AMMUNITION LINKING AND DELINKING MECHANISM

Field of the Invention

[0001] The present invention generally relates to ammunitions. More particularly, the present invention relates to a device or apparatus for linking and delinking ammunitions of self-loading weapon.

Background of the Invention

[0002] In a field of warfare, where the soldiers are dealing with live and death situations, rapid and smooth firing can be essential to keep ones alive. Automatic firearms, such as machine guns, are designed to fire rounds, either through large-capacity magazine or ammunition belt. The amount of bullets held by magazines is generally limited, once finished, the firearms can be reloaded by replacing the emptied magazine with a loaded one. Typically, the bullets are kept independently without any linkage.

[0003] The ammunition belt, on the other hand, is provided for retaining and feed cartridges (or bullets) into firearm. Different feeding systems of the firearms require generally an associated ammunition belt to function properly. Many modern ammunition belts use disintegrating links that forms the ammunition belt. Each disintegrating links retain a single cartridge. In same cases, if not all, two or more ammunition belts can be link together to form a longer ammunition belt.

[0004] For example, an automatic grenade launcher fires the 40mm high velocity grenades that are belt-linked in belts of 32 rounds using M16A2 Links. Upon finishing the belt of ammunition, the crews have to open the feeder cover, load a new belt of grenades and ready the weapon. But during a combat situation whereby a huge volume of

continuous support firepower is required for area suppression of the enemy, a short delay would be experienced during engagement due to the need to load a new belt into the gun and such delay can be critical.

[0005] Another typical occurrence in the field is that some rounds and links could inevitably get damaged during handling or continuous firing, resulting in the users having to either break the damaged rounds off the belt and use the remaining rounds in shorter belts, or avoid using the remaining belt of ammunitions at all which lead to wastage. Accordingly, it is desired that each round on the belt can be link and delinking when necessary.

[0006] US patent serial no. US 3,254,565 issued to the United States of America as represented by the Secretary of Army on 7 June 1966 discloses a connector means for longitudinally displaceable cartridge belt link. As shown in **FIG. 1**, each cartridge **18** in the belt is firmly but slidably encircled by a correspondingly shaped link **22**. A connector **52** is assembled on each link **22**, which allows the cartridge to be joined together to form a belt form. The connector **52** has an enlarged rectangular head **62**. The connector **52** is freely rotatable on the link **22** in either direction about an axis parallel to the longitudinal axis of the link **22**. The connector **52** can be pushed into a keyhole slot **46** provided on a projected offset **44** of the link **22** to couple the two links **22**. The keyhole slot **46** provides has an opened slot to allow the connector **52** to slide through in and out in order to link and delink the cartridges.

[0007] With a proper construction, such ammunition belt has proven to be effective solution for ammunition belt. To ensure that each cartridge is properly connected to another, it is desired that the connector **52**, once pushed into the keyhole slot **46**, is

properly secured therein to maintain the ammunition belt form. It is also desired that once the links are attached to each other, it cannot be easily delinked by a soldier's bare hand. Accordingly, the keyhole is adapted with the opened slot smaller than the diameter connector. Such tight fit requires linking and delinking to be done through machine or other means. On the field, soldiers had to use screwdrivers and pliers to separate the grenade rounds if they wanted to reuse partial ammo belts – a process that took entirely too much time and effort in the fast pace of a war zone. De-linking with screwdrivers and other general tools also compromises the integrity of the metal, which can ultimately lead to weapon stoppage.

Summary of the Invention

[0008] One aspect of the present invention provides a coupling device for linking and delinking rounds/cartridges on an ammunition belt formed by a chain of shaped link. Each carrying one round/cartridge, wherein each shaped link having a keyhole slot and a connector. The coupling device comprises a pair of round holders abutting to each other along a longitudinal side thereof, the two round holders are slidable against each other along the longitudinal side, the round holders are adapted with a recess for holding one round each and a channel across the two round holders for receiving the connector and the keyhole slot, wherein operationally, when the two round holders are slid to disconnect the connector from the keyhole slot to delink the round.

[0009] In one embodiment, the round holders further comprise a guide for coupling the round holders. The guide is adapted to allow the round holders to be slidable against each other. The guide may be in a form of dovetail, groove and tongue joint, or the like along the longitudinal side.

[0010] In another embodiment, each round holder further comprises a holder bar extended sideway for operationally actuating the two round holders to slide. The round holder may further comprises a squeezer bar pivoted to the two holder bars at two respective pivot points, the squeezer bar having two handles at the two ends disposed alongside with the two holder bar, whereby squeezing the squeezer bar against the corresponding handle provides a class-two lever to slide the holder. It is possible that one handle of the squeezer bar is tilted from the corresponding handle. The handles may be telescopic handles.

[0011] The objectives and advantages of the invention will become apparent from the following detailed description of preferred embodiments thereof in connection with the accompanying drawings.

Brief Description of the Drawings

[0012] Preferred embodiments according to the present invention will now be described with reference to the Figures, in which like reference numerals denote like elements.

[0013] **FIG. 1** shows a known ammunition belt;

[0014] **FIG. 2** illustrates a coupling device in according to one embodiment of the present invention;

[0015] **FIG. 3A** illustrates the coupling device of **FIG. 2** with two separated rounds loaded thereon;

[0016] **FIG. 3B** shows that the two rounds in **FIG. 3A** are linked together through the coupling device;

[0017] **FIG. 4A** illustrates the coupling device of **FIG. 2** with two separated ammunition belts loaded thereon; and

[0018] **FIG. 4B** shows that the ammunition belts of **FIG. 4A** are linked together through the coupling device.

Detailed Description of the Invention

[0019] The following descriptions of a number of specific and alternative embodiments are provided to understand the inventive features of the present invention. It shall be apparent to one skilled in the art, however that this invention may be practiced without such specific details. Some of the details may not be described in length so as to not obscure the invention. For ease of reference, common reference numerals will be used throughout the figures when referring to same or similar features common to the figures.

[0020] **FIG. 2** illustrates a coupling device **100** in accordance with one embodiment of the present invention. The coupling device **100** is adapted as a portable device allowing user to link/delink the rounds on/from the ammunition belt. Preferably, the rounds are linked together via a chain of shaped links to form the ammunition belt. Specifically, the shaped link is a ring holder adapted for circumscribing each round. Each shaped links are connected on to another via a keyhole slot and a connector provided on the shaped link. The coupling device **100** comprises two round holders **102** and **104** abutting to each other along a longitudinal side thereof. The two round holders **102** and **104** are slideable against each other along a guide **106** provided at the common

longitudinal side. The guide **106** can be a dovetail joint along the common longitudinal side. Without departing from the scope of the invention or imposing any limitations, other joint or coupling means, such as a lap joint, a groove joint (with tongue on the other side), spline joint or the like, may also be desired.

[0021] The two round holders **102** and **104** are generally configured in a mirroring manner to each other. Each round holder **102** or **104** comprises a holder body **112** defining a recess **114**, and a handle shaft **116** extending from the lower part of the holder body **112**. The recess **114** is defined on a major surface of the holder body **112** forming the general shape of a desired round for retaining one round with the shaped link attached thereon. There is further provided a connector seat **108** on both longitudinal sides of each round holder. The connector seat **108** is shaped in a form of channel adapted to give way to the connector and the keyhole slot on the shaped link of the ammunition belt. The overall construction of the round holder does not require the recess **114** be covering the entire round, it is sufficient as long as the shaped link attached on the round is retained with the connector and keyhole slot seated and aligned thereon.

[0022] When the two round holders **102** and **104** are coupled to each other, and they are aligned, the connector seats **108** on both round holders **112** are also in alignment. Such alignment allows two rounds **302** on a linked ammunition belt to be retained thereon with the connector placed across the channels as shown in **FIG. 3B**. When the two round holders **102** and **104** are slid along the longitudinal axis, the two channels of the connector seat **108** offset thereby forcing the connector to slide out from the keyhole slot of the shaped links to delink the two rounds retained thereon as shown in **FIG. 3A**. Linking two unlinked rounds works in a reversed manner; one is required to simply place the two

rounds on the round holders with the connector of one round **302** properly rested beneath the keyhole slot of the adjacent round (see **FIG. 3A**), when the handles are being squeeze to align the round holders, the connector is being forced into the keyhole slot to link the two shaped link.

[0023] Preferably, the round holders **102** and **104** are adapted to provide channels **109** at the opposite side such that the two ammunition belts **402**, **404** can be connected as one as shown in **FIG. 4A** and **FIG. 4B**. Likewise, it is possible to utilize the coupling device **100** to delink an ammunition belt into two.

[0024] Still referring to the **FIG. 2**, the handle shaft **116** extending from the lower part of each round holder has a handle **122**, **124** extended sideway of the handle shaft **116**. The end of both handle shafts **116** are respectively pivoted apart to the middle part of a squeezer bar **126**. The two pivots act as a fulcrum of a class two (2) lever to provide leverage linkage to slide the two round holders **102**, **104** along their longitudinal side as aforementioned; the two sides of the squeezer bar **126** extend extended sideway alongside with the handle **122**, **124** act as the leverage handles for the corresponding the pivots. Operationally, only one sider of the squeezer bar **126** can be squeezed towards the handle of the same side, while the other pivots away. As the squeezer bar **126** is being pressed as the effort, the pivot point that is further away serves as the fulcrum where the pivot point that is nearer become the load to move (slide) the corresponding round holder against the other. Such configuration provides mechanical advantage to amplify the applied force (i.e. squeeze the handles) to aid the user to link/delink the rounds on the ammunition belt.

[0025] **FIG. 2** illustrates an embodiment where one side handle of the squeezer bar is configured to tilt away from the adjacent handle.

[0026] In one embodiment, the handles, inclusive those on the squeezer bar **126** are telescopic handles allowing the length of the handles to be extended to further amplify the applied force.

[0027] The present invention provides a portable device that is simple to operate. It allows the user to link/delink cartridges from an ammunition belt efficiently and effectively. In particular, the present device is suitable for ammunition belt that adapts keyhole slots and connectors as the connecting means. One such example is the M16A2 Cartridge Links adapted for 40mm high velocity grenades.

[0028] As the device provided in the present invention is able to link and delink the rounds easily, it is even possible to link a new ammunition belt onto an ammunition belt loaded on the firearm. Accordingly, it minimizes the exposure risk of army troops and ensures the continuous suppression of the enemy during combat situations.

[0029] When a round or linkage on an ammunition belt is damaged, this tool may also be used to remove the round together with the shaped link from the ammunition belt via delinking the damaged round and linking the rest of the undamaged rounds back together for continuous usage. No good rounds are required to be disposed any further.

[0030] For the sake of clarification, the shaped link for holding the round/cartridge thereon is adapted to with a keyhole slot and a connector disposed at diametrically opposed sides. Such keyhole slot is sometime referred to as a female connector, female toggle member or the like; and the connector is sometime referred to as male member, male toggle member/connector or the like.

[0031] The round holders are configured to hold the rounds/cartridges with the respective shaped link remained intact. The coupling device **100** is therefore able to link/delink the rounds by displacing the entire round together with the shaped link against another along its longitudinal direction to connect/disconnect the connector to/from the keyhole slot. It is also understood that the coupling device **100** is capable to link/delink the male connecting member with/from the female connecting member.

[0032] Referring back to the **FIG. 2**, the round holder **104** (i.e. the right holder) of the illustrated coupling device **100** is slidable in a positive displacement (the right) in relation to the round holder **102** (i.e. the left holder). Such positive displacement is able to link/delink the shaped links with the keyhole slot disposed on the left side of the round and the connector disposed on the right side of the adjacent round.

[0033] In an alternative embodiment, the round holder **104** of the illustrated coupling device **100** may be adapted to slide in a negative displacement in relation to the round holder **102**, for linking/delinking ammunition belt wherein the keyhole slot is disposed on the right side of the round, and the connector is provided on the left side of the adjacent round.

[0034] In a further embodiment, the coupling device **100** may be configured to offer both positive displacement and negative displacement between the two round holders. It is also possible that both handles of the squeezer bar **126** are tilted away from the neighboring handles.

[0035] While the present invention has been described with reference to particular embodiments, it will be understood that the embodiments are illustrative and that the invention scope is not so limited. Alternative embodiments of the present invention will

become apparent to those having ordinary skill in the art to which the present invention pertains. Such alternate embodiments are considered to be encompassed within the scope of the present invention. Accordingly, the scope of the present invention is defined by the appended claims and is supported by the foregoing description.

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CLAIMS

What is claimed is:

1. A coupling device for linking and delinking rounds/cartridges on an ammunition belt formed by a chain of shaped link, each carrying one round/cartridge, wherein each shaped link having a keyhole slot and a connector, the coupling device comprising:

a pair of round holders abutting to each other along a longitudinal side thereof, the two round holders are slidable against each other along the longitudinal side, the round holders are adapted with a recess for holding one round each and a channel across the two round holders for receiving the connector and the keyhole slot, wherein operationally, when the two round holders are slid to disconnect the connector from the keyhole slot to delink the round.

2. The coupling device according to claim 1, wherein the round holders further comprises a guide for coupling the round holders, wherein the guide are adapted to allow the round holders to be slidable against each other.

3. The coupling device according to claim 2, wherein the guide is in a form of dovetail along the longitudinal side.

4. The coupling device according to claim 2, wherein the guide is in a form of groove and tongue joint along the longitudinal side.

5. The coupling device according to claim 1, wherein each round holder further comprises a holder bar extended sideway for operationally actuating the two round holders to slide.

6. The coupling device according to claim 5, further comprises a squeezer bar pivoted to the two holder bars at two respective pivot points, the squeezer bar having two handles at the two ends disposed alongside with the two holder bars, wherein squeezing the squeezer bar against the corresponding handle provides a class-two lever to slide the holder.

7. The coupling device according to claim 1, wherein one handle of the squeezer bar is tilted from the corresponding handle.

8. The coupling device according to claim 1, wherein the handles are telescopic handles.