

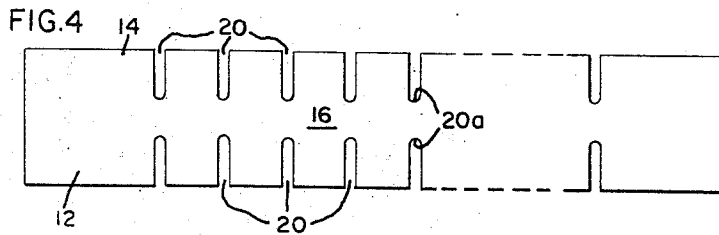
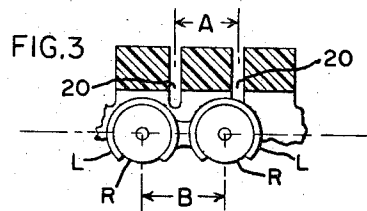
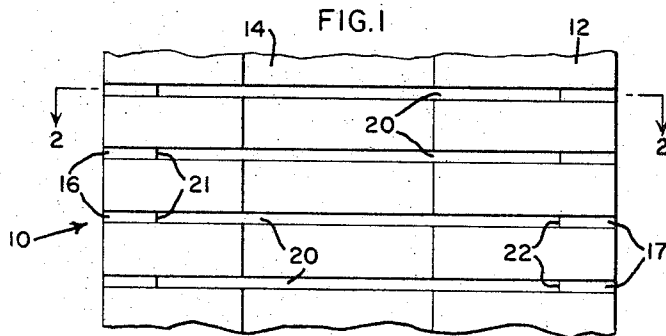
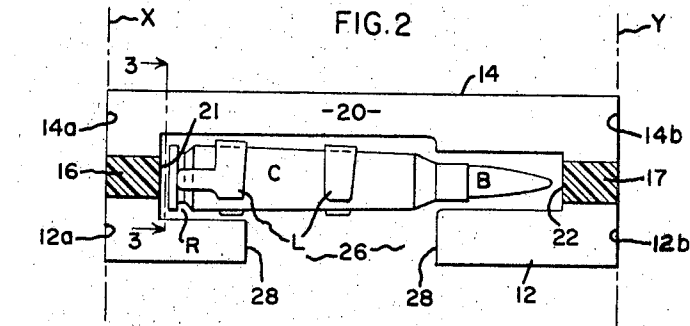
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FLEXIBLE ONE-PIECE CHUTE

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3,435,937

**FLEXIBLE ONE-PIECE CHUTE**

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4 Claims

**ABSTRACT OF THE DISCLOSURE**

A generally rectangular, flexible ammunition chute constructed of a non-metallic corrosion resistant plastic material and having spaced first and second pairs of generally rectangular walls forming a passageway therebetween, one pair of the walls having spaced kerfs lying in parallel planes perpendicular to the longitudinal axis of the chute.

This invention relates generally to improvements in chuting or conveyors for ammunition and like articles and, more particularly, to an integral chute formed of a non-metallic material including means enhancing chute flexibility while facilitating free and rapid movement of ammunition or articles therethrough.

There are currently a number of high rate of fire weapons employed in the Government arsenal suitable for use in guerilla-type warfare under adverse field conditions, e.g., high humidity and temperatures or heavy rainfall. Some of these weapons, particularly those of the Gatling-gun type, require that large quantities of ammunition be fed to the guns in an extremely short time period. Typically ammunition of this type, in the 7.62 mm. caliber or 50 caliber size, is supplied in belts. That is, individual cartridges are belted together using detachable links. It is desirable to provide chuting to facilitate smooth and rapid delivery of the belted ammunition from the container to the gun.

It is known to provide a flexible delivery path including chuting means capable of twisting and bending. Several of these conventional designs feature means designed to smooth the ammunition passage through the chute. However, these prior art devices leave much to be desired by way of cost, reliability, and sensitivity to climatic conditions. That is, most, if not all, are constructed of a plurality of interfitting metal parts with flexibility being provided by loose interconnection of the relatively movable chute segments. These chutes tend to suffer from kinking and corrosion and are prone to jam the ammunition when flexed, as well as being relatively costly to repair or throw away.

Accordingly, the general object of this invention is to provide an improved highly reliable, low cost flexible chute for conveying ammunition or the like in large quantities at high speeds between a container and a vibrating or relatively moving weapon or machine.

To this end, I have provided an article conveying chute extruded from a single piece of highly corrosion and temperature resistant non-metallic material, e.g., Teflon. In the disclosed embodiment the chute is used to deliver belted ammunition to a gun and thus, comprises a first pair of spaced, elongated walls defining the width of the chuting and a second pair of shorter walls joining the first pair of walls at the respective lateral edges thereof to form a general rectangular ammunition flow path between the walls.

A feature of the one-piece ammunition chute are means to enhance its flexibility comprising a plurality of parallel arranged, spaced cuts or kerfs through the first pair of walls only. Another feature, therefore, is that the uninterrupted second pair of walls provide smooth, low-friction surfaces upon which the respective base (primer)

and bullet ends of the cartridges can ride in their rapid passage through the flexing and twisting chuting.

In addition, where used with ammunition, for example, I arrange the mean distance between adjacent kerfs in a vernier relationship with respect to the mean distance between the cartridge longitudinal centers so that, effectively, the slotted first pair of walls presents a solid smooth surface to the relatively moving belt, while maintaining maximum flexure capability in the chute.

Other objects and advantages of my invention will be better understood and realized when the following detailed description is read in conjunction with several drawings of which:

FIG. 1 is a plan view of a portion of the novel, one-piece chuting of my invention;

FIG. 2 is a view along line 2 of FIG. 1;

FIG. 3 is a view along line 3 of FIG. 2 and illustrating the vernier feature; and

FIG. 4 is a side view of the chute of FIG. 1.

Referring now to the particular drawings, FIG. 1 is a segment of my improved chuting shown in plan view. The chute is an integral piece, preferably an extrusion, of a non-metallic or highly corrosion-resistant plastic material such as Teflon. The chute 10 comprises a first pair of walls indicated at 12 and 14. As seen in the drawings, the first pair of walls have an elongated rectangular shape in cross-section, being spaced apart and having their respective lateral edges, at 12a-12b and 14a-14b, lying in parallel planes X and Y, respectively. Joining the first pair of walls adjacent the respective lateral edges are a second pair of relatively short wall portions 16 and 17. The second pair of wall portions, also generally rectangular in cross-section, combine with and space the first pair of walls to provide a generally rectangular ammunition flow-path therewithin. As seen in FIGS. 2 and 4 in particular, the ammunition is typically of the belted variety comprising a plurality of cartridges, one of which is indicated in FIG. 2, having a case C, a bullet B and an extractor rim or primer end, R. A plurality of detachable links of known design, one of which is partially shown at L, provide the means for moving the ammunition from a container to the weapon (both not shown), usually by a known feeder gear arrangement (also not shown) attached to the belt at or near the weapon location.

As indicated, the chute facilitates the ammunition movement and must be flexible to compensate for relative movement between say, a gun mounted on a turret and a fixed, or otherwise relatively movable container. Obviously, in the case of conventional metal chuting as the chute whips and twists the belt being free to move sideways (left to right, and vice-versa, in FIG. 2) will cause the primer or the bullet ends, or both, to contact the sides of the chute. If the sides are formed of a series of loosely connected plates binding could occur as the bullet tip or extractor rim edges contact the edges of the segments.

The present invention provides both the necessary flexibility as well as a smooth path in a one-piece, low cost corrosion resistant chute. To this end, it will be noted that the first pair of walls 12 and 14 are cut by a plurality of kerfs, indicated at 20. The kerfs 20 do not, however, essentially extend into the wall portions 16 and 17, as can be seen in FIGS. 3 and 4, but rather each bottom at the level of the latter wall portion at a radius 20a. Thus, there are uninterrupted end walls having smooth surfaces at 21 and 22 opposing the primer end R and bullet end B of the cartridges at all times. These walls 16 and 17 also provide and function as strengthening ribs extending lengthwise of the one-piece chute 10.

Additionally, and in accordance with another feature of my invention, the path of the belted ammunition is

further smoothed by a vernier arrangement now to be described in detail. Turning to FIG. 3, it will be seen that the mean or average distance between adjacent kerfs 20 is indicated by dimension A. Conversely, the average or mean distance between the longitudinal axis or cartridge centers is indicated by dimension B. A and B are related in vernier fashion so that, along the entire length of the chute, only approximately one in four of the cartridge centers is in the same plane as a kerf at any instant. In effect, while the walls 12 and 14 are cut, to provide enhanced flexibility to the plastic one-piece conveyor 10, nevertheless the rapidly moving belt essentially sees a smooth surface at both of these walls.

FIG. 2 also illustrates a clearance slot 26 formed by two intermediate opposing edge portions 28—28 of wall 12. The slot provides access to and clearance for the cartridges, as well as adding flexibility.

What I claim and desire to secure by Letters Patent of the United States is:

1. A one piece chute having a longitudinal axis, for guiding ammunition along said longitudinal axis, comprising:

a first pair of substantially parallel, spaced apart, wall portions, each having a respective inner, mutually opposed surface, together defining the width of said chute transverse to said longitudinal axis;

a second pair of substantially parallel, spaced apart, wall portions, each having a respective inner, mutually opposed surface, together defining the height of said chute transverse to said longitudinal axis;

said first and said second pair of wall portions being mutually integral;

each of said first pair of wall portions having a plurality of kerfs therethrough, said kerfs lying in spaced apart, parallel planes, each perpendicular to said longitudinal axis, whereby said kerfs interrupt said first wall portions into subportions having limited mutual relative movement between adjacent subportions, to provide flexibility to said chute, while said uninterrupted and continuous second wall portions serve as ribs to provide strength to said chute; each of said inner opposed surfaces of said second wall portions being smooth, continuous and uninterrupted for providing a smooth guide surface for the respective primer and bullet ends of ammunition passing along said longitudinal axis through said chute, the respective ends of the ammunition being in intermittent sliding contact with said guide surfaces during said passage.

2. A chute according to claim 1,

wherein one of said first pair of wall portions has a slot therethrough extending longitudinally along said chute,

said slot providing access to and clearance for the ammunition, and also providing additional limited

mutual relative movement between adjacent subportions of said first wall portions and thereby additional flexibility to said chute.

3. A chute according to claim 1,

wherein said chute is extruded from a non-metallic, corrosion resistant plastic material having a low coefficient of friction, said material being substantially insensitive to temperature changes over the normal operating temperature range of said chute.

4. A loaded, one piece, belted ammunition chute, comprising:

a plurality of rounds of ammunition, each having respective primer and bullet ends, and immediately adjacent rounds being coupled together by belting means and thereby spaced apart at a first distance; said ammunition being disposed in a one piece chute having a longitudinal axis and including:

a first pair of substantially parallel, spaced apart, wall portions, each having a respective inner, mutually opposed surface, together defining the width of said chute transverse to said longitudinal axis;

a second pair of substantially parallel, spaced apart wall portions, each having a respective inner, mutually opposed surface, together defining the height of said chute transverse to said longitudinal axis; said first and second pair of wall portions being mutually integral;

each of said second pair of wall portions being integral and uninterrupted and said inner surface thereof being smooth, continuous and uninterrupted to provide a smooth guide surface for the respective ends of said rounds,

each of said first pair of wall portions having a plurality of kerfs therethrough, said kerfs lying in parallel planes, each perpendicular to said longitudinal axis with adjacent planes spaced apart at a second distance;

said first distance between said rounds and said second distance between said kerfs having a vernier relationship whereby said inner surfaces of said first pair of wall portions provides an effectively smooth guide surface to said rounds when moving relative thereto.

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EVON C. BLUNK, *Primary Examiner.*

U.S. Cl. X.R.