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(54) **FAST-LOAD LID ASSEMBLY FOR
PAINTBALL**

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(57) **ABSTRACT**

A lid assembly for a paintball hopper is disclosed, which reduces the paintball reload time. The lid assembly has an outer ring dimensioned to fit over a loading opening of the paintball hopper. A barrier member, such as an elastic membrane or plurality of flanges, is disposed across the inner perimeter of the outer ring such that the loading opening is substantially sealed. Also, a securing member is provided for securing the outer ring to the paintball hopper. A paintball hopper formed with the lid assembly described above is disclosed as well.

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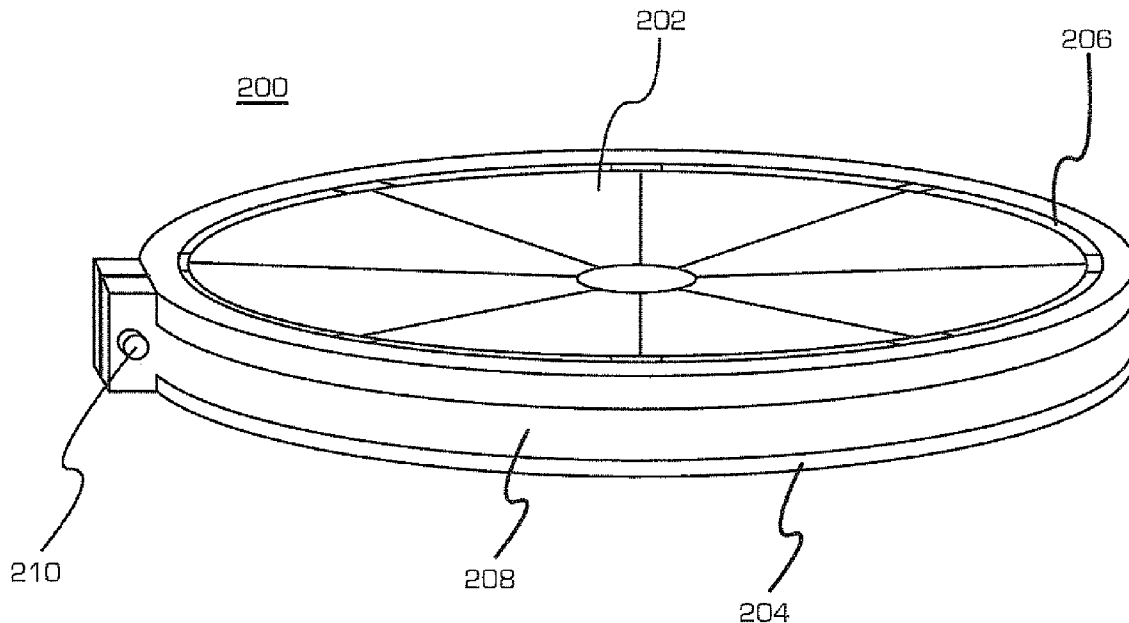


FIG 1
PRIOR ART

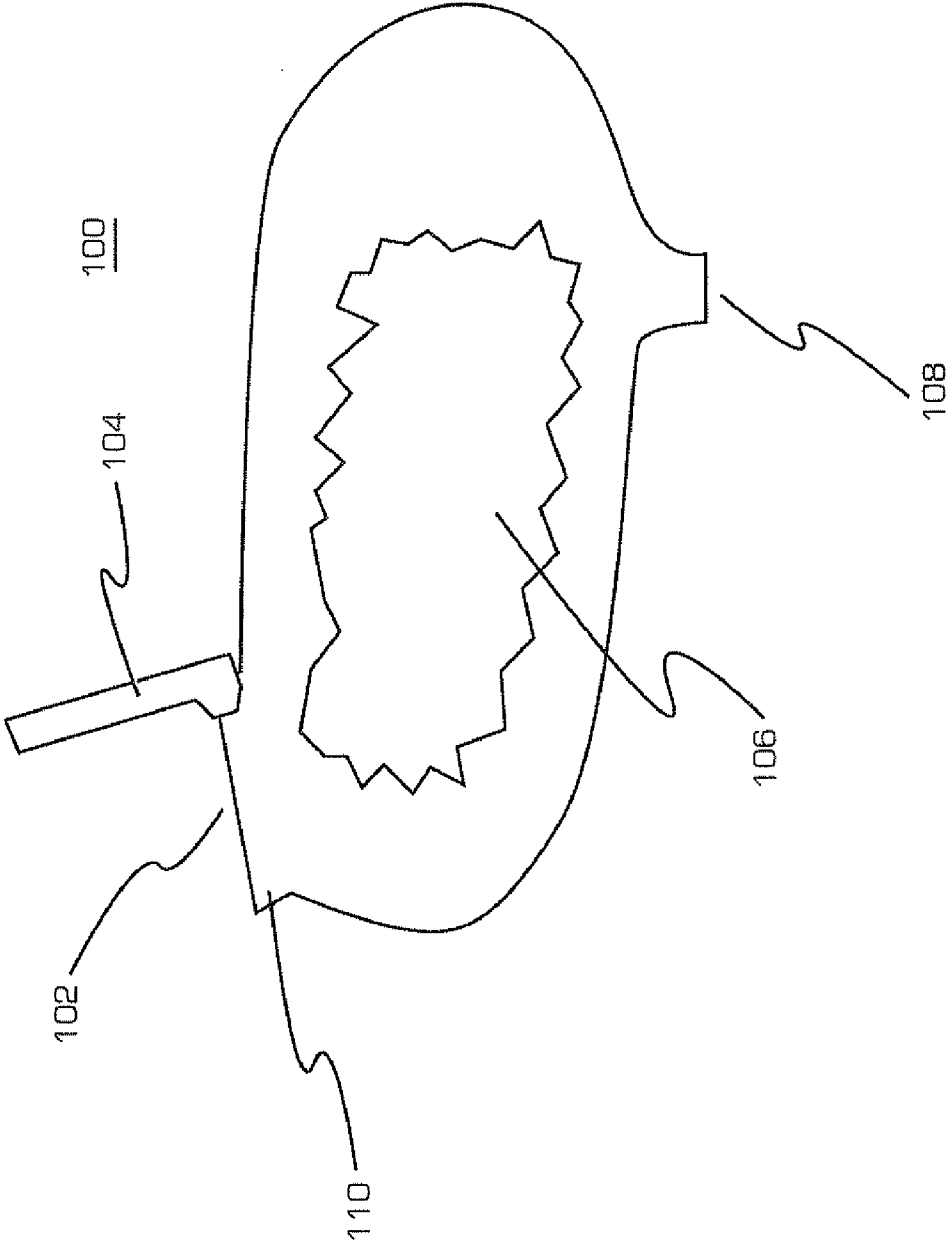


FIG 2

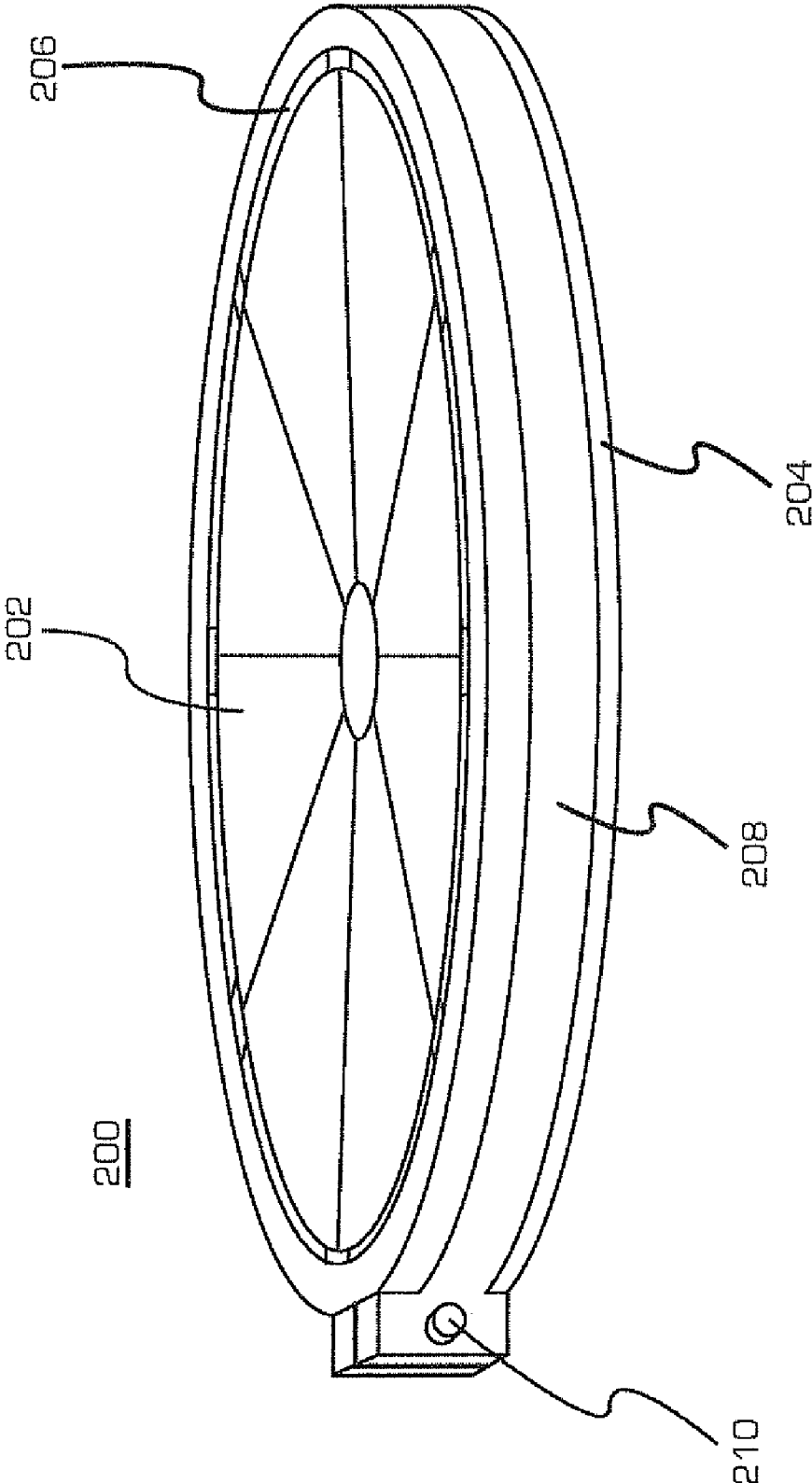


FIG 3

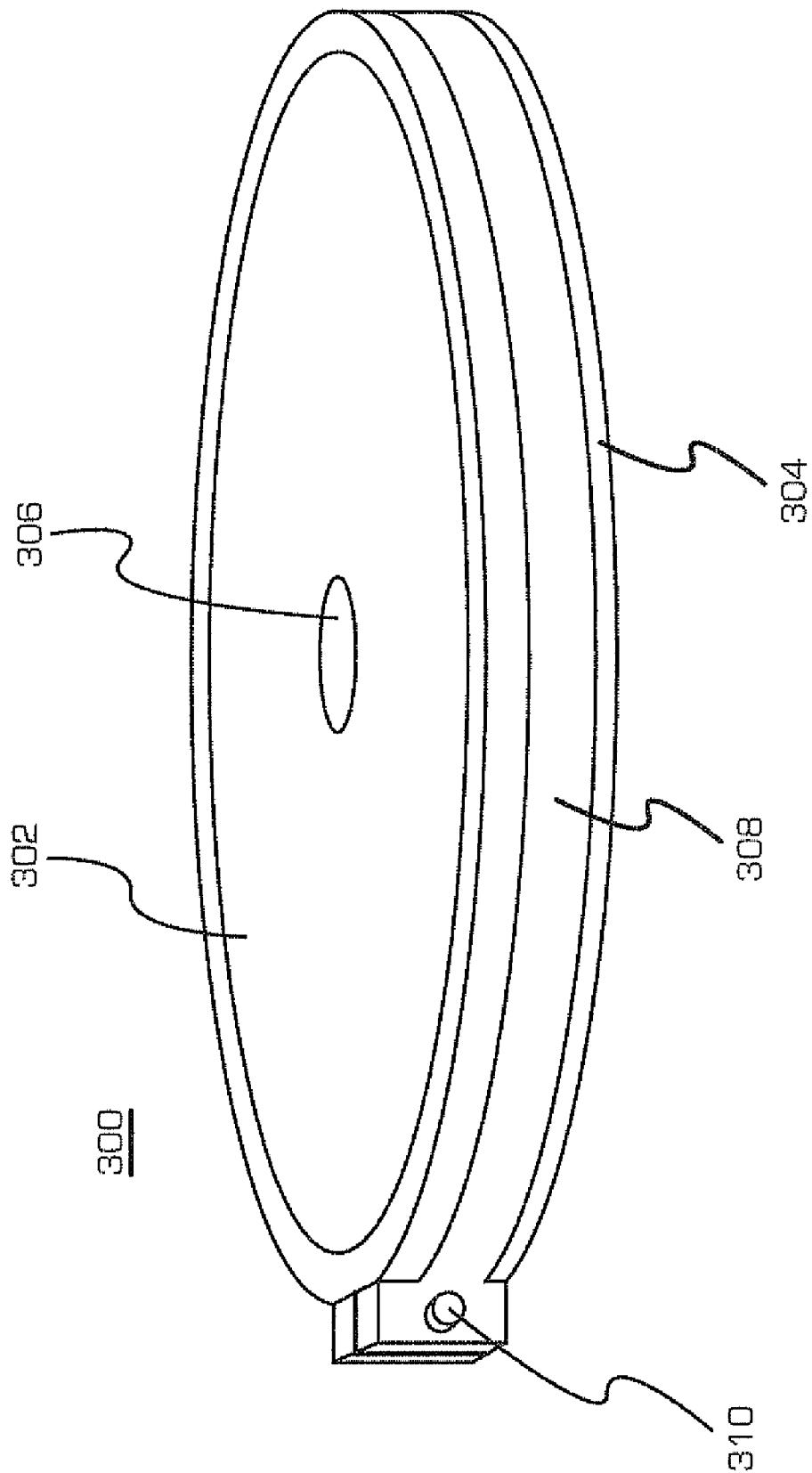


FIG 4

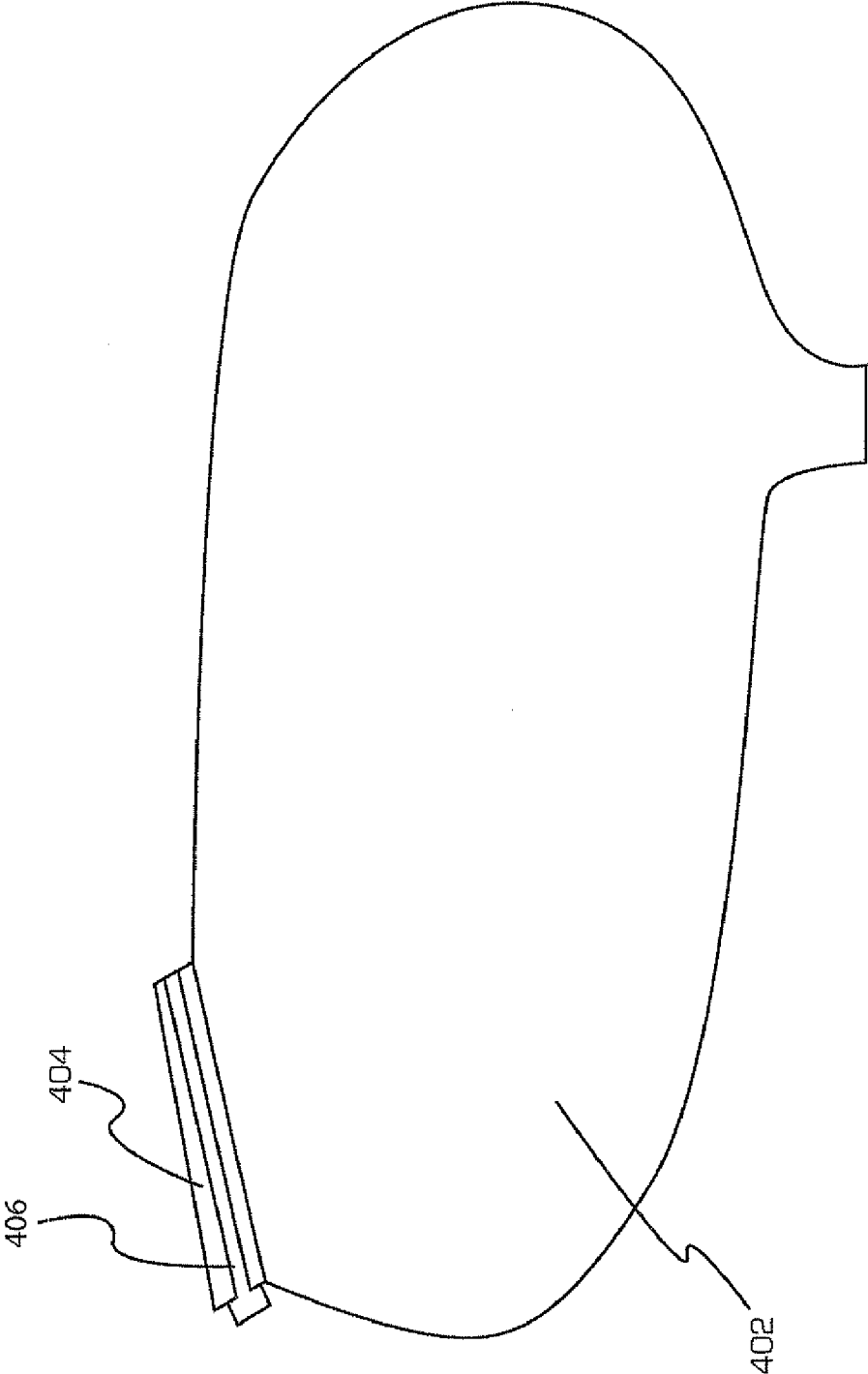
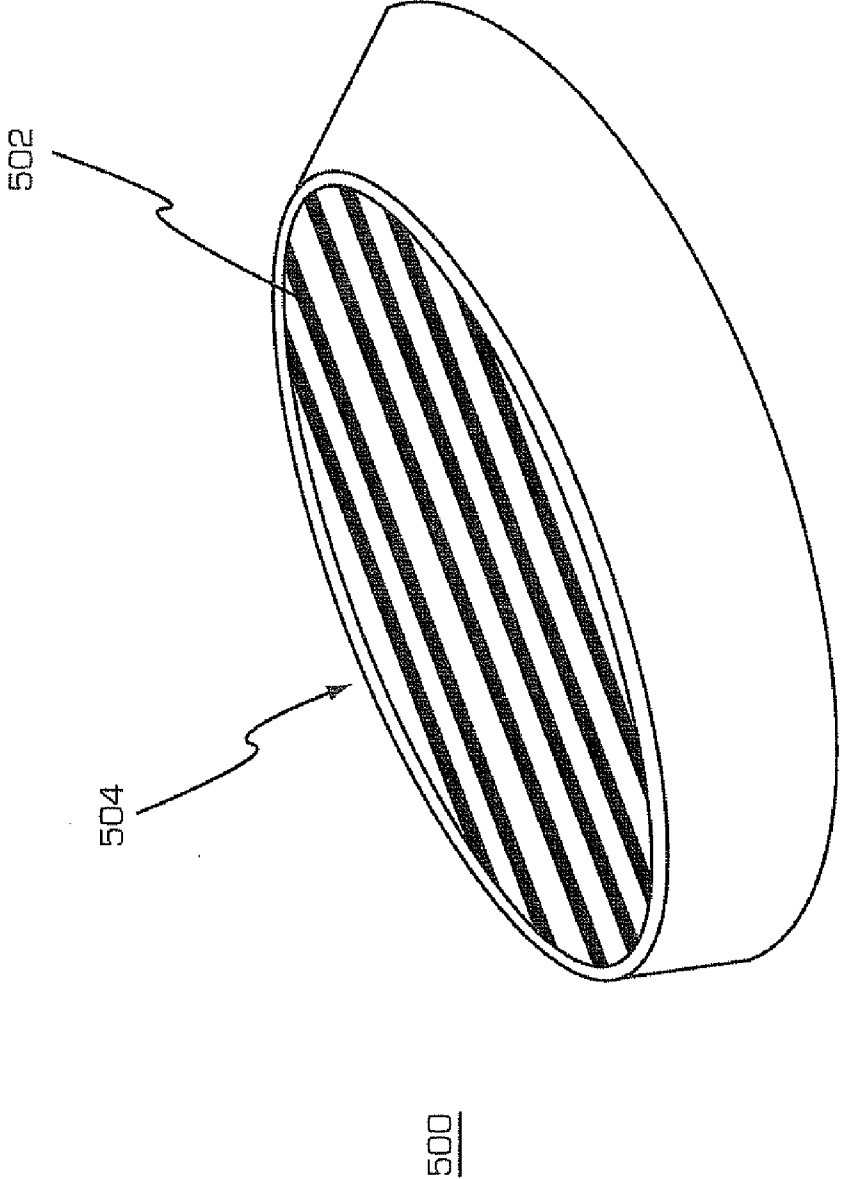


FIG. 5

PRIOR ART



**FAST-LOAD LID ASSEMBLY FOR
PAINTBALL**

I. FIELD OF THE INVENTION

[0001] The present invention relates generally to paintball equipment. More specifically, the present invention relates to a lid assembly for minimizing paintball loading time.

II. BACKGROUND OF THE INVENTION

[0002] Paintball has become a sport enjoyed by many people worldwide ranging from the weekend player to professional players. The sport of paintball can be very fast-paced and intense when played by teams of professional paintballers and generally any advantage is sought for maximizing a team's chances of defeating the opponent. To that end, paintball guns have been engineered with greater range, increased rate of fire, reduced jamming, and overall increased reliability.

[0003] However, the paintball guns have long had one limitation that has become more evident with the increase in the rate of fire of the paintball guns used at the professional level. The speed with which a paintball hopper can be loaded during a tournament has remained essentially unchanged. A player must first flip open a lid covering the opening of the paintball hopper, then open a new canister of paintballs and pour the new supply of paintballs into the hopper through the opening. The player then re-closes the lid on the hopper. In the heat of battle every moment spent in the process of loading a paintball gun leaves the player vulnerable to attack by the opponent side without any ability to mount a defense.

[0004] A player that is able to reload quickly can achieve a significant advantage over the opponents and thus increase the chances of winning. Therefore, a need exists for decreasing the amount of time needed to reload a paintball gun.

[0005] The Speed Feed™ offered for sale by Upfront Paintball Sports attempts to address the above-identified need in the paintball sport. As shown in FIG. 5, Speed Feed™ is a replacement lid 500 having flexible strips 502 spaced at regular intervals across the lid opening 504. The flexible strips deform when balls are pushed through with sufficient force. Thus the Speed Feed™ design allows for quick loading without the need to open a lid.

[0006] However, the Speed Feed™ product has several significant disadvantages. The flexible strips deform regardless of whether the balls are pushed from the outside or from the inside. Consequently, the paintballs have a tendency to fly out of the paintball hopper during game play.

[0007] Moreover, the Speed Feed™ design allows dirt and debris, such as leaves, twigs, grass, etc., to enter the paintball hopper. The dirt and debris can have a detrimental effect on the functioning of the hopper. For example, dirt can easily impair the proper functioning of the sensors used for feeding balls into the firing chamber of the paintball gun. While larger debris can block the feed opening of the hopper. In both cases paintballs would not be feed into the firing chamber of the paintball gun.

III. SUMMARY OF THE INVENTION

[0008] An embodiment of the present invention is a lid assembly dimensioned for mating with a paintball hopper. The lid assembly has an outer ring structure dimensioned to fit over an opening of the paintball hopper; and a barrier member disposed in an internal area formed by the outer ring structure.

The barrier member allows paintballs to pass through the barrier member when a predetermined force is applied. Also, the barrier member substantially seals the opening of the paintball hopper when the predetermined force is removed. In addition, the lid assembly has a securing structure for holding said lid assembly to said paintball hopper.

[0009] The barrier member can be formed as a plurality of radially disposed flanges and hinge members connecting each of the flanges to the outer ring structure. Alternatively, the barrier member can be formed of an elastic membrane having a small central opening. The small central opening expands upon application of a predetermined force.

[0010] Another embodiment of the present invention is a lid assembly having an outer ring structure dimensioned to fit over an opening of the paintball hopper; a plurality of radially disposed flanges; hinge member connecting each of the flanges to the outer ring structure; and a securing structure for holding the lid assembly to the paintball hopper.

[0011] Yet another embodiment of the present invention is a paintball hopper for use with a paintball gun. The paintball hopper includes a hopper body having a central chamber for holding a plurality of paintballs, a paintball feed tube insertable into a paintball gun for feeding paintballs into a firing chamber of the paintball gun, and an opening formed at a top portion of the hopper body for loading the paintballs into the central chamber; and a lid assembly disposed on the opening for preventing debris from entering the central chamber. The lid assembly has a plurality of radially disposed flanges connected to an outer ring by a hinge member.

IV. BRIEF DESCRIPTION OF THE DRAWINGS

[0012] These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings wherein:

[0013] FIG. 1 illustrates a conventional paintball hopper;

[0014] FIG. 2 illustrates an embodiment of a lid assembly in accordance with the present invention;

[0015] FIG. 3 illustrates another embodiment of a lid assembly in accordance with the present invention;

[0016] FIG. 4 illustrates a paintball hopper embodiment having a lid assembly in accordance with the present invention; and

[0017] FIG. 5 illustrates a conventional rapid loading lid assembly.

**V. DETAILED DESCRIPTION OF THE
INVENTION**

[0018] A conventional paintball hopper 100 is shown in FIG. 1. Generally a paintball hopper 100 has a opening 102 at a top surface for loading paintballs into a central chamber 106. A lid 104 covers the opening 102 when the paintball gun is in use. The lid 104 is pivoted open when the paintball hopper 100 is being reloaded. Paintballs flow from the chamber 106 through a feeder tube 108 into a firing chamber of a paintball gun (not shown).

[0019] Referring to FIG. 2, an embodiment of a lid assembly 200 is shown. The lid assembly 200 has a plurality of flanges 202 radially disposed around an internal perimeter of an outer ring 204, and hinge members 206. In addition, a securing member 208 is provided for securely fastening the lid assembly 200 to a paintball hopper 100.

[0020] Hinge members 206 can be formed as live hinges, and springs. Other appropriate means for providing pivoting of the flanges 202 when downward pressure is provided and returning the flanges 202 to their predefined resting position when downward pressure is removed, as well known in the art can be used as hinge members as well.

[0021] The outer ring 204 is dimensioned to fit over a lip 110 formed on the paintball hopper 100 and defining an opening 102 on the paintball hopper 110 for loading paintballs. Prior to fitting the lid assembly 200 over the opening 102, the conventional lid 104 is removed from the paintball hopper 100. Once fitted on the opening 102, the lid assembly is secured to the paintball hopper 100 using a securing member 208. The securing member 208 can be a clamp, as shown in FIG. 2, which wraps around the outer ring 204 and disposed with a screw 210 for tightening the clamp.

[0022] Alternatively, the securing member can be integrally formed on the outer ring 204 with a screw used for tightening the outer ring 204 around the lip 110 of the paintball hopper 100.

[0023] In another alternative, the securing member can be fashioned as an integral collar such that the lid assembly is securely held onto the hopper by a compressive, elastic force exerted by the securing member. As such, the securing member can be formed as an extension of the outer ring, where both portions are fabricated of an elastic material that can be stretched over the hopper opening.

[0024] It should be noted that some conventional paintball hoppers lack the lip 110 shown in FIG. 1. In such situations the lid assembly of the present invention can be dimensioned as necessary to mate with the opening and secured using such securing means as a strap disposed about a perimeter of the paintball hopper, adhesive applied between a surface of the lid assembly and the paintball hopper, and pressure exerting members that apply outward force between the perimeter of the lid assembly and the perimeter of the opening in the paintball hopper.

[0025] Additionally, in paintball hoppers lacking a lip 110, an adaptor fashioned to provide a lip could be used. The adaptor provides the benefit of accepting a standardized lid assembly rather than requiring that lid assemblies be specifically constructed and dimensioned for every model of paintball hopper with which they are to be used.

[0026] Moreover, an extender/riser can be used to increase the capacity of the paintball hopper. The extender/riser is formed to couple to the paintball hopper lip 100 or in the manner discussed above for hoppers lacking a lip 100. While the adaptor discussed above is intended to be as compact as possible while still providing the necessary coupling of the lid assembly with the lipless hopper, the extender/riser is intended to provide significantly more room between the lid assembly and the hopper central chamber. In this way the flanges have more room to pivot downward then might be available with certain hopper designs. Also, the added room can be utilized to hold more paintballs than would be contained within the central chamber alone. The riser/extender can be formed either as an adaptor or integral with the lid assembly. In either embodiment, the extender/riser is dimensioned substantially with a cylindrical cross-section.

[0027] Once the lid assembly 200 is secured to the paintball hopper 100, the weight of paintballs placed on the surface formed by the flanges 202 cause the flanges 202 to pivot downward into the chamber 106 thus allowing the paintballs to fall through the lid assembly and fill the chamber 106. With

the weight of the paintballs removed from the surface of the flanges 202, the hinge members 206 return the flanges 202 to the closed position, preventing dirt and dust from entering the chamber 106. Additionally, the hinge members 206 do not allow the flanges 202 to pivot upward. Consequently, the paintballs, once loaded into the paintball hopper 100, are prevented from accidentally falling out of the paintball hopper 100 through the lid assembly 200.

[0028] Alternatively, the lid assembly 200 can be constructed such that the opening of a paintball canister contacts the flanges 202. As the paintballer holds the paintball canister against the lid assembly 200, the downward force exerted by the contact between the paintball canister and the flanges 202 causes the flanges 202 to pivot downward, allowing the paintballs held in the paintball canister to pass through the lid assembly 200. The benefit in this design is that the hinge members can be made stronger since the flanges 202 are not required to pivot under the weight of a single paintball. Rather, the significantly greater weight of the canister and/or the force exerted by the paintballer while maintaining contact between the canister and the lid assembly 200 provides the necessary force for pivoting the flanges 202.

[0029] Another embodiment of a lid assembly 300 is shown in FIG. 3. In the present embodiment, the lid assembly 300 has an elastic membrane 302 instead of the flanges 202 shown in the embodiment of FIG. 2. The elastic membrane 302 is secured to or formed integrally with an outer ring 304. The outer ring 304, as in the previous embodiment, is dimensioned to fit over the opening 102 of the paintball hopper 100. Additionally, the elastic membrane 302 has a centrally formed oculus 306.

[0030] As with the previous embodiment, a securing member 308 fastens the outer ring 304 around the lip 110 of the paintball hopper 100. A tightening screw 310 provides the necessary adjustment of the securing member 308 so that the lid assembly 300 remains securely attached to the paintball hopper 100 regardless of any minor variations in diameter of the opening 102 from one model to another of the paintball hoppers 100.

[0031] As force is exerted downward on the elastic membrane 302, the oculus 306 expands to the point where a paintball can easily pass through the oculus 306. In addition the downward force applied deforms the elastic membrane 302 such that paintballs are guided directly to the oculus 306. The downward force is applied by the paintball canister as it is positioned and held in place for loading paintballs into the paintball hopper 100.

[0032] FIG. 4 shows a paintball hopper 402 with a lid assembly 404 installed. The lid assembly 404 is held securely to the paintball hopper 402 by the securing means 406. Alternatively, an embodiment of the present invention is a paintball hopper with a lid assembly of the type discussed above and shown in FIGS. 2 and 3. The lid assembly is either pre-installed or integrally formed during manufacture.

[0033] The described embodiments of the present invention are intended to be illustrative rather than restrictive, and are not intended to represent every embodiment of the present invention. Various modifications and variations can be made without departing from the spirit or scope of the invention as set forth in the following claims both literally and in equivalents recognized in law.

What is claimed is:

1. A lid assembly coupleable to a paintball hopper, said lid assembly comprising:

an outer ring structure dimensioned to fit over an opening of said paintball hopper; and
 a barrier member disposed in an internal area formed by said outer ring structure, said barrier member allowing paintballs to pass through said barrier member when a predetermined force is applied, said barrier member substantially sealing said opening of said hopper when said predetermined force is removed.

2. The lid assembly as in claim 1, further comprising a securing structure for holding said lid assembly to said paintball hopper.

3. The lid assembly as in claim 2, wherein the securing structure secures said lid assembly to said paintball hopper using compressive elastic force.

4. The lid assembly as in claim 2, wherein the securing structure secures said lid assembly to said paintball hopper using a clamping force maintained and adjusted using a clamp adjusting device.

5. The lid assembly as in claim 1, further comprising an adaptor assembly disposed between said lid assembly and said paintball hopper, said adaptor assembly including a securing structure for holding said adaptor assembly to said paintball hopper, and said lid assembly having a second securing means for holding said lid assembly to said adaptor assembly.

6. The lid assembly as in claim 5, wherein said adaptor assembly having an extended chamber formed between a top opening on which said lid assembly is disposed and a bottom opening disposed and coupled to said paintball hopper, said extended chamber providing expanded paintball holding capacity for said paintball hopper.

7. The lid assembly as in claim 1, wherein said barrier member comprises:
 a plurality of radially disposed flanges; and
 hinge member connecting each of said flanges to said outer ring structure.

8. The lid assembly as in claim 7, wherein said hinge member allows said flanges to pivot downward into said central chamber when a predetermined force is applied to a top surface of said flanges, returns said flanges to a sealing position when said predetermined force is removed, and prevents said flanges from pivoting outward.

9. The lid assembly as in claim 7, wherein said hinge member is a live hinge integrally formed with said flanges and said outer ring.

10. The lid assembly as in claim 7, wherein each of said flanges have a triangular shape dimensioned to form a substantially circular outer perimeter and each of two opposing sides of each said flange being oriented parallel with a side of an other of said flanges.

11. The lid assembly as in claim 1, wherein said barrier member is formed of an elastic membrane having a small central opening, said small central opening expanding upon application of said predetermined force.

12. A lid assembly coupleable to a paintball hopper, said lid assembly comprising:
 an outer ring structure dimensioned to fit over an opening of said paintball hopper;
 a plurality of radially disposed flanges;
 hinge member connecting each of said flanges to said outer ring structure; and
 a securing structure for holding said lid assembly to said paintball hopper.

13. The lid assembly as in claim 12, wherein said hinge member allows said flanges to pivot downward into said central chamber when a predetermined force is applied to a top surface of said flanges, returns said flanges to a sealing position when said predetermined force is removed, and prevents said flanges from pivoting outward.

14. The lid assembly as in claim 12, wherein said hinge member is a live hinge integrally formed with said flanges and said outer ring.

15. The lid assembly as in claim 12, wherein each of said flanges have a triangular shape dimensioned to form a substantially circular outer perimeter and each of two opposing sides of each said flange being oriented parallel with a side of an other of said flanges.

16. A paintball hopper for use with a paintball gun, said paintball hopper comprising:

a hopper body having a central chamber for holding a plurality of paintballs, a paintball feed tube insertable into a paintball gun for feeding paintballs into a firing chamber of said paintball gun, and an opening formed at a top portion of said hopper body for loading said paintballs into said central chamber; and

a barrier member disposed on said opening for preventing debris from entering said central chamber, said barrier member allowing paintballs to pass through said barrier member when a predetermined force is applied, said barrier member substantially sealing said opening of said hopper when said predetermined force is removed.

17. The paintball hopper as in claim 16, wherein said barrier member comprises:

a plurality of radially disposed flanges; and
 hinge member connecting each of said flanges to a perimeter of said opening.

18. The paintball hopper as in claim 17, wherein said hinge member allows said flanges to pivot downward into said central chamber when a predetermined force is applied to a top surface of said flanges, returns said flanges to a sealing position when said predetermined force is removed, and prevents said flanges from pivoting outward.

19. The paintball hopper as in claim 17, wherein said hinge member is a live hinge integrally formed with said flanges and said outer ring.

20. The paintball hopper as in claim 17, wherein each of said flanges have a triangular shape dimensioned to form a substantially circular outer perimeter and each of two opposing sides of each said flange being oriented parallel with a side of an other of said flanges.

21. The paintball hopper as in claim 16, wherein said barrier member is formed of an elastic membrane having a small central opening, said small central opening expanding upon application of said predetermined force.

22. A paintball hopper for use with a paintball gun, said paintball hopper comprising:

a hopper body having a central chamber for holding a plurality of paintballs, a paintball feed tube insertable into a paintball gun for feeding paintballs into a firing chamber of said paintball gun, and an opening formed at a top portion of said hopper body for loading said paintballs into said central chamber; and

a lid assembly disposed on said opening for preventing debris from entering said central chamber, said lid assembly having a plurality of radially disposed flanges connected to an outer ring by a hinge member.

23. The paintball hopper as in claim 22, wherein said hinge member allows said flanges to pivot downward into said central chamber when a predetermined force is applied to a top surface of said flanges, returns said flanges to a sealing position when said predetermined force is removed, and prevents said flanges from pivoting outward.

24. The paintball hopper as in claim 22, wherein said hinge member is a live hinge integrally formed with said flanges and said outer ring.

25. The paintball hopper as in claim 22, wherein each of said flanges have a triangular shape dimensioned to form a substantially circular outer perimeter and each of two opposing sides of each said flange being oriented parallel with a side of an other of said flanges.

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