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(54) **PAINTBALL GUN DEVICE**

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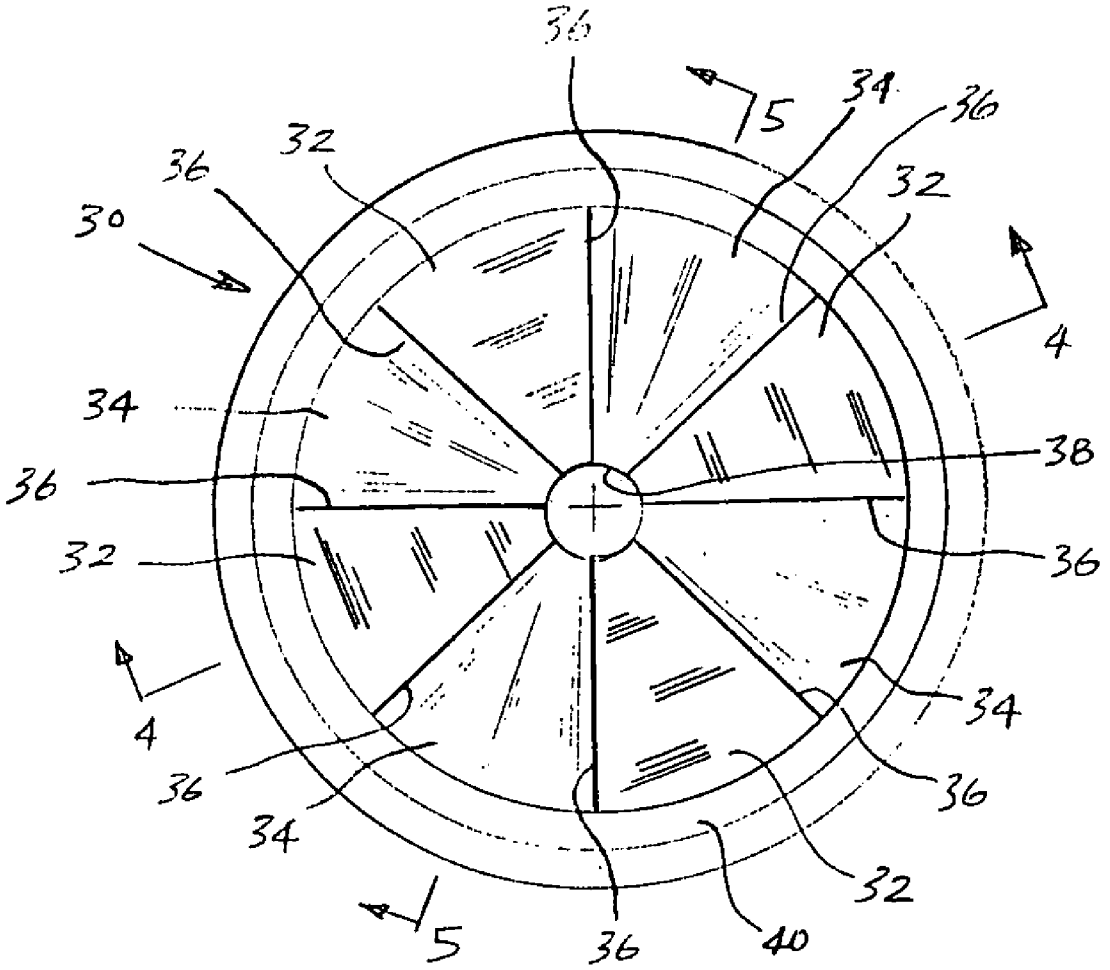
(57) **ABSTRACT**

A quick load paintball device, and quick load hopper device.



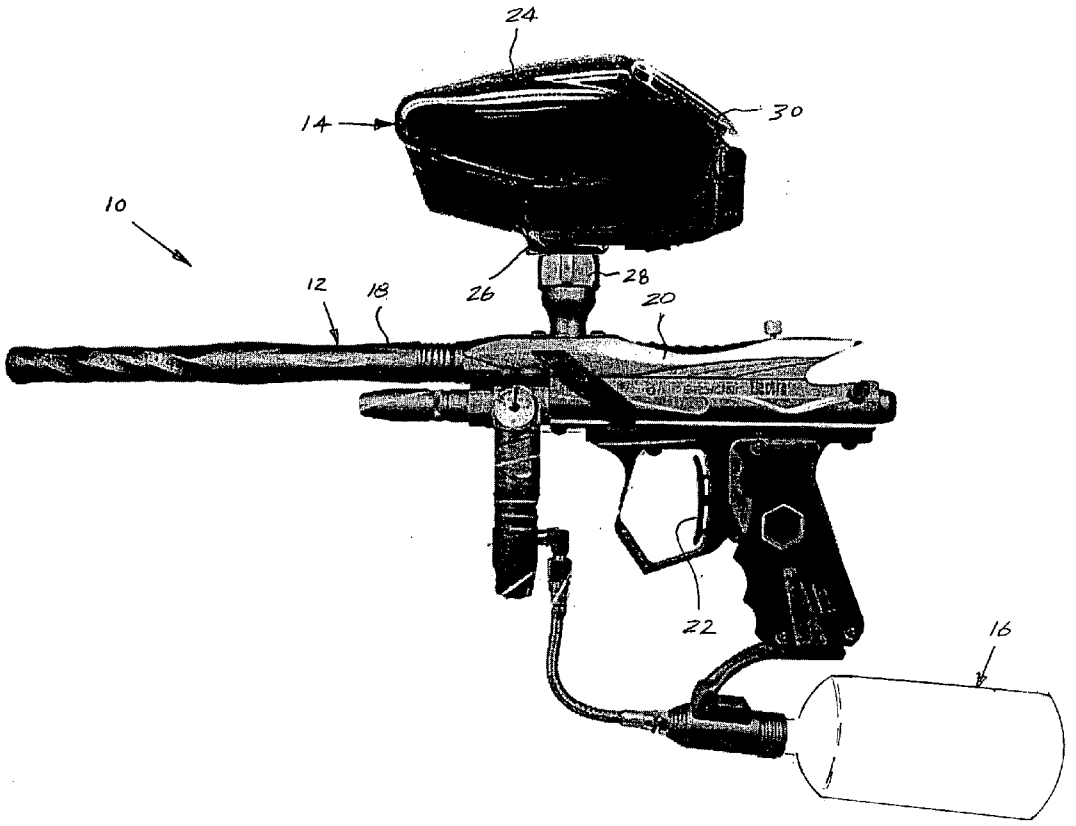


FIG. 1

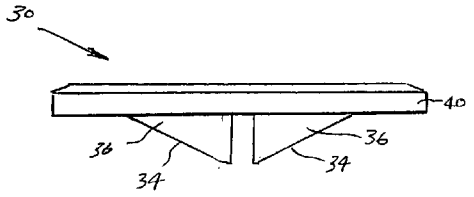


FIG. 2

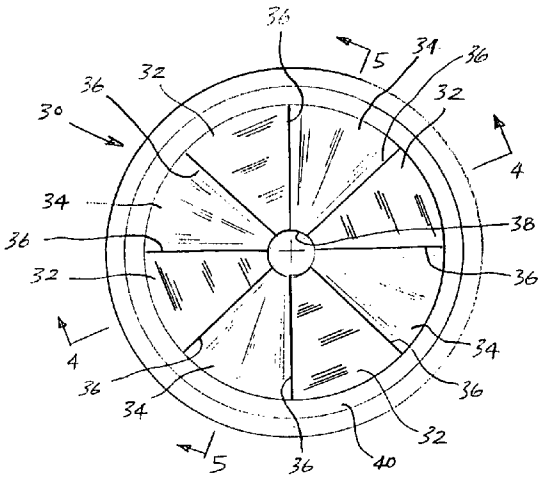


FIG. 3

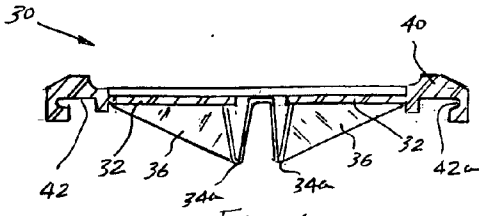


FIG. 4

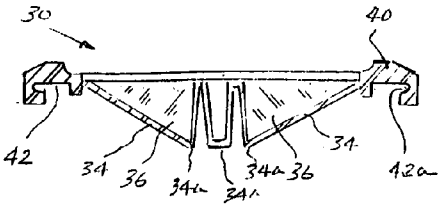


FIG. 5

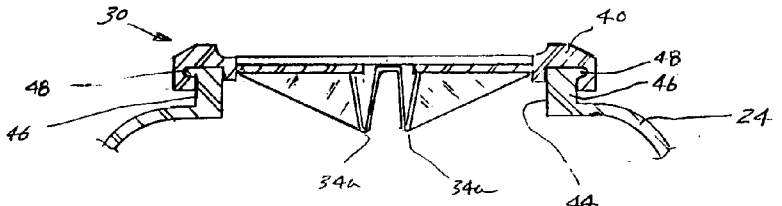


FIG. 6

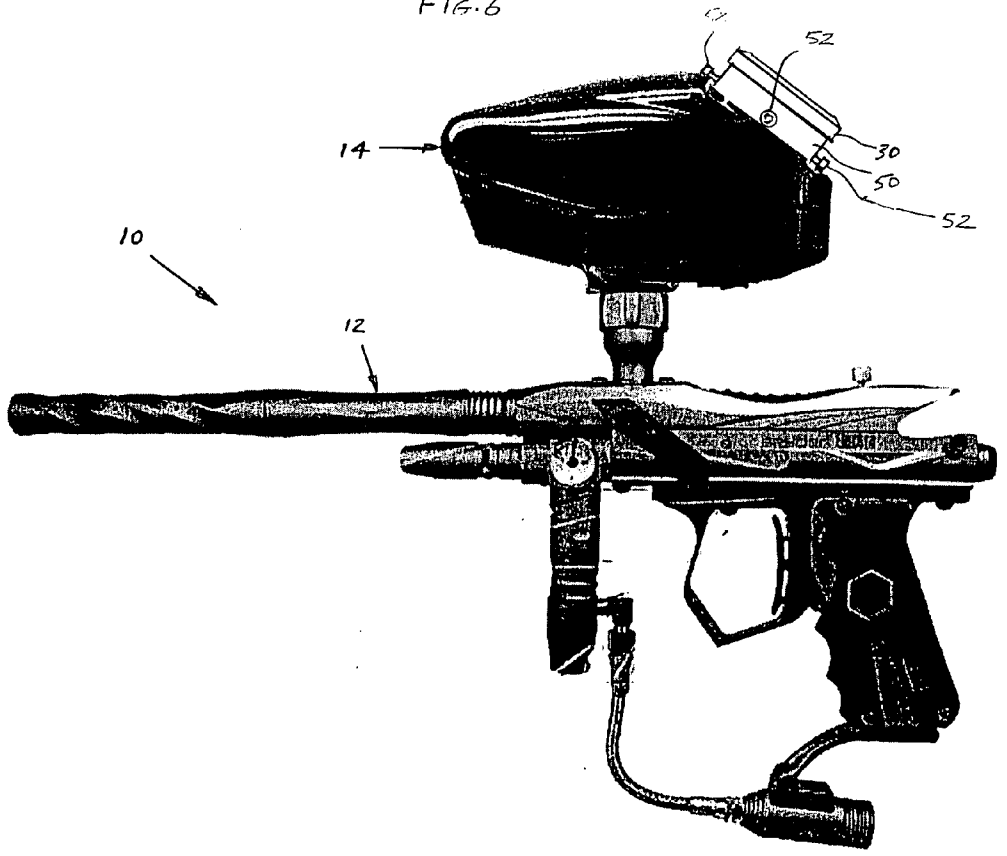


FIG. 7

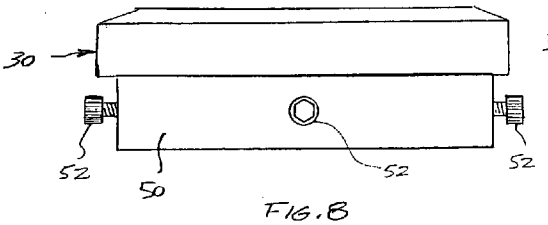


FIG. 8

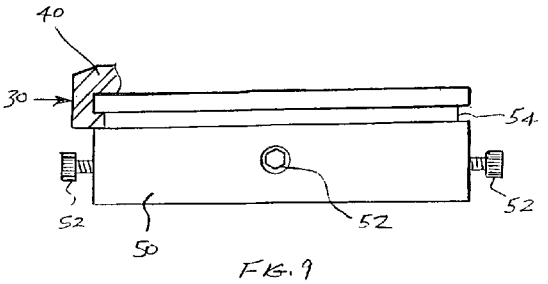


FIG. 9

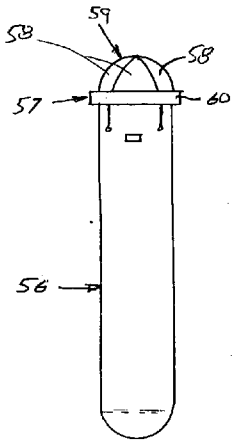


FIG. 10

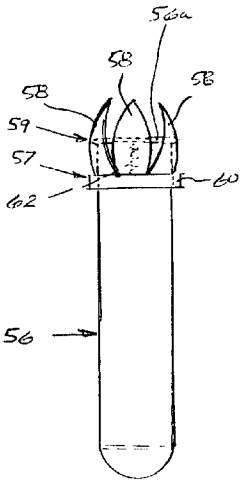


FIG. 11

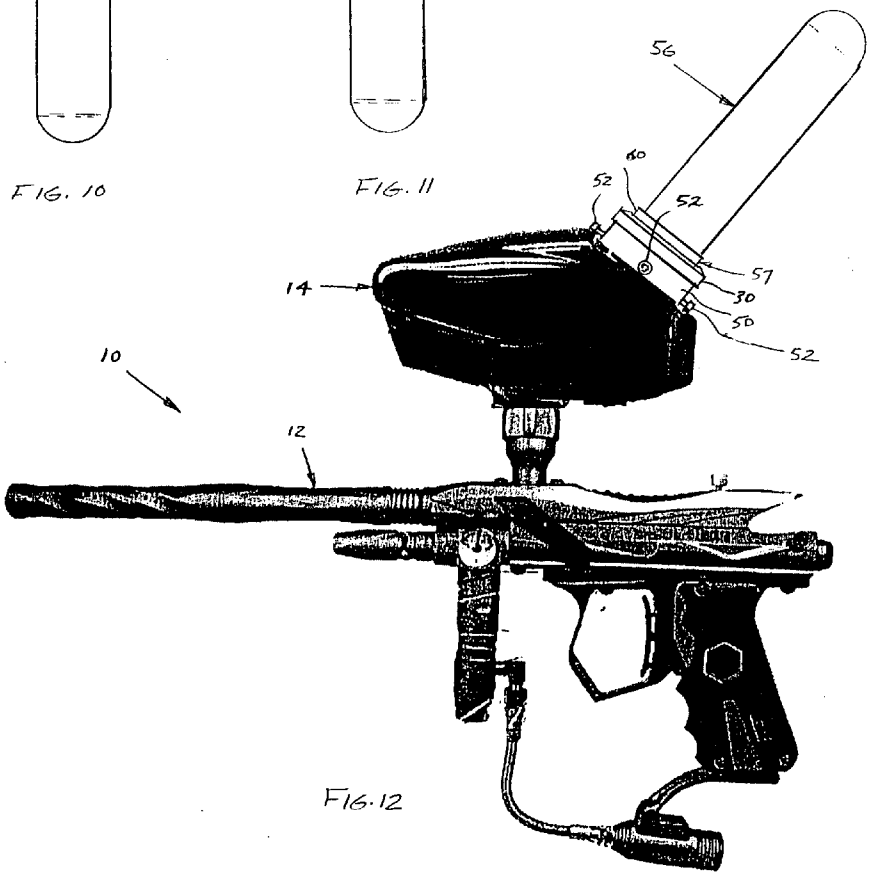


FIG. 12

PAINTBALL GUN DEVICE

FIELD OF THE INVENTION

[0001] The present invention is directed to a paintball gun device, in particular to a rapid paintball hopper loading device.

BACKGROUND OF THE INVENTION

[0002] The sport of paintball is fast growing in the United States attracting the interest of children, teenagers, young adults and even older adults. One of the key promotion aspects to paintball today is the numerous paintball tournaments held locally, regionally, statewide and even countrywide. The tournaments attract the very best players throughout the states due to both the competitive aspect of the sport, and now the significant promotional revenues being paid to the top players.

[0003] The tournaments test and showcase a variety of skills of the players, including speed, agility and aiming precision of the players. The paintball guns have hoppers for containing and storing a significant quantity of paintballs when associated with the paintball gun. Most paintball hoppers are filled by opening the top of the hopper (i.e. lifting up or removing a plastic flap or cap), and then loading the paintballs from a hand-held container into the hopper. The initial fill of paintballs into the hopper prior to the start of the tournament is easy to achieve, since there is no action taking place. However, when filling or loading the hopper of the paintball gun during actual play of the tournament, loading the hopper of the paintball gun becomes significantly more difficult and problematic. Specifically, it becomes difficult to open and quickly and accurately fill the hopper when other players are aiming and shooting at the subject player and the subject player is simultaneously returning fire during the filling operation. Many times a significant number of paintballs are spilled or otherwise lost or wasted from the player's limited supply of ammunition when attempting to pour paintballs from the container into the hopper. Further, the filling process makes the player a larger profile and significantly distracts the players attention greatly increasing the risk and chance the player will be hit by a paintball and knocked out of the competition during the paint ball filling process.

[0004] It is desirable to load the paintball hopper as fast as possible using a separate container storing paintballs. Typically, a player utilizes multiple separate containers removably attached or affixed to clothing and/or an accessory(ies) (e.g. pants, shirt, jacket, vest, belt, holster or other paintball holder). Further, it is desirable to load the paintball hopper as easy as possible with a single hand or even partly hands free.

[0005] Again, during a tournament the player is significantly more likely to be shot and eliminated from the tournament when attempting loading the paintballs into the hopper due to the higher profile of the player using a separate container of paintballs (i.e. separate container and/or hand(s) of player is exposed holding container above hopper). Thus, there exists a substantial advantage in loading the hopper from a separate container as fast as possible with little use of a single hand (i.e. almost hands free) to reduce the risk and chances of being shot and eliminated from the tournament.

[0006] Thus, there exists a need for faster paintball loading process into a paintball gun, particularly during action play during a tournament. Further, it is advantageous that the hopper can be filled with paintballs with either a single hand or hands free during the filling operation. The present invention significantly speeds up the loading of paintballs from a separate container into the hopper of the paintball gun, and allows for a single hand or hands free transfer during the paintball loading process.

SUMMARY OF THE INVENTION

[0007] A first object of the present invention is to provide an improved paintball gun device.

[0008] A second object of the present invention is to provide an improved hopper device for a paintball gun.

[0009] A third object of the present invention is to provide an improved paintball gun hopper filling arrangement.

[0010] A fourth object of the present invention is to provide a quick load paintball device.

[0011] A fifth object of the present invention is to provide an improved paintball gun hopper loading system.

[0012] A sixth object of the present invention is to provide a paintball gun device including a hopper device having a diaphragm flap valve arrangement.

[0013] A seventh object of the present invention is to provide a paintball gun device including a hopper device having an opening configured to be opened by a separate container of paintballs.

[0014] The present invention is directed to an improved paintball gun device, an improved hopper device for a paintball gun, an improved paintball loading system for a paintball gun device, and an improved process or method of loading paintballs into a paintball gun device.

[0015] The paintball gun device according to the present invention, preferably includes a paintball hopper. The paintball hopper is preferably removably connected to the paintball gun device, however, the paintball hopper can be more permanently connected to the paintball gun.

[0016] The paintball hopper device includes an upper fill opening. The paintball hopper device can be made of a variety of different materials including plastic, metal, composite, fiberglass, graphite, Kevlar, or other suitable material. Preferably, the paintball hopper device according to the present invention is an injection molded plastic article. The opening of the paintball hopper device according to the present invention is provided with a closure, in particular a specialized closure that allows the opening to be opened and closed by forcing paintballs by hand through the closure, or using a separate container configured for opening the closure. Optionally, the paintball device can include the primary specialized closure in combination with a secondary closure (e.g. snap cap, screw closure) to provide a double closure during storage, transport, or non-use of the paintball gun device.

[0017] The specialized closure of the paintball hopper device according to the present invention is preferably includes a resilient diaphragm flap valve configured to be opened by use of force (e.g. forcing paintballs by hand (e.g. fingers) through the specialized closure or using a separate specialized paintball loading pod or container). Preferably,

the resilient diaphragm flap valve is configured to automatically close due to its resilient nature when the force is removed. The separate storing and loading container can be provided with a closure (e.g. snap fit lid or screw cap closure) for securely storing the paintballs within the container. The upper end of the separate storing and loading container can be configured to cooperate with and actuate or otherwise open the specialized closure of the paintball hopper to allow paintballs to be gravity fed from the separate container into the hopper device. Specifically, when the upper end of the separate container is tilted and forced into the specialized closure of the hopper device, the resilient diaphragm flap valve of the specialized closure is opened to allow paintballs to be poured from the separate container into the hopper device. For example, the specialized closure can include one or more flap portions that are pushed downwardly to open the diaphragm flap value with the open neck of the separate paintball container when the neck of the separate paintball container is forced into the opening of the paintball hopper device. When the separate paintball container, after being emptied of paintballs, is retracted from the opening of diaphragm flap valve the specialized closure allows the resilient flaps to bend upwardly and effectively close the opening of the paintball hopper device.

[0018] More preferably, the separate storing and loading container is a specialized container having an upper closure that can be selectively opened and closed. For example, the upper closure can include four pedal portions and a spring biased slip ring configured to bend open the pedal portions to release paintballs by gravity from the separate storing and loading container when the specialized container is docked onto the hopper device.

[0019] The paintball gun device according to the present invention is configured to be loaded with paintballs faster and with more precision versus conventional paintball hopper loading methods. The improvement is mainly in the hopper device having an upper opening to allow paintballs to be loaded in one direction into the hopper device. The specialized closure device allows the hopper device to be opened and closed without opening and closing a lid on a conventional hopper device. The specialized closure device provided in the opening of the hopper device is opened and closed by the upper end of the separate paintball storing and loading container. When the upper end of the separate container is inserted or forced into the specialized closure device of the hopper device, the specialized closure device opens up to allow paintballs to be gravity fed or otherwise pour from the separate container into the hopper device by gravity. Further, once the separate container storing paintballs is emptied it is then simply tossed aside, and the specialized closure device recloses allowing the player to continue shooting and focusing on the tournament action going on around the player.

[0020] The specialized closure device is configured to automatically and immediately close when the mouth of the separate container is pulled upwardly and out of the specialized closure device. Thus, the user does not have to take any further action to close the hopper device unlike the conventional lid type closure on a conventional hopper device requiring a lid to be closed or a cap to be applied to the hopper.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] FIG. **1** is a perspective view of the paint ball gun device according to the present invention.

[0022] FIG. **2** is a side elevational view of the specialized closure device of the paint ball hopper device according to the present invention.

[0023] FIG. **3** is a top planar view of the specialized closure device shown in FIG. **2**.

[0024] FIG. **4** is a transverse cross-sectional view of the specialized closure device, as indicated in FIG. **3**.

[0025] FIG. **5** is a transverse cross-sectional view of the specialized closure device, as indicated in FIG. **3**.

[0026] FIG. **6** is a transverse cross-section view of the closure device, as indicated in FIG. **3**, shown mounted on a hopper device according to the present invention.

[0027] FIG. **7** is a perspective view of the paintball gun device shown in FIG. **1** modified with an adapter for the specialized closure of the hopper device.

[0028] FIG. **8** is an enlarged side elevational view of the adapter shown in FIG. **7**.

[0029] FIG. **9** is an enlarged side elevational view of the adapter and partial broken away side elevational view of the specialize closure mounted on the adapter shown in FIG. **7**.

[0030] FIG. **10** is a side elevational view of the separate storing and loading or otherwise specialized paintball container with the upper end in a closed mode.

[0031] FIG. **11** is a side elevational view of the separate storing and loading or otherwise specialized paintball container with the upper end in an opened mode.

[0032] FIG. **12** is a perspective view of the paintball gun device shown in FIG. **1** with the specialized paintball container docked into the specialized closure of the hopper device during a paintball loading operation.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0033] A paintball gun device **10** according to the present invention as shown in FIG. **1**.

[0034] The paintball gun device **10** includes three (3) main components including a paintball gun **12**, hopper device **14**, and pressurized gas cylinder **16**.

[0035] The paintball gun **12** includes a barrel **18** connected to a receiver **20** having a trigger **22**. The paintball gun **12** can be any of a wide variety of conventional paintball guns, and the gas cylinder **16** can be any of a wide variety of conventional gas cylinders.

[0036] The hopper device **14** includes a hopper **24** provided with a connecter **26** (e.g. tubular connector to be received within receiver connector **28**) and a closure **30** (e.g. specialized closure).

[0037] The closure **30** is shown in detail in FIGS. **2-6**.

[0038] The closure **30** includes four (4) flat flap portions **32** connecting and alternating with inclined flap portions **34**, as shown in FIG. **3**. The flap portions **32** and **34** are connected by vertical sidewalls **36** so that the flaps **32**, **34** and vertical sidewalls **34** are a continuous member (e.g. continuous bent sheet or membrane) folded or formed into the three-dimensional shape indicated. At the center of the closure **30** is a variable size opening or orifice **38** that is shown closed (i.e. its smallest diameter), as shown in FIG. **3**. The outer ends of the flaps **32**, **34** are flexibly connected to a rim **40** so as to hinge relative thereto.

[0039] The closure **30** is preferably a single piece molded resilient plastic or rubber composition. Alternatively, the closure **30** can be made of multiple pieces assembled together (e.g. separate flaps, separate side walls and/or separate rim heat welded or adhered together).

[0040] The rim **40**, as shown in FIGS. **4-6**, is provided with a circumferential groove (e.g. circular groove) on the lower surface thereof to accommodate and connect with the upper opening **44** of the hopper **24**, as shown in FIG. **6**. Specifically, the hopper **24** is provided with a circular flange **46** having a radial outwardly extending rim **48** configured to connect and anchor within the secondary groove **42***a* of primary groove **42**. Due to the resilient nature of the closure **30**, a band stress is exerted between the rim **40** of the closure **30**, and thus the rim **48** of the flange **46** of the hopper **24** securely affixes the closure **30** to the hopper **24**. In some instances, the closure **30**, the flange **46** and rim **48** of the hopper **24** are configured to provide a snap-fit connection there between.

[0041] The closure **30** is configured so that the closure **30** functions as a one (1) way valve for the flow or loading direction of paintballs into the hopper device **14**. Specifically, paintballs from a separate container or by hand can be loaded downwardly through the orifice **38** of the closure **30** by exerting force or pressure on the planar flap portions **32** resiliently forcing the orifice **38** wider. The flap portions **32**, **34** all bend downwardly upon force being exerted on the planar flap portions **32** allowing paintballs to flow through the enlarged orifice **38**. However, when force or pressure is applied to the lower surfaces of the inclined flap portions **34** (i.e. when paintballs attempt to escape from the hopper device **14**), the inclined flap portions **38** resist bending upwardly due to the tip portions **34***a* (see FIG. **6**) contacting with each other effectively preventing the paintballs from moving or flowing upwardly out of the hopper device **14**.

[0042] An alternative embodiment of the application of the closure **30** is shown in FIG. **7**.

[0043] In the embodiment shown in FIG. **7**, the closure **30** is connected to the hopper device **14** by an adapter **50**. The adapter **50** allows the closure **30**, for example, to be connected to a conventional hopper device. Further, the height of the adaptor **50** allows for a separate container of paintballs to be inserted mouth wise into and through the closure **30** and be received within the adapter **50** to allow paintballs to pour from the separate container into the hopper device **14**. In this manner, the adaptor **50** accommodates the upper portion of the separate container so as to not reduce the volume (i.e. paintball capacity) of the hopper device **14** while allowing the separate container to function in combination with the adaptor **50** to provide a quick paintball loading system.

[0044] The adapter **50** can be a ring-shaped part or component (e.g. made of plastic, injection molded plastic, sections of poly vinyl chloride (PVC) pipe), and provided with a plurality of set screws **52**. The ends of set screws **52** contact the flange **46** (See FIG. **6**) underneath the rim **48** of the hopper **24** to secure the adaptor **50** to the hopper device **14**.

[0045] As shown in FIG. **9**, the adaptor is provided with a groove **54** to accommodate the rim **40** (See FIG. **6**) of the closure **30** similar to the flange **46** and rim **48** of the hopper **24**. The closure **30** can be securely held onto the adapter **50** by the band stress between the rim **40** and the groove **54** of the adapter **50**.

[0046] The hopper device **14** shown in FIGS. **1** and **7** can be hand-loaded (i.e. with fingers) with paintballs by a user taking one or more paintballs in his or her hand and the pushing or stuffing the paintball into and through the orifice **38** shown in FIG. **3**. Alternatively, and more preferably, the hopper device **14** is loaded with a separate container **56** (e.g. specialized container), as shown in FIGS. **10-12**.

[0047] The container **56** is used for storing a plurality of paintballs during play. For example, a plurality of containers **56** are attached to clothing or accessories (e.g. pants, jacket, vests, belts, holsters). The container **56** is provided with a specialized closure **57** including four (4) flexible petals **58**, which open (FIG. **11**) and close (FIG. **10**) as shown. For example, the petals **58** are cut out of a hemispherical cover **59** into the pedal shapes indicated from the wall of the cover **59** of the specialized closure **57**. The specialized closure **57** includes a slip ring **60** configured to slide upwardly and downwardly to close or open, respectively, the upper end of the container **56**. The slip ring **60** is biased upwardly by a plurality of springs **62** (e.g. four springs equally spaced around perimeter of slip ring **60**) to biased the petals **58** closed. When the slip ring **60** is forced downwardly, the petals **58** open by the upper edge **56***a* of container **56** pushing outwardly on the petals **58** to allow paintballs to exit the container **56** when the container **56** is turned upside down. Alternatively, the springs **62** are eliminated and the slip ring **60** can be moved unassisted between the closed and open position. Optionally, there are provided stops configured so that the slip ring is releasably locked in the open or closed position (e.g. snap or click type lock), which can be released by exerting a threshold force on the slip ring **60**.

[0048] As shown in FIG. **12**, the upper end of the container **56** or specialized closure **57** is forced into the closure **30** of the hopper device **14** to dock therewith. The closure device **30** acts as a stop against the slip ring **60** to bias the slip ring **60** so as to open the petals **58** within the hopper device **14** (e.g. the petals **58** open within the hopper device **14** shown in FIG. **1** or the adapter **50** shown in FIG. **7**). In this manner, the container **56** can be turned upside down without the paintballs falling out of the container **56**, and then the container **56** is opened when the upper end thereof is forced into and docks within the hopper device **14**. Again, the petals **58** open the orifice **38** of the closure **30** when the petals **58** are closed, and then when the slip ring **60** is forced rearwardly (FIG. **12**), the paintballs are gravity fed from the container **56** into the hopper device **14**.

[0049] In the spring biased version of the slip ring **60**, the player uses a single hand to bias the container **56** against the closure device **30** to open and maintain the petals **58** open while the paintballs transfer from the container **56** into the hopper device **30**. Upon releasing this force, the slip ring **60** begins to eject the container **56** from the closure device **30** until completely removed therefrom. In the version of the slip ring without springs, the player uses a single hand to jam and dock the container **56** into the hopper device **30**. The player can release his or her hand for hands free transfer of the paintballs from the container **56** into the hopper device **30**. Upon completion of the transfer, the player again grips the container **56** with one hand and pulls it out of the hopper device **30** and then discards same.

[0050] In an alternative embodiment, the specialized closure **57** is eliminated, and the container **56** is provided with a snap fit or twist cap closure. However, the user must cover the opening of the container with his or her fingers acting as

a flap valve when loading the upper end of the container into the closure **30** so that the paintballs do not fall out of the container **56** until the upper end of the container **56** is insert and docks within the closure **30** of the hopper device **14**.

We claim:

1. A paint ball gun device, comprising:

a paint ball gun including a barrel connected to a receiver;

a hopper device connected to said receiver of said paint ball gun, said hopper device having an upper opening; and

a closure device disposed within said upper opening of said hopper, said closure device including an orifice configured to open wider when paint balls are loaded though said closure device and configured to close smaller after the ball paint balls have been loaded into said hopper device.

2. A device according to claim **1**, wherein said closure device is a resilient diaphragm.

3. A device according to claim **2**, wherein said diaphragm including a plurality of flap portions.

4. A device according to claim **3**, wherein a plurality of said flap portions are located in a transverse plan of said closure device.

5. A device according to claim **3**, wherein a plurality of said flap portions are located at an angle extending downwardly from a perimeter of said closure device towards a center of said diaphragm device.

6. A device according to claim **4**, wherein a plurality of said flap portions are located at an angle extending downwardly from a perimeter of said closure device towards a center of said diaphragm device.

7. A device according to claim **7**, wherein said plurality of flaps alternate one transverse flap portion to a next inclined flap portion.

8. A device according to claim **1**, wherein said closure device is configured to allow paint balls to be loaded through said closure device in one direction, and prevents paint balls from escaping from the hopper device through said closure device in an opposite direction.

9. A device according to claim **1**, wherein said closure device functions as a one-way valve relative to the movement of paint balls through said closure device.

10. A device according to claim **1**, including a collar device disposed between said hopper device and said closure device.

11. A device according to claim **10**, wherein said collar device includes one or more fasteners for connecting said collar device to said hopper device.

12. A device according to claim **11**, wherein said fasteners are set screws extending radial inwardly through said collar with ends anchoring on a flange of said upper opening into said hopper device.

13. A device according to claim **1**, including a loading container configured to store paint balls, said loading container including an upper mouth and a lid configured to open and close mouth of said loading container.

14. A device according to claim **13**, wherein said mouth of said loading container is configured to open said closure device of said hopper device.

15. A device according to claim **14**, wherein said loading container and said closure device of said hopper are configured to allow hands free gravity loading of said paint balls from said loading container into said hopper device after said mouth of said loading container is inserted into said closure device.

* * * * *