Nov. 21, 1961 E. A. KAMP ET AL 3,009,394

AMMUNITION LINK

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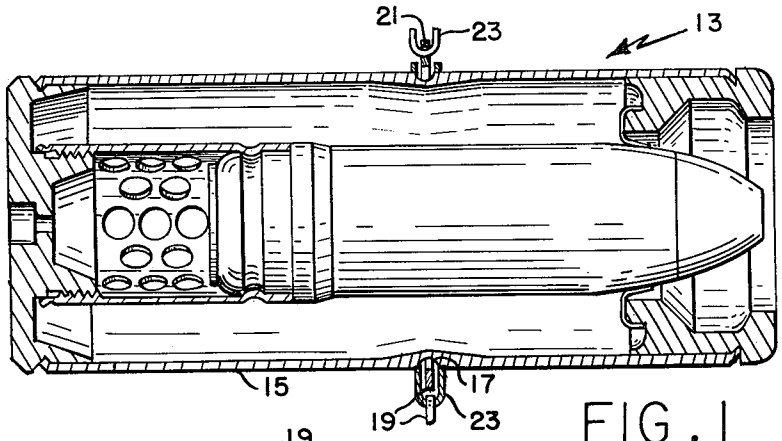


FIG. 1

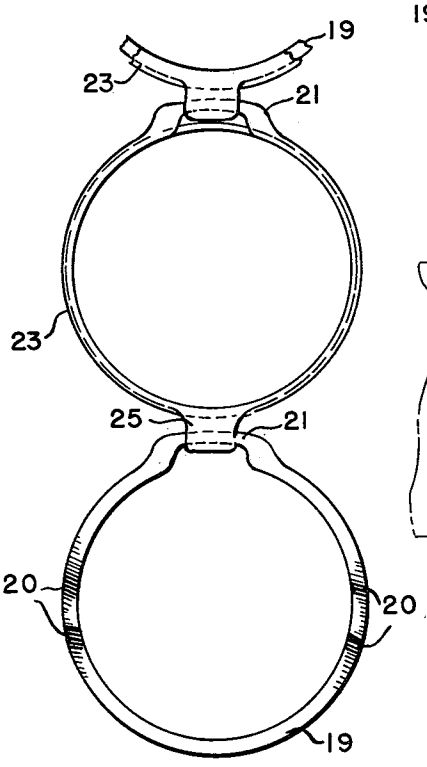


FIG. 2

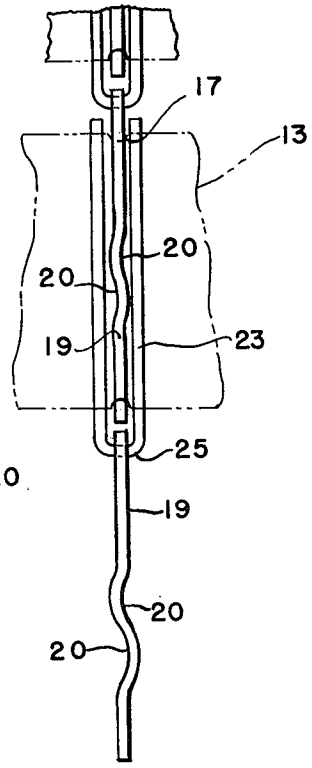


FIG. 3

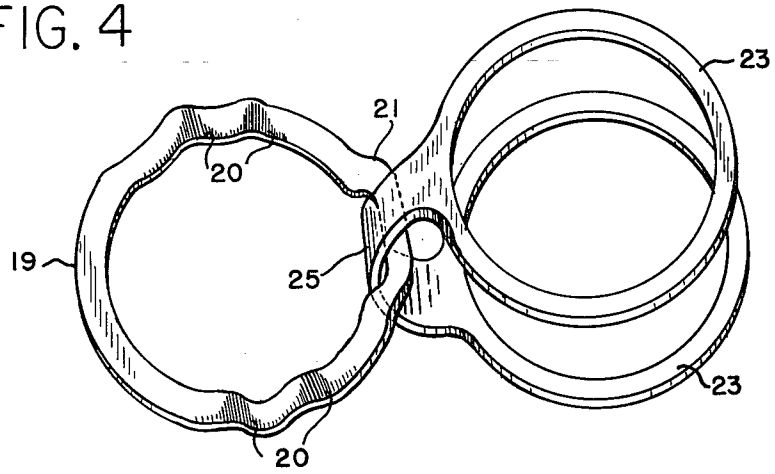
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FIG. 4



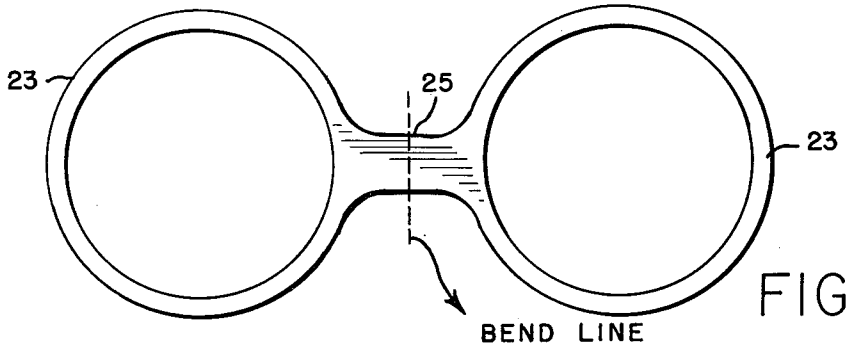


FIG. 5

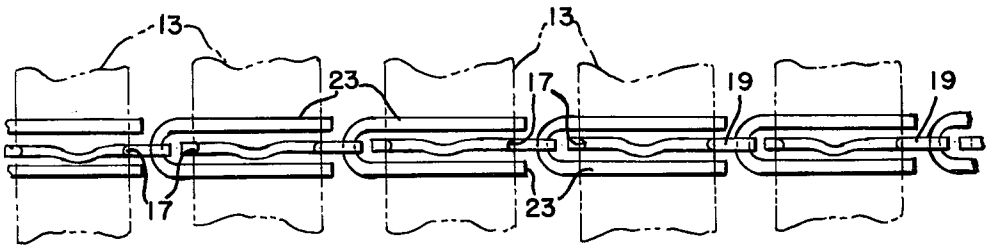


FIG. 6

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AMMUNITION LINK

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This invention relates to ammunition links which connect together to form an ammunition belt. More particularly, the invention is concerned with providing an ammunition link which, when formed into a belt, is sufficiently flexible to permit stacking, fanning, twisting, etc. of the belted rounds.

The installation of automatic cannon which are capable of extremely high speed operation on military aircraft has made it increasingly necessary to provide an ammunition belt which can be flexed in virtually all directions and yet is simple and reliable in operation. The design of modern military aircraft generally require that the ammunition magazines be located in comparatively accessible places which are usually remote from the guns or cannon. This makes it necessary to feed the ammunition along indirect paths and around other parts and equipment. Also, the ammunition belt must necessarily be sufficiently flexible to permit substantially universal movement of the cannon during the aiming and firing of the weapon. Thus, it can be seen that the belt must be capable of flexing, twisting and curving in both roll and fan in order to prevent jamming and gun failure as well as damage to the cannon or ammunition.

Accordingly, it is a primary object of the present invention to provide an improved ammunition link which, when loaded and connected to other identical links, forms an ammunition belt of the self-disintegrating type.

Another object of the invention is to provide an ammunition link which is simple and inexpensive to manufacture in production quantities using standard methods and machinery.

A further object of the invention is to provide an ammunition link which is unusually light and flexible, making it particularly adaptable for use on military aircraft.

A still further object of the invention is to provide an ammunition link which can be assembled to form an ammunition belt that is reliable and, because of its simple structure, is not subject to failures caused by careless assembly of the links.

Another object of the invention is to provide a link which can be quickly and easily attached to a round of ammunition and is easily located at the center of gravity of the round without requiring special tools or skill for assembly.

Other important features of the ammunition link described herein include its ready adaptability for use with telescoped rounds of ammunition. Also, because the link is so simple, and easily applied to the ammunition round, it is an improvement over presently known ammunition links which require various pins, springs, or other small parts for assembling. The link is simple in structure and can be easily and economically mass produced and fabricated.

These and other objects, features and advantages will become more apparent after considering the following detailed description of a preferred embodiment of the invention as shown in the accompanying drawings wherein like reference characters refer to like parts throughout the several views:

FIGURE 1 is a cross-sectional view of a conventional telescoped round of ammunition having an ammunition link attached according to the invention;

FIGURE 2 is a plan view of adjacent ammunition links;

FIGURE 3 is an end view of the links shown in FIGURE 2;

FIGURE 4 is a view in isometric enlarged to show the details of a single link of the belt;

FIGURE 5 is a plan view of a blank forming one section of the link as it appears before it is bent; and

FIGURE 6 shows the links attached to several adjacent rounds of ammunition, thereby forming an ammunition belt according to the invention.

Referring now to FIGURE 1, there is shown a telescoped round of ammunition designated by the reference numeral **13**. For illustration purposes, the type of ammunition pictured is split breech, 30 mm., surrounded by a steel case **15**. A shallow groove **17** is formed in the steel case **15** near the longitudinal center of gravity of the round and serves as a retaining slot for a portion of the cartridge belt link.

That portion of the link which is in engagement with groove **17** is an inner annular ring **19** (FIGURE 2) which is stamped or coined with a slight wave **20** in its surface. The annular ring **19** consists of a stamping having an offset portion **21** extending outwardly to form an ear-like projection on the edge of the ring. The inner edge of the projection **21** is farther from the center of the ring than the outside diameter of the ring itself, thereby allowing clearance between a portion of the ring **19** and the groove **17**.

An outer mating member **23** (FIGURE 5) having a bridge portion **25** which is dimensioned to engage and fit into the ear-like projection **21** of the inner annular ring **19**. The outer mating member **23** shown in FIGURE 5 comprises a pair of annular rings connected by a bridging strap **25**. At assembly, the mating member **23** is passed through the inside diameter of the annular ring **19** so that the bridging strap **25** is in the projection **21** and then the member **23** is bent along the bend line to form part of the structure shown in FIGURE 4. The inner annular ring **19** combined with the outer mating member **23**, as shown, forms a single link. When this link is combined with other identical links and ammunition rounds, an ammunition belt is formed.

The links are assembled into belt form by inserting an inner annular ring **19** of one link between the annular rings of the mating member **23** of an adjacent link. The round of ammunition **13** is then inserted through the three annular rings until the inner ring **19** falls into the retaining slot **17**. The two adjacent links are thereby locked together with the ammunition round functioning as a hinge pin or pintle. By repeating these assembly steps, a belt of any desired length can be made up (FIGURE 6).

The coined portion **20** of the inner annular ring **19** allows the ring to expand, permitting it to be slipped over the ammunition round. When the ring **19** reaches the slot **17**, it again contracts and falls in place in the slot. Since the annular rings of the mating member **23** are positioned on either side of the inner ring **19**, relative lateral movement of the link and round is thereby prevented.

Sufficient flexibility is given to the linked rounds to permit stacking and required twisting because the annular rings which comprise the mating member **23** are free to move in rotation. Also, clearance is allowed in the projection **21** between the bridge portion **25** of the mating member **23** and the body of the round **13** so that the linked rounds can fan freely. De-linking of the ammunition belt is accomplished in the reverse manner by withdrawing the round from the rings, thereby releasing the adjacent links.

Although the invention has been described with particular reference to one embodiment thereof, it will be understood to those skilled in the art that various changes

and modifications can be made therein without departing from the invention. For example, the wavy or corrugated portions **20** of annular ring **19** which are used to vary the inside diameter of the ring may be of other forms or shapes and might even include the formation of the annular ring similar to that of a C-ring, thereby relying on the elasticity of the metal used to form the ring in the plane of the ring. Also, the belt has been shown in use with 30 mm. telescoped rounds but with certain apparent modifications it can be adapted for use in feeding rockets to a rocket launcher. We intend, therefore, to be limited only by the full scope and spirit of the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. An ammunition link for receiving ammunition and cooperating with other similar links to form an ammunition belt, each of said links comprising a first annular ring member having corrugated portions for engagement with a slot in said ammunition, said first annular ring member being provided with an offset rim portion, a second member comprised of a pair of annular rings connected at their rims by a bridge portion, said bridge portion engaging said offset rim portion allowing relative angular motion between said first and second members, the annular rings of said second member being dimensioned to allow rotation of said second member with respect to the received ammunition.

2. An ammunition link as defined in claim 1 wherein the inner diameter of said first annular ring is smaller than the outside diameter of an ammunition round when said first annular ring is unstressed and larger than the outside diameter of said round when a stress is applied to said corrugations which tends to cause the said ring to approach a flattened condition.

3. In combination, a round of ammunition having an annular groove around its outer periphery at its center of gravity, a cartridge belt link, said link comprising a first annular member having corrugated portions, said first annular member being provided with a projecting ear portion, a second member having a pair of annular rings connected by a bridge portion, said bridge portion interconnected to said first annular member at said projecting ear portion, said first annular member being dimensioned to engage said annular groove in said ammunition round, thereby retaining both of said members in position.

4. The combination described in claim 3 wherein said first annular member is formed of a springy metallic material to allow temporary enlargement of its diameter without permanent deformation of the member.

5. The combination described in claim 3 wherein the annular rings of said second member are dimensioned so that their inner diameter exceeds the outer diameter of the ammunition round to allow for relative rotational movement between the round and said second member.

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