach to a pistol or revolver using the present technology and increase shot accuracy, mitigate recoil, and better train shooters.
ACCESSORIES ATTACHED TO FIREARM USING LATERAL MECHANISM

CROSS REFERENCE TO PRIOR APPLICATIONS

[0001] This application claims priority under 35 U.S.C. 120 based upon Non-Provisional application Ser. No. 14/642,315, entitled “ACCESSORIES ATTACHED TO FIREARM MAGAZINE”, filed Mar. 9, 2015, which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates generally to a laterally attached stabilizing attachment for a pistol or revolver, and more particularly, to an attachment for a pistol or revolver with an accessory that is attached via a laterally inserted stabilizing means, such as a brace or other accessory for the pistol or revolver.

BACKGROUND OF THE INVENTION

[0003] There are several categories of firearms, each of which has unique features in their design, unique needs and traits, and unique accessories built specifically to exploit their features and enhance them. For example, rifles and carbines may have scopes or laser sights that are attached to the top of the firearm to increase accuracy, thereby increasing the chances of a successful shot. Pistols may have suppressors to suppress some of the sounds typically associated with firing a shot.

[0004] Revolvers generally use grips on their handles. Grips serve several purposes: to ergonomically contour the handle of the revolver to the user’s shooting hand, to alter the cosmetic appearance of the revolver, and to attach accessories to the revolver, albeit rarely.

[0005] However, when the grip is used to attach accessories to the revolver, these accessories are integrated into the revolver’s grip, or at the very least designed for a specific mounting system to the grip. For example, MARSHALL (U.S. Pat. No. 1,027,556) teaches a brace for a revolver that is screwed into the handle of the revolver directly. WILLOUGHBY (U.S. Pat. No. 5,177,309) and DANIELSON (U.S. Pat. No. 7,260,910) independently teach laser sighting systems for a firearm grip and integrated into a custom grip, respectively.

[0006] In any of these aforementioned examples, a situation exists wherein the accessory cannot be removed without swapping the grip out with another grip or removing the grip, which generally involves removing and reapplying screws or other techniques that are inefficient and slow and are generally performed in a shop. Changing grips is monotonous and is impractical for field use. Further, given the nature of these accessories being attached to a grip or integrated with a grip, a particular combination of accessories on a grip would have to be created for each combination of accessories desired for use at the same time. Moreover, the present inventor is unaware of any examples with an easily swappable accessory mechanism that can be used in the field that will quickly and easily allow a stable accessory to be attached to the revolver via the butt end of the firearm.

[0007] Further, several firearms utilize magazines to hold ammunition. Such firearms include automatic and semi-automatic pistols.

Small firearms, revolvers, pistols, and the like can generate considerable recoil forces. Muzzle rise is a common phenomenon in all widely used firearms. Muzzle rise reduces accuracy of the firearm and makes it difficult to engage a target for a subsequent round. In addition, untrained shooters and shooters under stressful circumstances can flinch in anticipation of the recoil causing the muzzle to go off target. As the power of the cartridge increases, recoil forces and muzzle rise increase proportionally. Because of the absence of a shoulder stock, all of the recoil forces are transferred to the shooter’s hand and wrist. In particular, the barrel axis lies above the center axis of the arm, so the handgun’s kickback gets transferred into angular momentum which must be absorbed by the shooter’s wrist. Because the firearm’s recoil forces release suddenly when the firearm is fired, it is difficult for the muscles in the hand, wrist, and forearm to provide the necessary counter force to cancel out the recoil forces. Handguns also typically have very short barrels. So while the barrel and the ammunition may be manufactured for accurate shooting, a small flinch, shake, or unsteadiness by the shooter will translate into a wide margin of error with respect to the intended target.

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Two methods for steadying the handgun and mitigating recoil forces are demonstrated in the art:

[0009] The first method, the rearward angular twisting forces from the firearm are mechanically transferred by way of a support brace into a downward force on the forearm thereby physically preventing the muzzle from rising. Examples of prior art using this method include: BOSCO (US 2014/0182181), SINGH, and SMITH. While effective to an extent, each of these examples has significant limitations:

[0010] BOSCO can only be used on handguns with a buffer tube by strapping the handgun to the shooter’s wrist. Very few handgums are designed and manufactured with a buffer tube so this is a significant limitation. As would be understood by one of ordinary skill in the art, strapping the firearm to the forearm is time consuming for the shooter, and limits the shooter’s ability to switch quickly to a different firearm which is undesirable.

[0011] SINGH and SMITH can only be used on a very limited number of handgums with a grip that is manufactured by the handgun manufacturer or altered by a gunsmith to allow the brace support to be attached to the grip of the handgun.

[0012] A second method for steadying the handgun and mitigating recoil forces is to attach a brace to the handgun which engages the underside of the forearm of the shooter. With this method, the shooter can push against the firearm a counter force prior to firing the firearm, which is ready to receive and cancel out the recoil forces when the handgun is actually fired. Examples of prior art utilizing this method include: LA (U.S. Pat. No. 3,162,966), BRESAN (U.S. Pat. No. 4,291,482), and TRONCOSO (U.S. Pat. No. 5,180,874). However, similar to problems with the techniques above, all of these examples require attaching the support brace to the handgun or the grip of the handgun, which requires the handgun to either be manufactured with a grip that supports such an attachment or the grip must be altered by an experienced gunsmith to allow for the brace to be attached.

[0013] Another method for stabilizing the firearm and mitigating recoil forces has the advantages. In certain situations and depending on a shooter’s preference, on the build of the
shooter, and the design and caliber of the handgun, one of the above techniques may be preferable to the other. For example, the first method may work acceptably for many smaller caliber handguns as the recoil forces generated are small and can be easy absorbed by the forearm; but would be difficult to implement safely for larger caliber handguns which can generate as much as 45 pounds recoil force. The second method is also useful in certain circumstances, but it still relies on the shooter’s wrist to put a forward positive force against the firearm prior to firing, which varies from shooter to shooter. As such the method would be less effective or useful for individuals with a disability or a weak wrist.

All prior art suffers from a few significant limitations:

- [0016] they all are designed to be attached directly to the handgun, usually the grip;
- [0017] they all are designed to allow the shooter to suppress recoil by having the brace twist into the shooter’s arm during a discharge or stabilize the firearm during discharge by applying pressure to the brace, thereby making the wrist rigid, but not both; and
- [0018] for all practical purposes, they are limited to a handful of firearm models that are manufactured with the necessary buffer tube or the necessary screws in the grip to allow these devices to be attached.

Attaching the support to the handgun is a significant limitation. There are only a handful of handgun models designed with a buffer tube, or with a slot to attach a support. In addition, many handguns do not have grips that are screwed to the frame that can be used to attach a support apparatus. As for the select few handguns manufactured with screws on removable grips, there are practical and market limitations with the idea of developing replacement grips which allow a brace to be attached to the handgun. The replacement grips would be in competition with an entire cottage industry of screw on grips to allow the firearm’s owner to customize the look, form, and feel of their handgun grip, which may additionally have intellectual properties protecting competitors from entering the market.

In general it would be beneficial if a new method of reversibly connecting an attachment, especially envisioned as a brace, to a firearm. It would be greatly beneficial if the modifications were secure, semi-permanent, and were not attached directly to the firearm such that it could be attached to a plethora of models without a gunsmith making alterations to the handgun. Further, it would be beneficial if the solution were robust and capable of changing attachments quickly and efficiently, in the field as easily as in the shop.

BRIEF SUMMARY OF THE INVENTION

[0021] Generally, the disclosed invention overcomes the limitations of the prior art to produce an innovative firearm that has a robust attachment adapted to secure a plurality of aftermarket devices to the firearm reversibly and without requiring any modification of the firearm itself. This is accomplished generally by creating a detachable locking mechanism to the grip of a revolver, base of a pistol magazine, or to the pistol magazine itself. The detachable locking mechanism may have a lateral connection means, wherein a male cross-section may laterally slide into a female cross-section, wherein they lock together to form a strong and unified structure. By connecting attachments to the magazine base or the magazine itself, no modification or alterations have to be made to the handgun or its grip. Further, the only change involves a relatively inexpensive replacement grip, baseplate, or magazine. This allows changing of accessories by removing the accessory from the grip, or in the case of magazines, for the firearm by merely changing the magazine, which can be done quickly in the field.

[0022] In a more preferred aspect of the invention, the disclosed invention overcomes limitations of prior art to produce an innovative handgun support brace for all handguns with detachable magazines. This is accomplished generally with two key innovations: (a) a brace arm connecting via a detachable locking mechanism to the base of the magazine or to the magazine itself, and (b) the firearm brace may be further configured to allow it to adjust and extend either above the forearm of the shooter or below the forearm of the shooter. By connecting the support brace to the magazine base or the magazine itself, no modification or alterations have to be made to the handgun or its grip. To use any model handgun with the brace, the only change involves a relatively inexpensive replacement baseplate, or a replacement magazine, which are designed to attach to the handgun brace. With the handgun brace being configurable to extend above or below the shooter’s forearm, the shooter can select the desired and most appropriate method for steadying the handgun and mitigating recoil under the given circumstances. For a better understanding of the invention, its operating advantages and the specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated an embodiment of the invention.

[0023] In another aspect of the invention, a mechanical device is provided to secure an accessory to a firearm comprising: a firearm; and a first connecting component; wherein the first connecting component has a substantially constant cross-section laterally through the first connecting component, such that it allows a second connecting component with a complementary cross section to laterally slide into and secure itself to the first connecting component, such that the first and second connecting components lock together to prevent substantially all translational and rotational movement relative to each other.

[0024] In yet another aspect of the invention, a structure for connecting an accessory to a firearm is provided comprising: a connecting component; and a structural component; wherein the structural component is selected from the group consisting of: a firearm magazine baseplate, a firearm magazine, a firearm grip, or a firearm; wherein the connecting component comprises a first connecting element that is mechanically secured to, integrated with, or part of the structural component; wherein the first connecting element is adapted to connect to a second connecting element mechanically secured to, integrated with, or part of an accessory; wherein the first connecting element comprises a female or male component locking component, adapted to mate with the second connecting element of the opposite gender; wherein the plane formed by the intersection of the longitudinal axis of the barrel of a firearm and the substantially-mirrored plane through the grip of the firearm define a vertical symmetry plane for the firearm; wherein the first connecting element has substantially the same lateral cross-section across the component such that it is adapted to mate with the second connect element by sliding the male com-
ponent into the female component orthogonally relative to the vertical symmetry plane, and wherein either the first or second connecting element comprises a bolt, screw, or plunger adapted to penetrate an orifice in the other connecting element such that when the male component is mated into the female component, the bolt, screw, or plunger can be inserted into the orifice to mechanically lock the two elements together to prevent the male component from disengaging the female component.

[0025] In even another aspect of the invention, a method of attaching an accessory to a firearm is taught, comprising: providing a first connecting component, integrated with or adapted to be secured to a firearm or firearm magazine; providing a second connecting component, adapted to be connected to an accessory for a firearm, wherein the first connecting component has a substantially constant cross-section laterally through the first connecting component, such that it allows the second connecting component with a complementary cross section to laterally slide into and secure itself to the first connecting component, such that the first and second connecting components lock together to prevent substantially all translational and rotational moment relative to each other; and locking the second connecting component into the first connecting component.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] The following drawings illustrate by way of example, and are included to provide further understanding of the invention for purposes of illustrative discussion of the embodiments of the invention. No attempt is made to show structural details of the embodiments in more detail than is necessary for a fundamental understanding of the invention, the description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice. Identical reference numerals do not necessarily indicate an identical structure. Rather, the same reference numeral may be used to indicate a similar feature or a feature with similar functionality. Importantly, the drawings demonstrate several embodiments of the invention that are not intended to be limiting. As would be understood by one of ordinary skill in the art in view of the disclosure, the present invention has a wide range of utility outside of the presently disclosed embodiments, which has been described generally herein. The precise scope of the present invention is to be defined by the claims. In the drawings:

[0027] FIG. 1 is a perspective view of the forearm support brace according to a first embodiment which is attached to the base of a magazine and the magazine is inserted into the handgun. This illustration depicts the arm brace configured for a right-handed shooter.

[0028] FIG. 2 is a side view of the forearm support brace according to a first embodiment which is attached to the base of a magazine and the magazine is inserted into the handgun. This illustration depicts the attachment in use with an embodiment of the brace arm extending over the forearm of the shooter.

[0029] FIG. 3 is a side view of the forearm support brace according to a first embodiment which is attached to the base of a magazine and the magazine is inserted into the handgun. This illustration depicts the attachment in use with an embodiment of the brace arm extending under the forearm of the shooter.

[0030] FIG. 4 is a exploded perspective illustration showing the parts of the brace arm of a first embodiment of the invention.

[0031] FIG. 5 is a side elevation of the forearm support brace according to a first embodiment which is disconnected from the base of the magazine, and the magazine is detached from the handgun.

[0032] FIG. 6 is a perspective view of the forearm support brace according to a first embodiment which is detached from the base of a magazine and the magazine is inserted into the handgun. This illustration depicts the arm brace configured for a left-handed shooter.

[0033] FIG. 7 is a side view of the forearm support brace according to a first embodiment which is assembled but disconnected from the magazine.

[0034] FIG. 8 is an exploded view of all of the components of a first embodiment of the inventive brace with the magazine inserted into the firearm.

[0035] FIG. 9 shows a side view of a forth embodiment of the invention, adapted as a rod brace with a wing nut and bolt joint that allows the brace to be adjusted.

[0036] FIG. 10 shows a side view of a third embodiment of the invention, adapted as a revolver with a brace attached by a dovetail lateral connection means according to an aspect of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0037] While the present invention is exemplified as braces being connected to the magazine of a firearm, those skilled in the art would readily recognize that the standard couplings and fittings could be used to secure many things to the magazine of a firearm for many useful purposes. Naturally, the scope of the present invention is not intended to be limited by the embodiments herein, which by their very nature are mere examples. Instead, the full scope of the invention is defined in the claims below.

[0038] As would be understood by one of ordinary skill in the art, firearms have a substantially vertical plane of symmetry down the barrel of the firearm. Orientations in this specification and claims will be made in reference to that plane. When the firearm barrel is parallel to the ground, and when the plane of symmetry is orthogonal to the ground (i.e., when the grip is pointed effectively down as much as possible subject to the other two constraints above having higher priority), orientation can be made in reference to the firearm. “Bottom” refers to the lower surface toward the ground. “Down” or “downward” refers to moving toward the ground through the firearm. “Top” refers to the upper surface toward the sky. “Upward” refers to moving upward from the ground through the firearm. “Back” refers to moving horizontally across the plane of symmetry, opposite the direction ammunition travels down the barrel when the firearm is fired (i.e., from the barrel’s opening where ammunition is discharged when fired, down the barrel, to the chamber). “Behind” refers to moving back on the firearm such that the area of discussion is offset from the firearm itself. “Forward” refers to moving horizontally across the plane of symmetry, following the path ammunition would travel down the barrel when the firearm is fired (i.e., from the chamber down the barrel to the barrel’s opening). “In front of” refers to moving forward on the firearm such that the area of discussion is offset from the firearm itself. “Pitch plane” refers to a hypothetical firearm’s axis of symmetry,
which extends to any magazine that would be inserted therein and any accessories (including braces) attached thereto. The pitch plane is a critical point of reference that is understood to exist for magazines and accessories even when they are not inserted into a firearm but is where the plane would be if the magazine were inserted into its firearm. “Pitch” refers to rotational movement on the vertical plane of symmetry changing the angle between the magazine and its attachment in that plane. “Lateral” refers to moving in a direction perpendicular to the vertical plane of symmetry (i.e., to the side of the firearm).

Further terminology used throughout this specification follows:

“Connecting component”—any art recognized system to connect two components that can be reversibly connected to each other that can be quickly and easily disconnected without requiring tools. It is to be understood that the connecting component is designed to be universal in that accessories with the appropriate mating mechanism with the connecting component can be changed onto the connecting component. Examples of connecting components are a (i) female slot adapted to mate with a male member, wherein either the female slot or the male member has some mechanism to mechanically secure the mated male member in the female slot; such as a pin, cap, or nut; (ii) a rail with lockable slots or holes adapted to mate with a male member, clip, pin, or screw, wherein either the rail or the male member, clip, pin, or screw has some mechanism to mechanically secure the mated male member, clip, pin, or screw in the rail, such as a (different) pin, cap, or nut; (iii) the inverse of (i) or (ii), such that the male member is attached to the grip and the female slot or rail respectively is attached to the accessory; (iv) or the like. Examples of mechanical securing mechanisms that are intended to be outside of the scope of the present invention include permanent or semi-permanent securing mechanisms, such as simple screws, simple bolting, welding accessories onto the grip, frame handle, baseplate, or magazine, or gluing accessories onto the same.

“Frame Handle”—the portion of the metal frame of the revolver to which the grip or attaches or mounts.

“Quick connection”—A universal quick connection consists of the following features: (a) a male and a mated female slot connection mechanism with one on the bottom of the handgun grip, handle, magazine, or baseplate and the other on the accessory that is being attached; (b) a spring-loaded—or equivalent structure, force biasing structure—locking and unlocking mechanism on at least one of the male or mated female slot connection mechanism; and (c) a hole or slot in either the male or mated female slot connection mechanism which allows the locking mechanism to latch into place. In a preferred embodiment, the spring-loaded locking and unlocking mechanism is a hand retractable spring-loaded plunger.

“Rail”—herein a rail refers to entire family of firearm rails. Exemplary rails are Weaver rails and picatinny rails, although other rails of various sizes and constructions are either known in the art or well within the grasp of the skilled artisan with routine design choices.

Connection Mechanism

The connecting mechanism comprises two critical features. First, the mechanism has two major components, each of which is a negative cutout of the other, such that the two pieces can be laterally slide into each other to form a mated pair. Second, when mated, some locking mechanism (to be discussed below) must engage the two components to stop lateral sliding. The locked, mated pair must create strong coupling and prevent translational (read: motion on a Cartesian graph) and rotational motion relative to each other.

By having the male component engage the female component laterally, the following critical things happen:

First, when stress is put on the joint when the firearm is in use (i.e., torquing the joint by firing the firearm, or pushing or pulling the firearm when the brace is connected to the user’s wrist, or the shoulder stock is engaged to the user’s shoulder, or when the firearm is secured to a mono-pod or by-pod at the joint), the walls of the male and female member absorb that force. A lateral connection that is inserted perpendicular to the firearm’s plane of symmetry is stronger and less likely to fail due to stresses introduced on the joint through the firearm pitching backward during recoil or being pushed forward during aiming. The mechanical connection strength from the connection is not created by a bolt, screw, plunger, or pin. A lateral dovetail or rail connection distributes the torque forces applied when the firearm is fired across a wider surface area and is relatively stronger than a dovetail or rail that is parallel to the barrel. A connection parallel to the barrel would transfer the forces into an outward force, potentially even causing translational motion to un-mate the male and female connections. Even if the connection is secured by a pin, bolt, screw, or plunger, the translational force is only stopped by that pin, bolt, screw, or plunger, which is a point of weakness in the design that can fail during use. Shooters in the field require a quick means of attaching or detaching accessories from the firearm, so if a spring plunger is used as the locking mechanism, the strength of the connection is dependent on the spring keeping the plunger in position and not popping out of place during use. Failure of the connection during use can be dangerous for the person using the firearm. As such, the position and angle of the connection are critical.

Second, the present invention is superior from an ergonomics perspective as well. When a pistol is in use, it is frequently necessary to attach or detach an empty magazine with a full magazine. The non-shooting hand must detach the brace, remove the empty magazine, insert a new magazine, and align and reconnect and secure the brace with a smooth and efficient motion, and then return the support hand to the side of the handgun to support the shooting hand when firing. All of this action must happen quickly with minimum interference with the orientation of the pistol as it faces the target. A lateral connection is more efficient at accomplishing these movements. As shooters are trained to bring their non-shooting hand from the side to grip the handgun from the side to assist the shooting hand, a lateral connection for the brace or shoulder stock coincides with this lateral movement by the non-shooting hand, and is therefore more efficient, quicker and easier to connect securely for both pistols and revolvers.

As would be immediately envisioned by the skilled artisan, two mated components can be manufactured via many methods, such as starting with a block of material, and laser cutting a pattern, orthogonal to one surface of the block, such that the block is separated into two complimentary pieces that do not fail apart without sliding one piece out of the other. From there, a locking mechanism, such as a
simple bolt (first component) and mating hole (second component) can be machined and installed to lock the two components together.

[0050] Importantly, the two components must be thick enough that when they are mated, they cannot twist in the lateral axis. Such structure is given by a “tight fit” and by having a wall thickness (thickness being in the direction of the lateral sliding) so that the material cannot twist off the lateral plane.

[0051] According the present invention, a firearm’s magazine may be adapted to be connected directly to an accessory without that accessory otherwise being connected to the firearm.

[0052] Connection Means: Rails

[0053] In an embodiment of the invention, the connection means is a rail. Exemplary rails are picatinny rails and Weaver rails.

[0054] A picatinny rail, also known as Mil-STD-1913, is a standard military rail mounting system for accessories consisting of a rail with multiple transverse slots. The rail is the same shape as a previous standard known as the weaver rail, except that the picatinny rail standardized the spacing of the transverse slots. The Picatinny locking slot width is approximately 0.206″, and the spacing between the slots is about 0.394″ and the slot depth is about 0.118″. Adding a picatinny rail to the butt end of a revolver grip will allow for the attachment of all standard accessories. If the rail was oriented laterally with an appropriate locking means, it would give a stronger and more ergonomic connection means specifically for the purpose of attaching accessories such as shoulder stocks, forearm braces, monopods and bipods to the firearm given the stresses exerted on the connection when the user is using these kinds of accessories.

[0055] Connection Means: Magazines and Magazine Baseplates

[0056] In one embodiment of the invention, a baseplate of a magazine is replaced with a custom baseplate that is integrated with an adapter such that the baseplate can connect to the accessory. Throughout this specification, embodiments may refer to a baseplate having a modification to attach to an accessory and text may refer to a magazine having an attachment means for an accessory. It is to be understood that it is well within the skill of the art for one to select connecting the adapter to the magazine or the magazine’s baseplate. Therefore, regarding this discussion, it is to be understood when discussing connecting the magazine that in an alternate embodiment, the skilled artisan could connect the device to the magazine baseplate instead, vice versa. In a preferred embodiment in the case of an accessory adapter being connected directly to the magazine, it is connected directly to the bottom of the magazine. In a more preferred embodiment of the invention and in the case of an accessory adapter being connected directly to the magazine, the side walls of the magazine are of a size that the walls of the magazine are completely surrounded in the magazine well when the magazine is substantially inserted into the firearm’s magazine well, such that only the bottom face of the magazine is not abutted to an inner face of the magazine well and as the general case of a handgun magazine.

[0057] In one aspect of the invention, the connection means to connect the accessory to the firearm magazine is reversible. In this specification, the term “reversible” is to be understood to mean can be disconnected in the field without using specialty tools, such as equipment to remove a weld or cut a portion of metal. In another aspect of the invention, the connection means has a first and second part, wherein the first part is permanently, semi-permanently, or temporarily secured to or integrated with a magazine base plate or the magazine itself. The second connection part is permanently, semi-permanently, or temporarily connected to an accessory.

[0058] As would be understood by the skilled artisan, any adapter can be used to connect a firearm magazine or magazine baseplate to its accessory, such as glue, welding, screws, bolts, or any other art recognized technique. Further, some firearms may not have removable baseplates, such as select Colt® pistols. Such firearms would require an adapter to be included in the design and manufacturer of the base of the magazine.

[0059] In a preferred embodiment of the invention, the accessory is a brace adapted to connect to the shooter other than at the shooter’s hand.

[0060] In a preferred embodiment, the accessory is not a monopod, bipod, or tripod or any other stand in which supports the weight of the firearm against the ground.

[0061] It is to be understood that the present invention is to mechanically secure accessories to the magazine. Therefore, in a preferred embodiment, the accessory is not an adapter designed to attach magazines to a Picatinny rail or any like (which are generally intended to connect spare magazines to the Picatinny rail of the firearm, not to connect an accessory to the magazine of the firearm in situ). Further, in a preferred embodiment, the accessory is not a monopod, bipod, or tripod or any other stand, which is intended to support the weight of the firearm against the ground. In a more preferred embodiment, the accessory is flashlight, brace, scope, or a sensor. In yet another preferred embodiment, the accessory is a brace.

[0062] Accessory

[0063] The accessory can be any accessory typically used as a firearm accessory. For example, the accessory can be a brace, shoulder stock, monopod, bipod, tripod, laser, light, scope, or sight. While sighting accessories, such as scopes and lasers, are within the scope of the invention, traditional means to attach those accessories may be more beneficial than the present invention due to the physical placement of those accessories on the firearm. Further, the present invention provides high amounts of support, which may not be necessary for such accessories. As such, braces, shoulder stocks, and supports, such as monopods, bipods, tripods, or other stands are preferred.

[0064] Accessory: Brace

[0065] In a particularly preferred aspect of the present invention, the accessory is a brace. Any brace can be used that is designed such that it can connect to a shooter’s body other than the shooting hand on one end and can connect directly to the firearm magazine on the other end. Importantly, a brace according to the present invention does not connect with the firearm itself, only the magazine or the magazine baseplate. The brace can be a single piece or several pieces. The brace can be a simple machined or bent rod, or it can be designed with joints to allow significant adjustment, as would be understood by one of ordinary skill in the art.

[0066] The brace may comprise inter alia rods, joints, screws, screw-nuts, bolts, nuts, wires, connection means. Most components other than an impact absorbing component (such as a compressible sleeve, described below) are
generally rigid with a high elastic modulus. The purpose of these rigid components is to transfer angular recoil, such that the shooter’s body other than hand can absorb the recoil. As such, it is critical that these components can withstand the forces put on them by use, transport, and by firing without fracture (i.e., leave a high breaking point). The majority of these components are made of ceramics, metals, alloys, plastics or carbon fiber as would be understood by one of ordinary skill in the art. More specific examples of materials include anodized aluminum, reinforced aluminum composite, an aluminum alloy, a solid so with an aluminum matrix, a fiber-reinforced material with an aluminum matrix, titanium, titanium alloys, steel, stainless steel, iron, ferroalloys, woven carbon fiber, plastic, nylon, polyamide nylon, polymers, nylon 6, and carbon-fiber reinforced aluminum. In a preferred embodiment, these components are made from 2024 or 7075 anodized aluminum and stainless steel to achieve a high strength to weight ratio and good weather resistance.

It is to be understood that the brace can be designed to connect to any point of a shooter’s body other than the shooting hand and fingers. For example, the brace could be designed to connect to a shooter’s offhand for stability. Further, the brace could be designed to connect to the shooter’s shoulder. In the preferred embodiment, the brace would be designed to connect either above or below the forearm of the shooter. The brace could connect to the forearm of the shooter at any point from the wrist to the elbow and perform its intended function. A connection on the forearm closer to the elbow would allow for greater leverage against the recoil forces of the firearm with the pivot point being at or about the connecting point between the brace and the magazine. A connection at the other end of the forearm closer to and including the connection with the wrist is still possible but less comfortable to absorb the recoil forces being translated into a downward force as there is more bone and less muscle at that location. However, the brace could still be adapted to connect at any point on the underside of the forearm, up to and including the connection with the wrist because any resistance to the shooting hand pushing forward helps to stabilize the handgun, and at least partially prepare the wrist and forearm to accept the recoil forces when the handgun is fired. In the event that the brace is connected to the shooting hand’s wrist, the brace must lock the wrist in place or otherwise give some recoil energy to the wrist as translational momentum instead of pure rotational momentum compared to use without the brace.

Those skilled in the art will appreciate that a brace can be constructed as a single piece that is customized to the arm of the shooter, or it can be constructed with one or more pivot joints to allow for horizontal and/or vertical adjustment of the brace to better engage the arm (or other engaging body part) of the shooter. Further, the pivot joint(s) can be adjusted and locked using a number of locking mechanisms including but not limited to: bolts, nuts, wing-nuts, thumb-screws, knobs, pins, spring-loaded ratchet mechanisms, push button ratchet mechanisms, spring-loaded locking pins, and hand retractable spring-loaded locking pins.

EXAMPLES

Referring now to FIGS. 1-8, a first embodiment of the present invention is shown. Firearm 111 is shown with an embodiment of the present invention attached thereon. Magazine 110 is secured to replacement base plate 101. Fitting 102 is adapted to be mated with replacement base plate 101 by laterally sliding into the form-fit groove on replacement base plate 101, such that the inventive brace can ultimately be disconnected at this connection and to give some mechanical stability to the connection. The hand retractable spring plunger 103, combined with the general form-fitting natures of the fitting 102 and replacement base plate 101, mechanically secures the fitting 102 to replacement base plate 101. Arm 104 is threaded on its first end so that it can be screwed into a threaded opening in fitting 102. Arm 104 extends behind the replacement base plate 101 and is threaded at its second end such that it can be bolted into connector assembly 106, and locked in place with locking bolt 105. Forearm brace 108 is inserted into connector assembly 106 to a shooter’s preferred depth, angle and orientation, and then pin 107 is inserted into the back of the connector assembly 106 and engages the nearest locking hole in brace 108 to mechanically lock the brace relative to the connector assembly 106 and thus the entire device.
Compressible sleeve 109 is adapted to surround brace 108 to give cushion to the brace when it engages the shooter’s arm 112.

[0072] The hand retractable spring-loaded plunger in 103 can be replaced with a bolt, thumbscrew, or spring-loaded ball plunger to lock the fitting 102 to replacement baseplate 101. Fitting 102 can be adapted to mate with replacement base plate 101 by horizontally or vertically sliding into a form-fit groove on replacement base plate.

[0073] The brace could be made as one piece and sized to the shooter, with the brace attached to the adapter 202 via set screws 203. The brace could engage the arm of the shooter from one side as in embodiment 100, or could do so from both sides.

[0074] In another embodiment, pin 107 could be replaced with a hand retractable spring loaded plunger. In another embodiment, the entire rear assembly of brace 100 could be replaced with a strap mechanism which straps around the arm. In another embodiment, forearm brace 108 could be curved in the section that engages the arm of the shooter. Multiple sub-embodiments of this embodiment are possible depending on the degree of customization, adjustment, and weight tolerance desired by the shooter.

[0075] Referring now to FIG. 9, a second embodiment of the present invention is shown. Connection means 402 with an integrated spring-loaded ball plunger locking mechanism is connected to a brace and a handgun magazine. The brace has a compressive sleeve (i.e., cushion; not labeled). The brace is adapted with wing-nuts 401 that allows pivoting of the brace around that point to adjust the brace. One wing-nut is vertical allowing lateral adjustment. The other wing-nut is horizontal allowing vertical adjustment. In this manner, a magazine-mounted brace is provided that allows adjustment of the brace.

[0076] Referring now to FIG. 10, a third embodiment of the present invention 500 is shown. Revolver 510 is installed with a connecting grip 520 thereon. The connecting grip 520 has a female connecting component 530 integrated thereon. Accessory 550 is exemplified as a brace but may be any accessory that a shooter wishes to connect to the butt end of a revolver, such as a laser pointer or a monopod. Accessory 550 comprises male connecting component 540. Female connecting component 530 and male connecting component 540 are exemplified as dovetail in shape, but can be any reasonable shape that would tend to lock together and give mechanical stability to torsional forces down the pitch plane of the firearm. When spring-biased plunger 560 is withdrawn, male connecting component 540 can laterally slide into female connecting component 530 to create a connection with rotational, mechanical strength down the pitch plane of the revolver. Spring biased plunger 560 may then snap into place when connecting components 540 and 530 are mated, thereby creating a mechanically secure connection.

1. A mechanical device to secure an accessory to a firearm comprising:
   a firearm; and
   a first connecting component;
   wherein the first connecting component has a substantially constant cross-section laterally through the first connecting component, such that it allows a second connecting component with a complementary cross section to laterally slide into and secure itself to the first connecting component, such that the first and second connecting components lock together to prevent substantially all translational and rotational moment relative to each other.
2. The mechanical device of claim 1, wherein the firearm is a revolver.
3. The mechanical device of claim 2, wherein the first connecting component is integrated with the grip of the revolver.
4. The mechanical device of claim 2, wherein the first connecting component is secured to the bottom of the butt end of the revolver.
5. The mechanical device of claim 1, wherein the firearm is a pistol.
6. The mechanical device of claim 6, wherein the first connecting component is secured to or integrated with the pistol’s magazine.
7. The mechanical device of claim 1, wherein the first or the second connecting component comprises a pin, bolt, screw, or plunger and the other connecting component comprises a mechanism to lock with the pin, bolt, screw, or plunger, and wherein said pin, bolt, screw, or plunger can penetrate the mechanism to lock with the pin, bolt, screw, or plunger when the first and second connecting components are laterally mated to lock the first and second connecting components together.
8. The mechanical device of claim 1, wherein the cross section is a dove-tail.
9. The mechanical device of claim 1, wherein the cross section is a rail.
10. A structure for connecting an accessory to a firearm comprising:
    a connecting component; and
    a structural component;
    wherein the structural component is selected from the group consisting of: a firearm magazine baseplate, a firearm magazine, a firearm grip, or a firearm;
    wherein the connecting component comprises a first connecting element that is mechanically secured to, integrated with, or part of the structural component;
    wherein the first connecting element is adapted to connect to a second connecting element mechanically secured to, integrated with, or part of an accessory;
    wherein the first connecting element comprises a female or male component locking component, adapted to mate with the second connecting element of the opposite gender;
    wherein the plane formed by the intersection of the longitudinal axis of the barrel of a firearm and the substantially-mirrored plane through the grip of the firearm define a vertical symmetry plane for the firearm;
    wherein the first connecting element has substantially the same lateral cross-section across the component such that it is adapted to mate with the second connect element by sliding the male component into the female component orthogonally relative to the vertical symmetry plane, and
    wherein either the first or second connecting element comprises a bolt, screw, or plunger adapted to penetrate an orifice in the other connecting element such that when the male component is mated into the female component, the bolt, screw, or plunger can be inserted into the orifice to mechanically lock the two elements.
11. The device of claim 10, wherein the first connecting element is actually mechanically secured to, integrated with, or part of the accessory.

12. The device of claim 11, wherein the accessory is a brace.

13. The device of claim 12, wherein the accessory is a shoulder stock.

14. The device of claim 10, wherein the firearm is a revolver.

15. The device of claim 10, wherein the firearm is a pistol.

16. A method of attaching an accessory to a firearm comprising:
   providing a first connecting component, integrated with or adapted to be secured to a firearm or firearm magazine;
   providing a second connecting component, adapted to be connected to an accessory for a firearm, wherein the first connecting component has a substantially constant cross-section laterally through the first connecting component, such that it allows the second connecting component with a complementary cross section to laterally slide into and secure itself to the first connecting component, such that the first and second connecting components lock together to prevent substantially all translational and rotational moment relative to each other; and
   locking the second connecting component into the first connecting component.

17. The method of claim 16, wherein the firearm or firearm magazine is a revolver, and wherein the first connecting component is actively integrated with or secured to the butt of the revolver.

18. The method of claim 17, wherein the second connecting component is connected to or integrated with an accessory.

19. The method of claim 18, wherein the accessory is a brace.

20. The method of claim 19, wherein the accessory is a shoulder stock.