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(54) **SPRING LOADED FEED MECHANISM FOR PAINTBALL LOADER**

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CPC ***F41B 11/57*** (2013.01); ***F41B 11/53*** (2013.01); ***G09B 23/28*** (2013.01)

(58) **Field of Classification Search**
CPC F41B 11/57; F41B 11/53; F41B 11/50; F41B 11/52; F41B 11/54; F41B 7/00; F42B 6/00; F42B 6/10; G09B 23/28
USPC 124/48, 71–77, 49, 50, 51.1, 52, 53; 89/33.16, 33.17
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,332,992 A 3/1920 Moore et al.
1,332,993 A 3/1920 Moore et al.

(Continued)

FOREIGN PATENT DOCUMENTS

DE 876370 5/1953
DE 2035097 8/1982

(Continued)

OTHER PUBLICATIONS

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(Continued)

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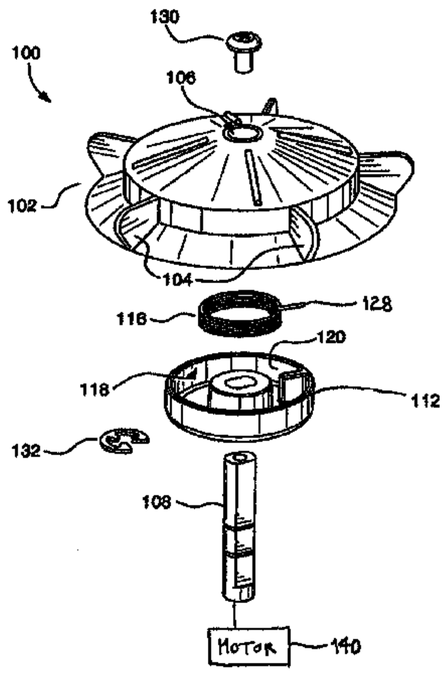
(57) **ABSTRACT**

A spring-loaded feed mechanism for a paintball loader. The feed mechanism includes an inner spool and an outer spool. A torsion spring is positioned between the inner and outer spools. The outer spool includes a pressure wall, from which the torsion spring is located on one end of the spring. A retaining wall is attached to the inner spool and is located at the opposite end of the torsion spring. When an operator of a paintball gun using the spring-loaded feed mechanism discontinues firing paintballs, the feed mechanism is stopped. Simultaneously, during the deceleration of the feed mechanism, the torsion spring is compressed, which allows the mechanical energy of the rotating feed mechanism to be stored within the compressed spring. When the operator desires to fire the paintball gun, the feed mechanism is accelerated to the requisite rotational speed. The compressed spring is release, thereby allowing the spring to assist in accelerating the feed mechanism to the necessary rotational speed.

28 Claims, 9 Drawing Sheets



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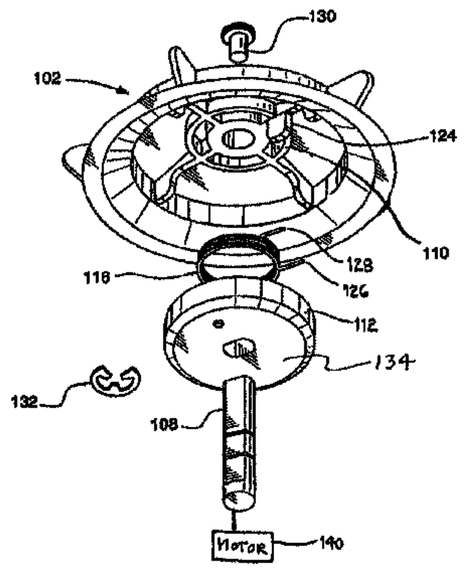

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Related U.S. Application Data

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(56) **References Cited**

U.S. PATENT DOCUMENTS

1,403,689	A		1/1922	Hyndman	
1,403,719	A		1/1922	Szepe	
1,404,689	A		1/1922	Fairweather	
1,743,576	A		1/1930	Smith	
1,867,513	A		7/1932	Lahti	
1,954,093	A		4/1934	Nelson	
2,064,888	A	*	12/1936	Dickinson	42/6
2,307,015	A		1/1943	Boynton	
2,338,984	A		1/1944	Van Horn et al.	
2,357,951	A		9/1944	Hale	
2,398,263	A		4/1946	Trimbach	
2,451,521	A		10/1948	Uglum	
2,526,969	A		10/1950	Powers	
2,568,432	A		9/1951	Cook	
2,639,904	A		5/1953	McMaster	
2,641,412	A		6/1953	Byberg	
2,676,633	A		4/1954	Lohre et al.	
RE23,951	E		2/1955	Graham	
2,716,973	A		9/1955	Desi	
2,900,972	A		8/1959	Marsh et al.	
3,089,476	A		5/1963	Wolverton	
3,134,301	A		5/1964	Even	
3,248,008	A		4/1966	Meierjohan	
3,273,553	A		9/1966	Doyle	
3,384,354	A		5/1968	Migule et al.	
3,410,453	A		11/1968	Lawrence	
3,467,073	A		9/1969	Rhodes	
3,610,223	A		10/1971	Green	
3,630,118	A		12/1971	Stoner	
3,695,246	A		10/1972	Filippi et al.	
3,724,437	A		4/1973	Halstead	
3,745,687	A		7/1973	Koon, Jr.	
3,766,901	A		10/1973	Cleary et al.	
3,777,732	A		12/1973	Holloway et al.	
3,788,298	A		1/1974	Hale	
3,789,891	A		2/1974	Bosch	
3,807,379	A		4/1974	Vodinh	
3,814,283	A		6/1974	Cioth	
3,844,267	A		10/1974	Mohr	
3,855,988	A		12/1974	Sweeton	
3,867,921	A		2/1975	Politzer	
3,894,657	A		7/1975	Eckmayr	
3,930,486	A		1/1976	Kahelin	
3,978,841	A		9/1976	Yarur et al.	
3,990,426	A		11/1976	Stokes	
4,021,036	A		5/1977	Nelson et al.	
4,027,646	A		6/1977	Sweeton	
4,034,644	A		7/1977	Hupp et al.	
4,044,290	A		8/1977	Gullo	
4,073,280	A		2/1978	Koehn et al.	
4,112,911	A		9/1978	Petrick, Sr.	
4,116,192	A		9/1978	Scott	
4,148,415	A		4/1979	Florida et al.	
4,185,824	A		1/1980	Natwick	
4,207,857	A		6/1980	Balka, Jr.	
4,280,697	A		7/1981	Yuasa	
4,299,383	A		11/1981	Yuasa	
4,332,097	A		6/1982	Taylor, Jr.	
4,391,264	A		7/1983	Abrham et al.	
4,396,193	A		8/1983	Reinhardt et al.	
4,481,862	A		11/1984	Wiethoff et al.	
4,487,103	A		12/1984	Atchisson	
4,502,455	A		3/1985	Stokes	
4,563,999	A		1/1986	Miehlich	
4,646,709	A		3/1987	Kholin	
4,676,137	A		6/1987	Stockton et al.	
4,695,954	A		9/1987	Rose et al.	
4,745,842	A		5/1988	Shou-Fu	
4,748,600	A		5/1988	Urquhart	
4,759,435	A		7/1988	Cedrone	
4,765,223	A		8/1988	Beckmann	
4,770,153	A		9/1988	Edelman	
4,817,955	A		4/1989	Hickson et al.	
4,819,609	A	*	4/1989	Tippmann	124/72
4,834,060	A		5/1989	Greene	
4,850,330	A		7/1989	Nagayoshi	
4,896,646	A		1/1990	Kahelin et al.	
4,923,066	A		5/1990	Ophir et al.	
4,926,742	A		5/1990	Ma et al.	
4,930,400	A		6/1990	Brandl et al.	
4,936,282	A		6/1990	Dobbins et al.	
4,951,548	A		8/1990	Wixon et al.	
4,951,644	A		8/1990	Viviani	
4,965,951	A		10/1990	Miller et al.	
4,986,251	A	*	1/1991	Lilley	124/67
4,993,400	A		2/1991	Fitzwater	
5,042,685	A		8/1991	Moulding, Jr. et al.	
5,061,222	A		10/1991	Suris	
5,063,905	A		11/1991	Farrell	
5,070,995	A		12/1991	Schaffer et al.	
5,097,816	A		3/1992	Miller	
5,097,985	A		3/1992	Jones	
5,166,457	A		11/1992	Lorenzetti	
5,233,125	A		8/1993	Bouver	
5,251,906	A		10/1993	Heller et al.	
5,282,454	A		2/1994	Bell et al.	
5,322,283	A		6/1994	Ritchie et al.	
5,335,579	A		8/1994	David	
5,337,726	A		8/1994	Wood	
5,353,712	A		10/1994	Olsen	
5,361,746	A		11/1994	Szente	
5,383,442	A		1/1995	Tippmann	
5,456,153	A	*	10/1995	Bentley et al.	89/33.02
5,464,208	A		11/1995	Pierce	
5,490,493	A		2/1996	Salansky	
5,497,758	A		3/1996	Dobbins et al.	
5,505,188	A		4/1996	Williams	
5,507,271	A		4/1996	Actor	
5,511,333	A		4/1996	Farrell	
5,520,171	A		5/1996	David	
5,542,570	A		8/1996	Nottingham et al.	
5,555,662	A		9/1996	Teetzel	
5,561,258	A	*	10/1996	Bentley et al.	89/33.17
5,600,083	A	*	2/1997	Bentley et al.	89/33.02
5,673,812	A		10/1997	Nelson	
5,675,110	A		10/1997	Gyre et al.	
5,722,383	A	*	3/1998	Tippmann et al.	124/76
5,727,538	A		3/1998	Ellis	
5,736,720	A		4/1998	Bell et al.	
5,749,797	A		5/1998	Sunseri et al.	
5,755,056	A		5/1998	Danner et al.	
5,771,875	A		6/1998	Sullivan	
5,784,985	A		7/1998	Lodico et al.	
5,791,325	A		8/1998	Anderson	
5,794,606	A		8/1998	Deak	
5,809,983	A		9/1998	Stoneking	
5,816,232	A	*	10/1998	Bell	124/51.1
5,819,715	A		10/1998	Haneda et al.	
5,836,583	A		11/1998	Towers	
5,839,422	A		11/1998	Ferris	
5,881,962	A		3/1999	Schmidt et al.	
5,887,578	A		3/1999	Backeris et al.	
5,947,100	A		9/1999	Anderson	
5,954,042	A	*	9/1999	Harvey	124/51.1
6,032,395	A		3/2000	Bentley et al.	
6,055,975	A		5/2000	Gallagher et al.	
6,062,208	A		5/2000	Seefeldt et al.	
6,083,105	A		7/2000	Ronin et al.	
6,085,735	A		7/2000	Cheek, Jr.	

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,109,252	A	8/2000	Stevens	
6,206,562	B1	3/2001	Eyraud et al.	
6,213,110	B1 *	4/2001	Christopher et al.	124/51.1
6,220,237	B1 *	4/2001	Johnson et al.	124/73
6,305,367	B1 *	10/2001	Kotsiopoulos et al.	124/49
6,311,682	B1	11/2001	Rice et al.	
6,325,233	B1	12/2001	Harris	
6,327,953	B1 *	12/2001	Andresen	89/33.17
6,347,621	B1 *	2/2002	Guthrie	124/48
6,349,711	B1	2/2002	Perry et al.	
6,374,819	B1	4/2002	Ming-Hsien	
6,408,836	B1	6/2002	Ming Hsien	
6,408,837	B1	6/2002	Johnson et al.	
D459,767	S	7/2002	Rushton	
6,415,781	B1	7/2002	Perrone	
6,418,919	B1	7/2002	Perrone	
6,425,781	B1	7/2002	Bernstein et al.	
6,460,530	B1	10/2002	Backeris et al.	
6,467,473	B1	10/2002	Kostiopoulos	
6,468,879	B1	10/2002	Lamure et al.	
6,481,432	B2	11/2002	Rushton et al.	
6,488,019	B2 *	12/2002	Kotsiopoulos	124/51.1
6,502,567	B1	1/2003	Christopher et al.	
6,520,854	B1	2/2003	McNally	
6,526,955	B1	3/2003	Juan	
6,588,412	B2	7/2003	Ferrara et al.	
6,591,824	B2	7/2003	Hatcher	
6,609,511	B2	8/2003	Kotsiopoulos	
6,615,814	B1	9/2003	Rice et al.	
6,644,293	B2	11/2003	Jong	
6,644,295	B2	11/2003	Jones	
6,644,296	B2	11/2003	Gardner, Jr.	
6,666,203	B2	12/2003	Madea et al.	
6,684,873	B1	2/2004	Anderson	
6,701,907	B2	3/2004	Christopher et al.	
6,701,909	B2	3/2004	Tiberius et al.	
6,708,685	B2	3/2004	Masse	
6,722,355	B1	4/2004	Andrews, Jr.	
6,725,852	B1	4/2004	Yokota	
6,729,321	B2	5/2004	Ho	
6,729,497	B2	5/2004	Rice et al.	
6,739,322	B2	5/2004	Rice et al.	
6,739,323	B2	5/2004	Tippmann, Jr.	
6,742,512	B1	6/2004	Ho	
6,752,137	B2	6/2004	Brunette et al.	
6,792,933	B2	9/2004	Christopher et al.	
6,802,306	B1	10/2004	Rice	
6,860,258	B2	3/2005	Farrell	
6,889,680	B2	5/2005	Christopher et al.	
6,899,328	B2	5/2005	Halliburton et al.	
6,915,792	B1	7/2005	Sheng	
6,978,776	B2	12/2005	Hamilton	
6,981,493	B1	1/2006	Poteracku	
7,000,603	B1	2/2006	Steenbeke	
7,017,569	B2	3/2006	Jong	
7,021,302	B2	4/2006	Neumaster	
7,040,505	B2	5/2006	Hashimoto et al.	
7,077,118	B2	7/2006	Lewis	
D535,339	S	1/2007	Broersma	
7,159,585	B2	1/2007	Quinn et al.	
7,210,473	B2	5/2007	Jong	
7,216,641	B2	5/2007	Friesen et al.	
7,222,617	B2	5/2007	Andresen	
D544,047	S	6/2007	Bell et al.	
7,231,914	B2	6/2007	Hatcher	
7,234,456	B2	6/2007	Andresen	
7,270,120	B2	9/2007	Broersma et al.	
7,270,121	B2	9/2007	Lubben	
7,322,347	B2	1/2008	Broersma	
7,322,348	B2	1/2008	Chen	
7,343,909	B2	3/2008	Christopher	
D567,302	S	4/2008	Choi	
D567,303	S	4/2008	Neumaster	
7,357,129	B2	4/2008	Neumaster et al.	
7,357,130	B2	4/2008	Broersma	
D572,318	S	7/2008	Broersma	
7,428,899	B2	9/2008	Andresen	
7,441,556	B2	10/2008	Friesen et al.	
7,445,002	B2	11/2008	Christopher et al.	
7,458,370	B2	12/2008	Chen	
D584,776	S	1/2009	Stevens	
7,487,769	B2	2/2009	Lubben	
7,490,597	B2	2/2009	Hatcher	
7,568,478	B2	8/2009	Hedberg	
7,591,260	B1	9/2009	Mu	
7,617,817	B1	11/2009	Kulp	
7,624,726	B2	12/2009	Wood	
7,654,255	B2	2/2010	Spicer	
7,673,627	B2	3/2010	Higgins et al.	
7,694,669	B2	4/2010	Campo	
7,762,246	B2	7/2010	Telford	
7,770,569	B2	8/2010	Andresen	
7,770,571	B2	8/2010	Tippmann, Jr. et al.	
7,779,825	B2	8/2010	Estrate	
7,832,389	B2	11/2010	Christopher et al.	
7,841,328	B2	11/2010	Italia et al.	
7,854,220	B1	12/2010	Neumaster	
7,921,835	B2	4/2011	Campo et al.	
6,213,110	C1	11/2011	Christopher et al.	
8,047,191	B2	11/2011	Christopher et al.	
8,104,462	B2	1/2012	Christopher et al.	
8,251,050	B2	8/2012	Christopher et al.	
RE43,756	E	10/2012	Christopher et al.	
8,356,589	B2	1/2013	Karnis	
8,387,607	B2	3/2013	Christopher et al.	
8,448,631	B2	5/2013	Spicer et al.	
2002/0014230	A1	2/2002	Christopher et al.	
2002/0020402	A1	2/2002	Kotsiopoulos	
2002/0059927	A1	5/2002	Woods, Sr.	
2002/0117159	A1 *	8/2002	Kotsiopoulos et al.	124/51.1
2003/0024520	A1	2/2003	Dobbins	
2003/0047173	A1	3/2003	Juan	
2003/0079731	A1	5/2003	Dobbins	
2004/0074487	A1	4/2004	Christopher et al.	
2004/0074489	A1	4/2004	Neumaster et al.	
2004/0112356	A1	6/2004	Hatcher	
2004/0134475	A1	7/2004	Jong	
2004/0194772	A1	10/2004	Hamilton	
2004/0211402	A1	10/2004	Christopher et al.	
2004/0245276	A1	12/2004	Hashimoto et al.	
2005/0028801	A1	2/2005	Lewis	
2005/0121015	A1	6/2005	Postorivo, Jr.	
2005/0188974	A1	9/2005	Pedicini et al.	
2005/0188978	A1	9/2005	Tiberius et al.	
2005/0217653	A1	10/2005	Christopher et al.	
2005/0241628	A1	11/2005	Hatcher	
2005/0274370	A1	12/2005	Lubben	
2005/0274371	A1	12/2005	Lubben	
2005/0284456	A1	12/2005	Chipley	
2005/0284457	A1	12/2005	Hatcher	
2006/0005823	A1	1/2006	Quinn	
2006/0032488	A1	2/2006	Telford	
2006/0037597	A1	2/2006	Wood	
2006/0054151	A1	3/2006	Christopher et al.	
2006/0086347	A1	4/2006	Hedberg	
2006/0124118	A1	6/2006	Dobbins	
2006/0130821	A1	6/2006	Hamilton	
2006/0157041	A1	7/2006	Freisen	
2006/0196489	A1	9/2006	Campo	
2006/0249131	A1	11/2006	Broersma	
2006/0254572	A1	11/2006	Hall	
2007/0012303	A1	1/2007	Christopher et al.	
2007/0012304	A1	1/2007	van Dorsser et al.	
2007/0017494	A1	1/2007	Andresen	
2007/0017495	A1	1/2007	Andresen	
2007/0056573	A1	3/2007	Campo	
2007/0062506	A1	3/2007	Bell	
2007/0081233	A1	4/2007	Andresen	
2007/0101981	A1	5/2007	Chen	
2007/0113834	A1	5/2007	Spicer	
2007/0137631	A1	6/2007	Christopher	
2007/0175463	A1	8/2007	Higgins et al.	
2007/0181117	A1	8/2007	Tippmann et al.	
2007/0215137	A1	9/2007	Jones et al.	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2007/0246479	A1	10/2007	Andresen
2007/0256676	A1	11/2007	Orvis et al.
2008/0017178	A1	1/2008	Marques et al.
2008/0047535	A1	2/2008	Handel
2008/0047536	A1	2/2008	Chen
2008/0047537	A1	2/2008	Kulp et al.
2008/0087264	A1	4/2008	Postorivo
2008/0178859	A1	7/2008	Moore et al.
2009/0000608	A1	1/2009	Christopher et al.
2009/0025700	A1	1/2009	Andresen
2009/0133680	A1	5/2009	Christopher et al.
2009/0178659	A1	7/2009	Spicer

FOREIGN PATENT DOCUMENTS

DE	3721527		1/1989
DE	4343870		6/1994
DE	4343871		6/1995
DE	19922589		12/2000
EP	0075970		4/1983
EP	01054228		11/2000
EP	01653189		5/2006
FR	921527		5/1947
GB	470201		8/1937
GB	551077		2/1943
GB	2 322 438		8/1998
JP	1179898		7/1989
JP	6325233		11/1994
TW	M255391	Y	1/2005
WO	WO98/13660		4/1998
WO	01/44745		6/2001
WO	02/42708		5/2002
WO	03087698		10/2003
WO	2007/035601		3/2007
WO	2007033309		3/2007
WO	2007044546		4/2007
WO	2007044822		4/2007
WO	2007/098554	A1	9/2007
WO	2008104061		4/2008
WO	2009/009748	A1	1/2009

OTHER PUBLICATIONS

U.S. Appl. No. 13/657,749 Non-Final Office Action dated Dec. 12, 2012.
U.S. Appl. No. 13/657,749 Reply to Office Action Filed Jun. 12, 2013.
U.S. Reexam No. 90/009,794, Filed Jul. 30, 2010 Notice of Intent to Issue a Reexam Certificate dated Sep. 28, 2011.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Non-Final Office Action dated Apr. 26, 2011.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Reply to Office Action filed Oct. 26, 2011.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Final Office Action dated Nov. 29, 2012.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Reply to Final filed Feb. 29, 2012.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Notice of Allowance dated Jun. 7, 2013.
U.S. Appl. No. 13/657,749 Final Office Action Dated Sep. 5, 2013.
WARPIG—World and Regional Paintball Information Guide, http://www.warpig.com/paintball/technical/loaders/halo/index.shtml, warpig.com, Odyssey Readies Halo for Production, by Bill Mills, Jun. 2001, pp. 1 to 5.
WARPIG—World And Regional Paintball Information Guide, http://www.warpig.com/paintball/technical/loaders/halo/review.shtml, warpig.com, Odyssey Halo, by Bill Mills, Dec. 2001, pp. 1 to 7.
Odyssey Halo B Paintball Hopper Review, http://www.paintball-gun-review.com/hopper-reviews/odyssey-halo-b . . . , Paintball Gun Review, Odyssey Halo B Paintball Hopper Review, 2004 Paintball-Gun-Review.com, pp. 1 to 4.
www.odysseypaintball.com, http://web.archive.org/web/20030205112543/http://www.odysseypain . . . , Odyssey Paintball Products, Understanding Halo B, pp. 1 to 3.
WARPIG—World and Regional Paintball Information Guide, http://www.warpig.com/paintball/technical/loaders/evlution/evlution . . . eVLution 2 Sneak Preview, by Bill Mills, Aug. 2001, p. 1 to 4.
WARPIG—World and Regional Paintball Information Guide, http://www.warpig.com/paintball/technical/loaders/evlution/index.shtml Brass Eagle's eVLution Loader, by Bill Mills, Aug. 2000, pp. 1 to 7.
WARPIG—World and Regional Paintball Information Guide, http://www.warpig.com/paintball/technical/labs/revytimes/index/shtml WARPIG Ballistic Labs Report: Revolution Response Times, by Bill Mills, copyright 1992-2010, pp. 1 to 4.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Reissue of U.S. Pat. No. 6,502,567, issued Jan. 7, 2003 Entitled: Rapid Feed Paintball Loader With Pivotable Deflector.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Office Action dated Apr. 23, 2008.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Office Action dated Apr. 21, 2009.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Office Action dated Apr. 26, 2011.
U.S. Appl. No. 11/031,952, filed Jan. 7, 2005 Housekeeping Amendment In Response to Decision Sua Sponte Merging Reissue and Reexamination Proceedings Dated Oct. 29, 2010.
U.S Appl. No. 90/009,715, filed Jun. 3, 2010 Housekeeping Amendment In Response to Decision Sua Sponte Merging Reissue and Reexamination Proceedings Dated Oct. 29, 2010.
U.S. Appl. No. 90/009,715, filed Jun. 3, 2010 Order Granting/Denying Request For Ex Parte Reexamination Dated Jun. 11, 2010.
U.S. Appl. Nos. 11/031,952 (Reissue) and 90/009,715 (Reexamination) Decision Sua Sponte Merging Reissue and Reexamination Proceedings Dated Sep. 30, 2010.
U.S. Reexam No. 90/009,715, Filing Date: Jun. 3, 2010 Request for Ex Parte Reexamination of U.S. Pat. No. 6,502,567, issued Jan. 7, 2003 Title: Rapid Feed Paintball Loader With Pivotable Deflector Date: Mar. 31, 2010.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Request for Ex Parte Reexamination of U.S. Pat. No. 6,213,110, issued Apr. 10, 2011 Entitled: Rapid Feed Paintball Loader.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Reexamination Ordered, dated Sep. 1, 2010.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Office Action dated Dec. 3, 2010.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Amendment filed Feb. 3, 2011.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010, Final Office Action dated Feb. 14, 2011.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Supplemental Amendment filed Feb. 16, 2011.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Amendment After Final filed Apr. 18, 2011.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Advisory Action dated May 4, 2011.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Notice of Appeal filed Jun. 15, 2011.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Amendment After Appeal filed Aug. 12, 2011.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Supplemental Amendment filed Aug. 14, 2011.
U.S. Reexam No. 90/009,794, Filing Date: Jul. 30, 2010 Appeal Brief filed Aug. 15, 2011.

* cited by examiner

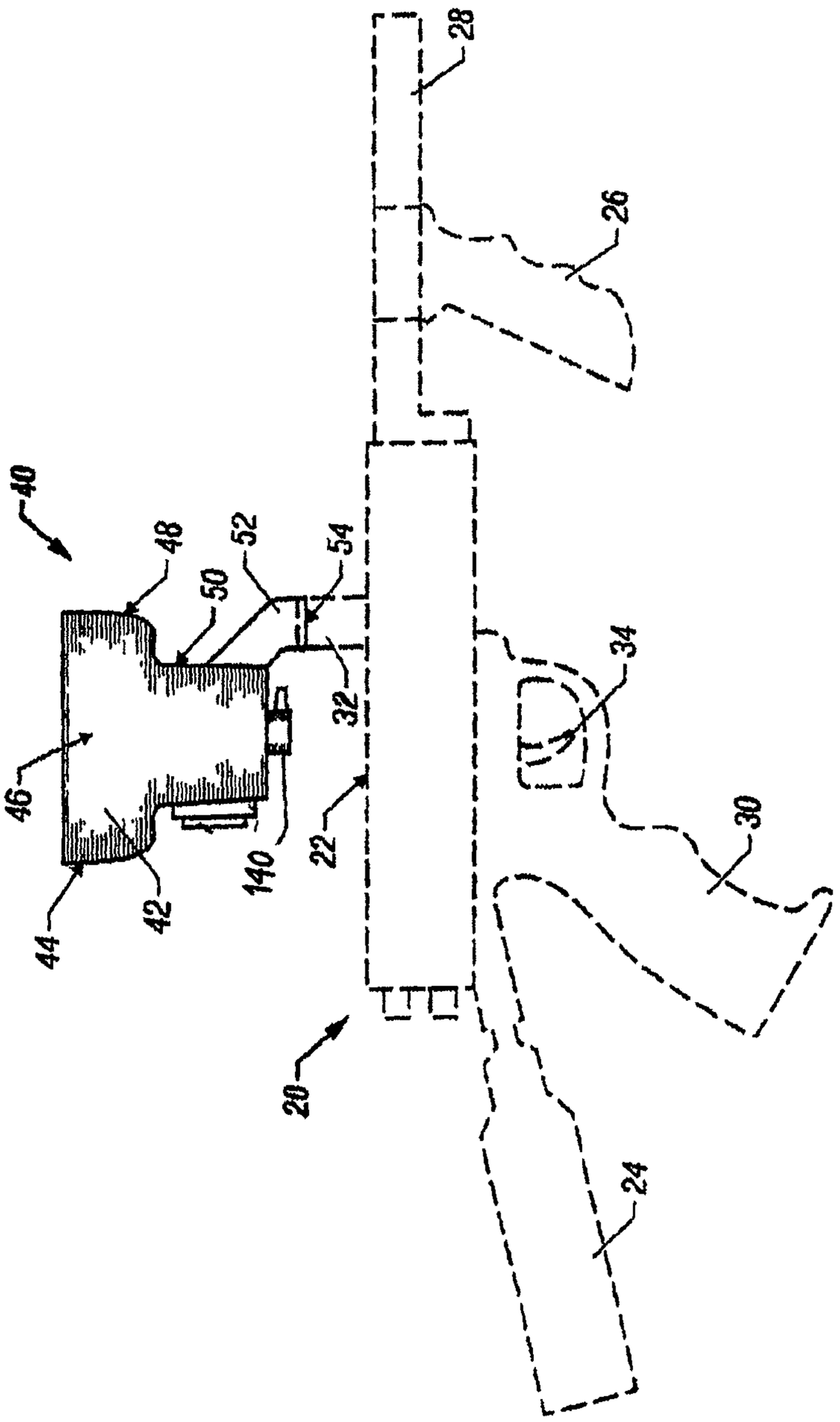

FIG. 1

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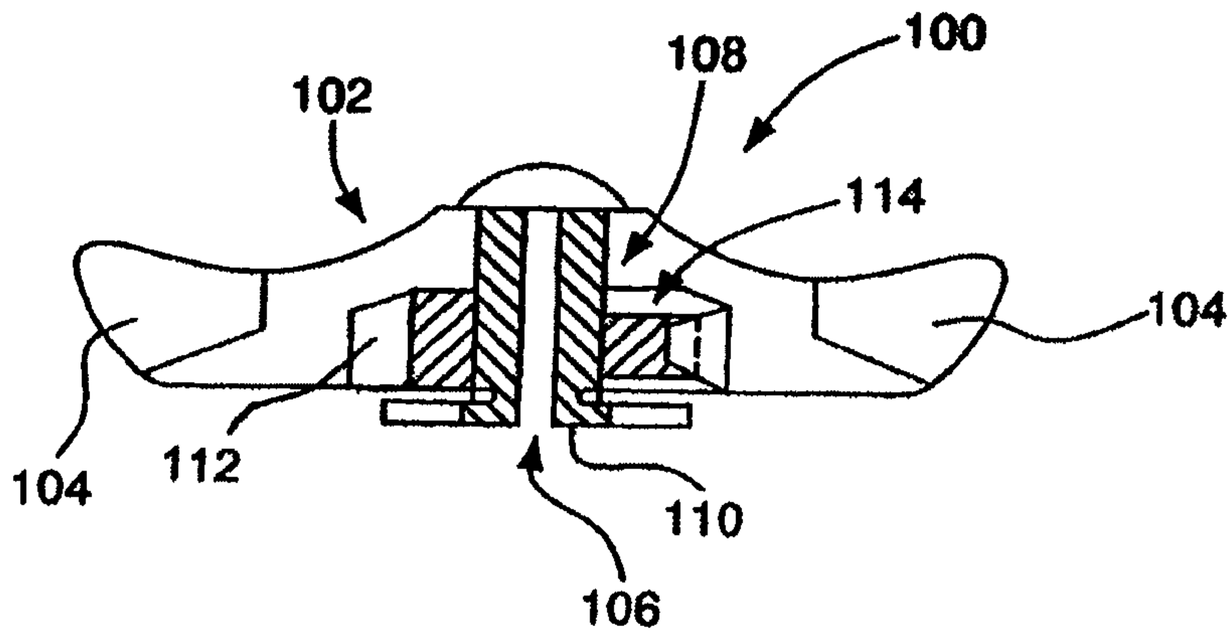

FIG. 2

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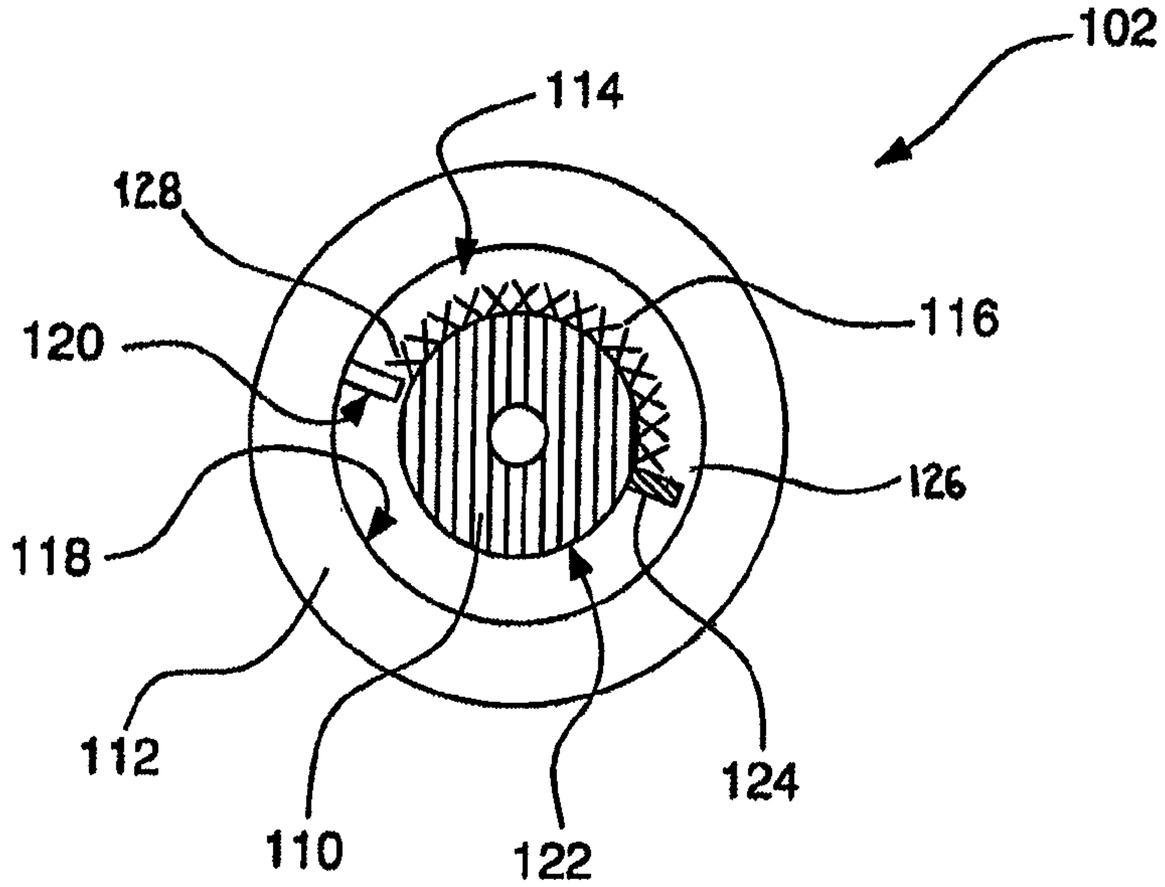

FIG. 3

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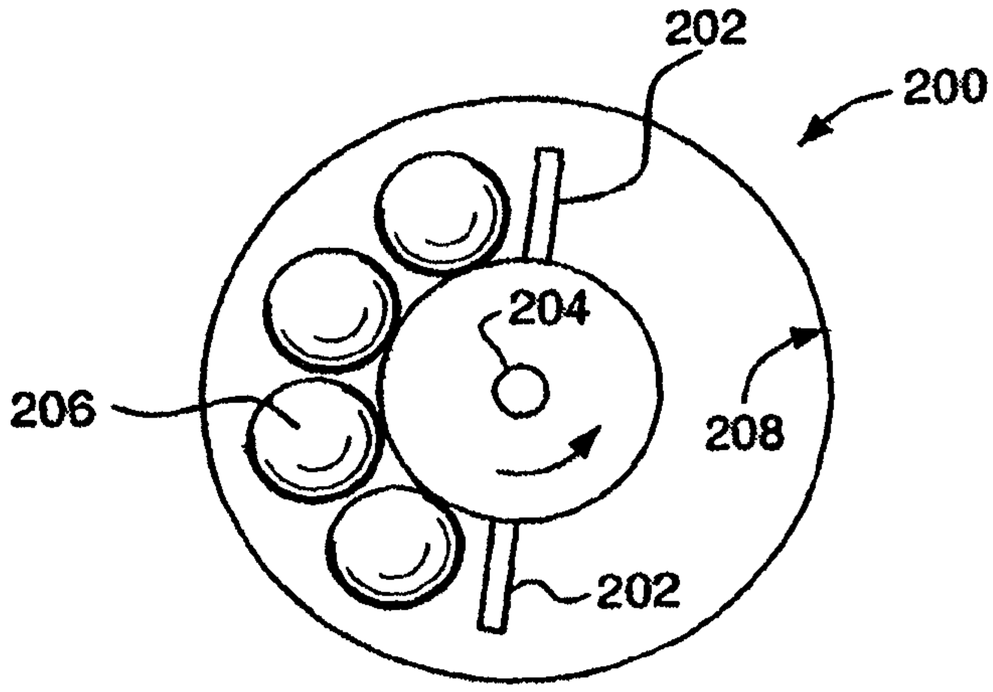

FIG. 4

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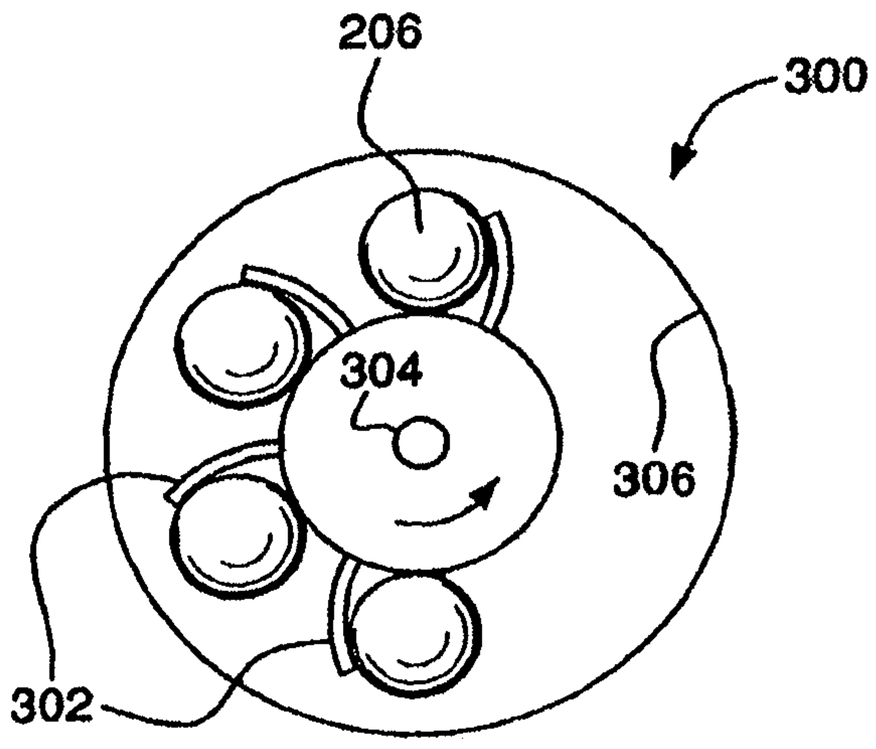

FIG. 5

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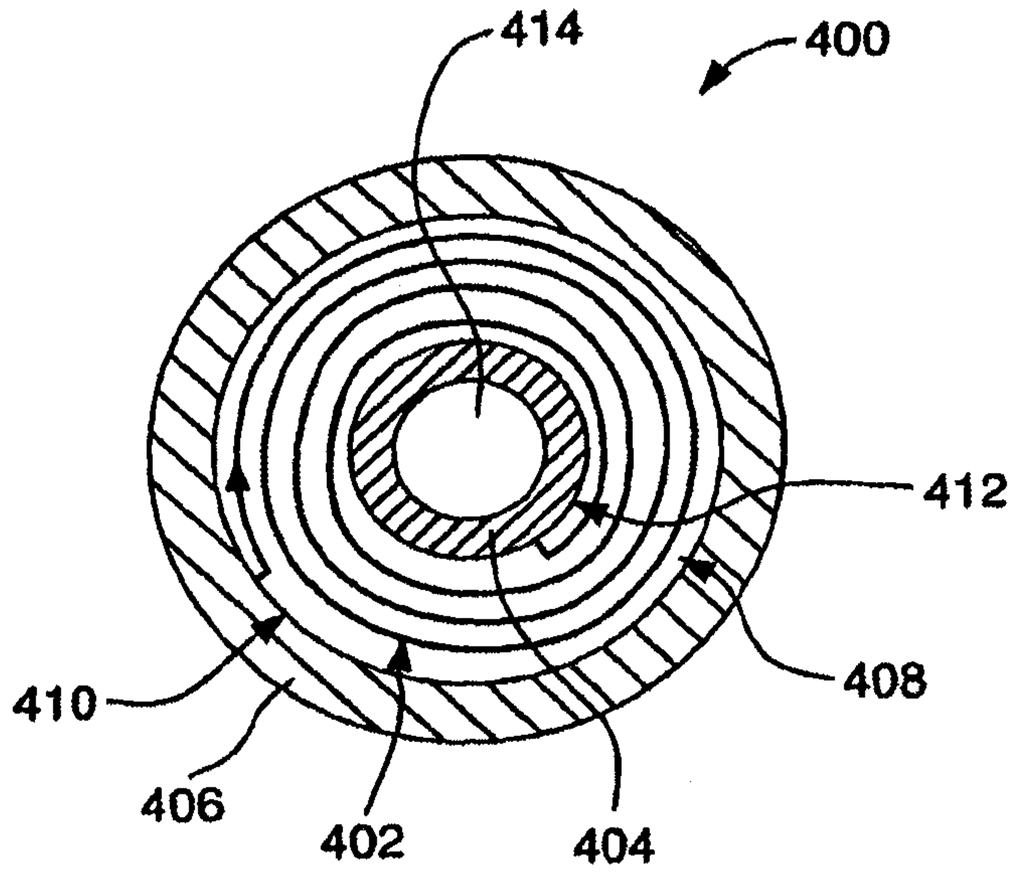

FIG. 6

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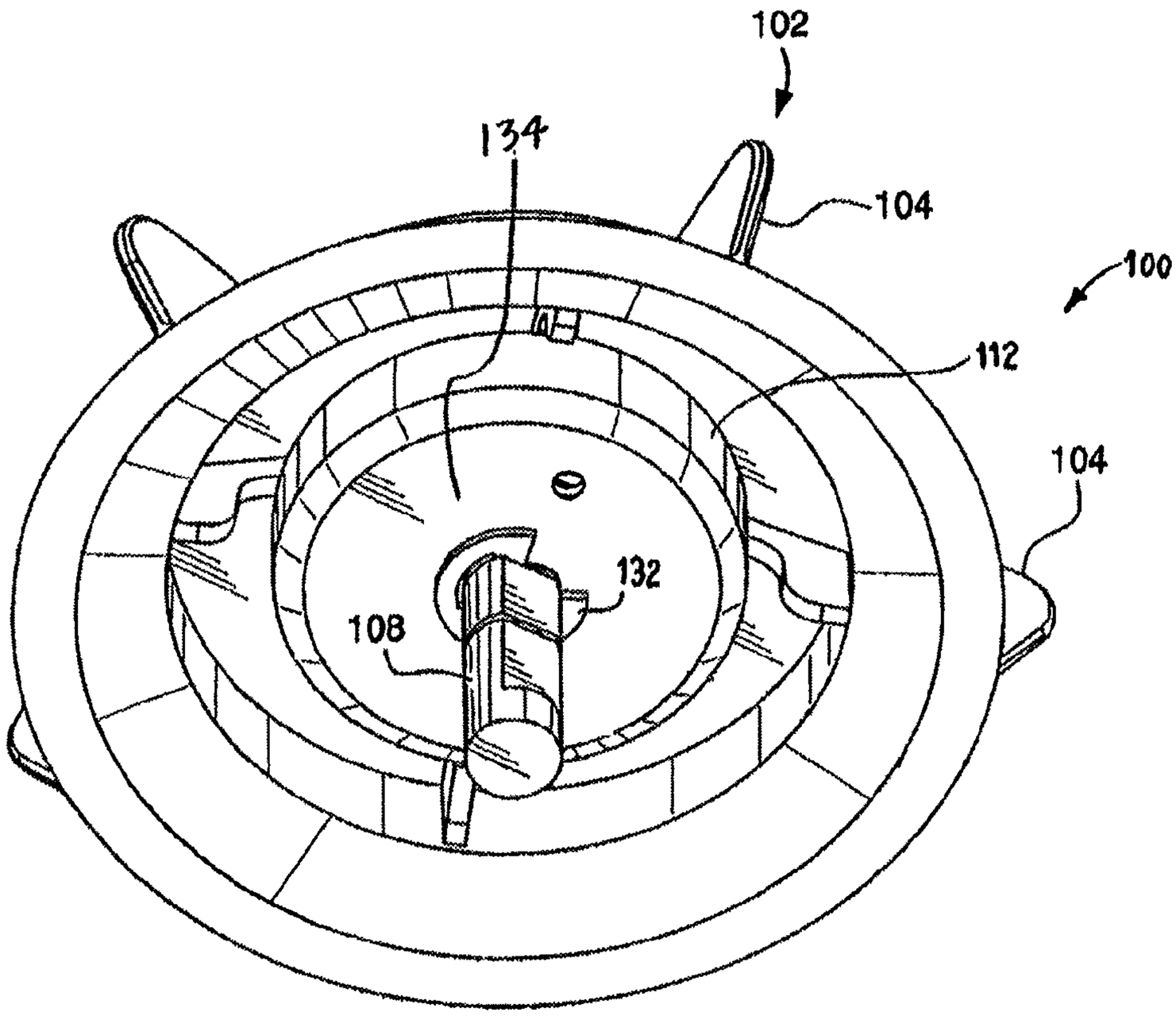

FIG. 7

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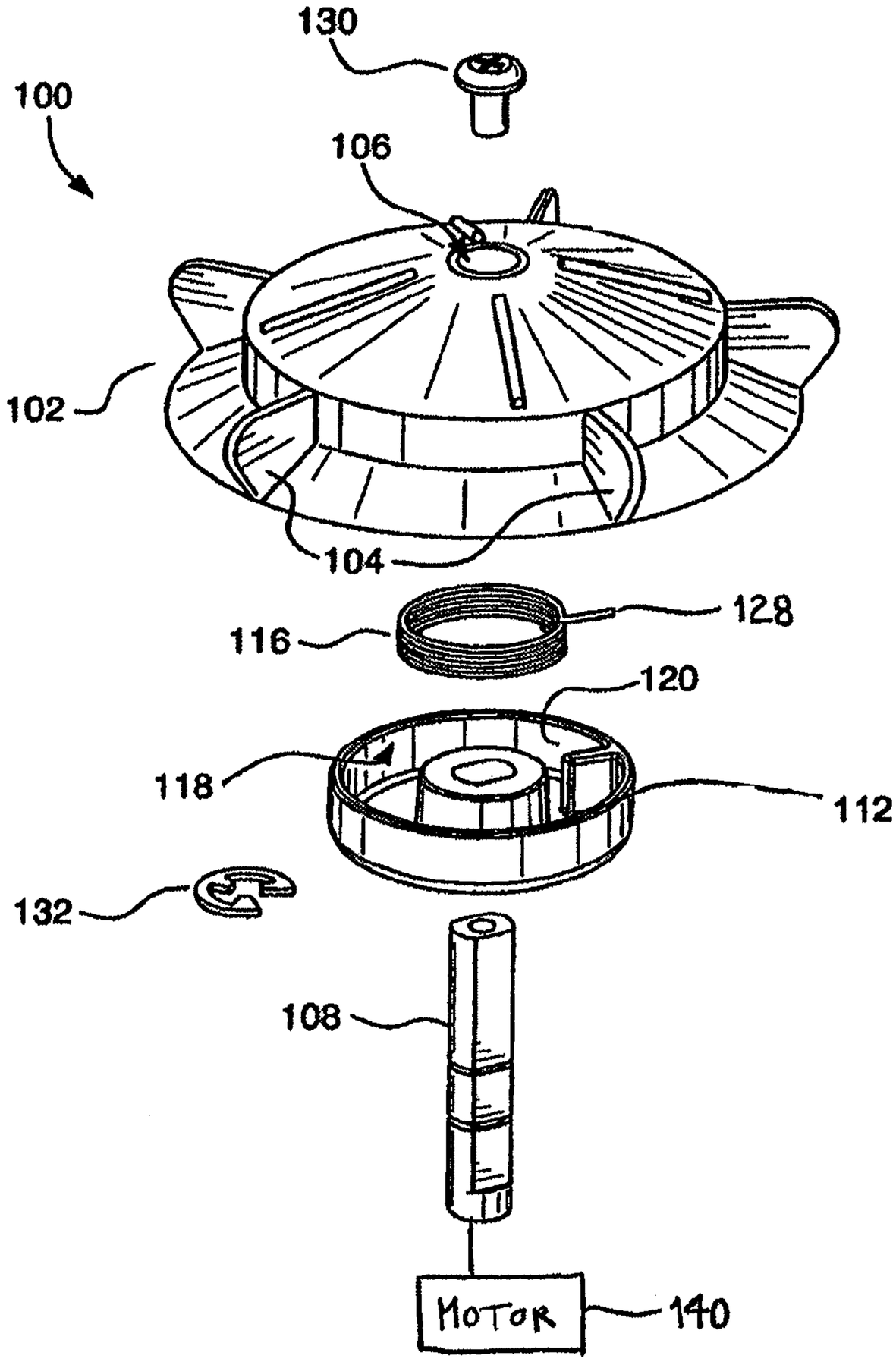

FIG. 8
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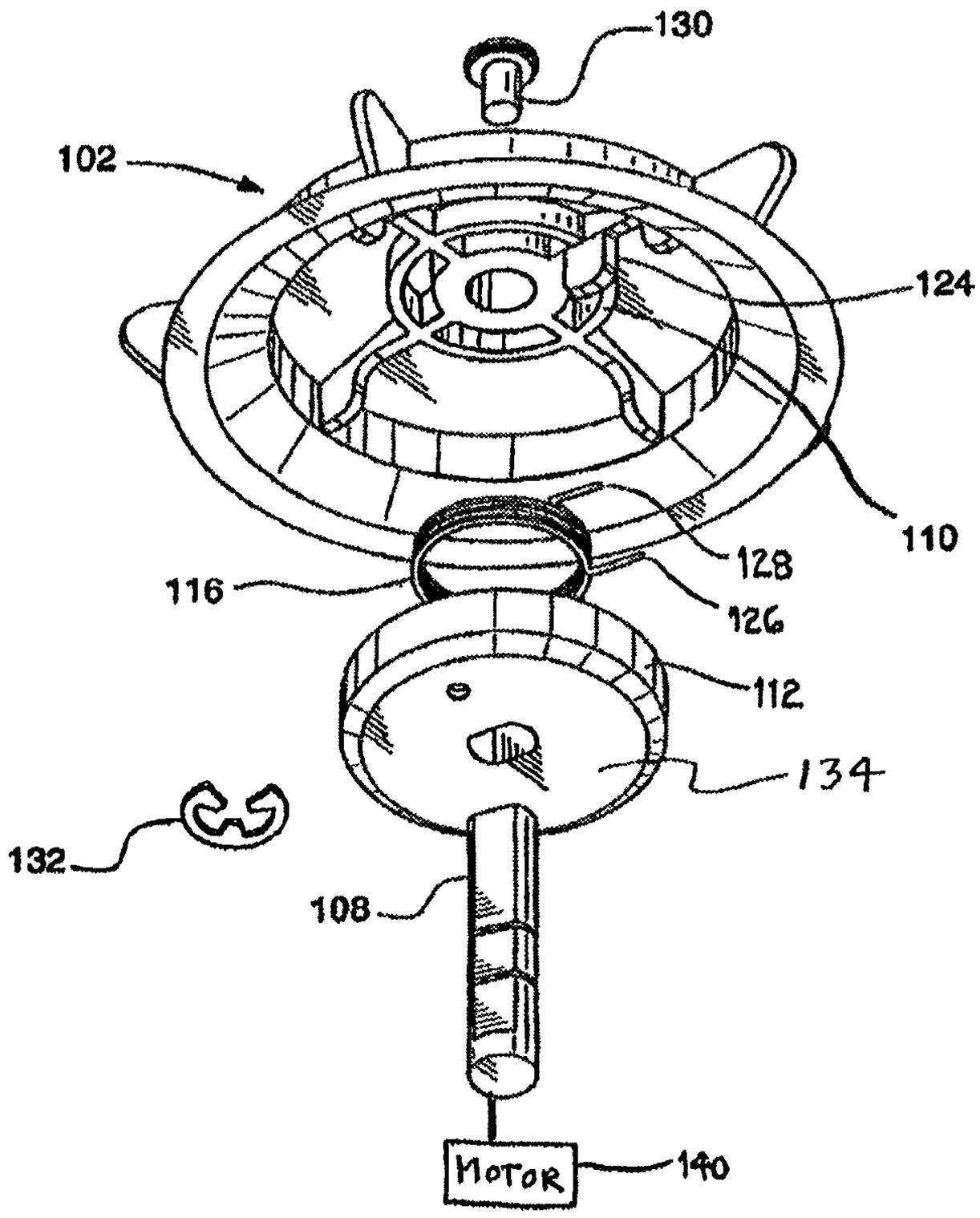

FIG. 9

AMENDED

SPRING LOADED FEED MECHANISM FOR PAINTBALL LOADER

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

RELATED APPLICATIONS

This application is a continuation-in-part of a co-pending U.S. patent application Ser. No. 09/949,440, entitled "Drive Cone for Paintball Loader," filed Sep. 7, 2001 in the names of James T. Christopher and Chris T. Goddard, which is a continuation-in-part of U.S. patent application Ser. No. 09/689,573, entitled "Rapid Feed Paintball Loader With Pivotable Deflector," filed Oct. 12, 2000 in the names of James T. Christopher and Albert G. Schilling, which is a continuation-in-part of U.S. patent Ser. No. 09/465,440, filed Dec. 16, 1999 in the names of James T. Christopher and Albert G. Schilling and now U.S. Pat. No. 6,213,110, which is hereby incorporated in its entirety by reference herein.

BACKGROUND OF THE INVENTION

1. Technical Field of the Invention

This invention relates to paintball loaders, and more particularly, to a spring-loaded feed mechanism feeding paintballs into a paintball gun.

2. Description of Related Art

Games utilizing paintball guns have increased in popularity over the past few years. Players of these games normally shoot paintballs at each other through paintball guns. The paintballs are gelatin-covered spherical capsules filled with paint. During play of the game, the players on each team advance toward each other. A player is eliminated from the game when the player is hit by a paintball fired from an opposing player's gun. When the paintball hits a player, a "splat" of paint is left on the player.

Normally an existing paintball loader includes a housing which is placed on an upper portion of a paintball gun. The housing is shaped to hold a large quantity of paintballs. At the bottom of the housing is an outlet tube through which the paintballs drop by the force of gravity. The outlet tube leads to an inlet tube located on the upper portion of the gun.

During the operation of existing paintball loaders, paintballs sequentially drop by gravity through the outlet tube into the inlet tube of the gun. The inlet tube directs each paintball into the firing chamber of the gun, where the paintball is propelled outwardly from the gun by compressed air.

The paintball gun and accessories have increased in performance and complexity over the years. Players demand high rates of fire of paintballs from the paintball guns with little or no jamming. However, existing paintball guns are limited in how fast they can accelerate to a rapid firing rate by the performance of the motor driving the paintball loader. In addition, if a loader is feeding paintballs at a high rate of balls per second, when the paintball gun discontinues firing, the loader rate of feeding paintballs must be immediately stopped, primarily through a braking mechanism to instantly stop the rotation of the loader. But such abrupt changes in the loader's rotation rate oftentimes results in paintball jams, as well as subjecting the paintball loader to undesirable forces. A paintball loader is needed which efficiently converts the

mechanical energy present at a high feed rate into potential energy for use by the loader during rapid startups. A paintball loader is specifically needed which utilizing a spring-loaded feed mechanism within the paintball loader to increase the performance of the loader.

Co-pending U.S. patent application Ser. No. 09/689,573 ('573) describes a paintball feed system providing enhanced performance over existing paintball feed systems. Additionally, '573 discloses a paintball loader which reliably and forcibly delivers paintballs to a paintball gun at a rapid, selectable rate, while actively preventing paintball jams. The paintball loader utilizes a drive cone to actively feed the paintballs to the paintball gun. However, when paintballs are no longer required to be fed to the paintball gun, the drive cone must be immediately stopped through the use of a braking mechanism. The braking mechanism rapidly slows the rotation of the drive cone, which subjects the drive cone to undesirable forces. These forces cause wear and tear on the paintball loader. Additionally, when an operator wishes to immediately fire paintballs at a fast rate, the drive cone must accelerate from a stationary position to a high rotation speed. Obviously, the time necessary to accelerate to a high rotational rate is limited by the torque provided by the motor driving the drive cone. Over-driving of a feed mechanism may also introduce undesirable forces on the paintballs located within the loader, resulting in paintball breakage or jams.

It would be a distinct advantage to have an apparatus which increases the performance of the paintball loader by decreasing the acceleration time necessary to rotate the drive cone at a high rate, while deceasing the undesirable forces on the loader when stopping the rotation of the drive cone. It would also be advantageous to have a mechanism which can be used in any paintball loader, enabling the simple modification of the feed mechanism used by the paintball loader. It is an object of the present invention to provide such an apparatus.

SUMMARY OF THE INVENTION

In one aspect, the present invention is a feed mechanism for use on a paintball loader. The feed mechanism includes an axial member longitudinally positioned about a center axis. The axial member is rotated by a motor. In addition, a spring communicates with the axial member. The spring compresses during rotational deceleration of the axial member and assists in the rotational acceleration of the axial member.

In another aspect, the present invention is a feed mechanism for use on a paintball loader. The feed mechanism includes an agitating device for feeding paintballs from the paintball loader to a paintball gun and a spring communicating with the agitating device. The spring is compressed when the agitating device is rotationally decelerated and released to assist in the rotational acceleration of the agitating device prior to the initiation of the rotation of the agitating device.

In still another aspect, the present invention is a rapid feed paintball loader for use on a paintball gun. The paintball loader includes a container for holding a plurality of paintballs, a feed mechanism rotatably mounted on a bottom portion of the container and at least one fin affixed to the feed mechanism. A motor is used to rotate the feed mechanism. An exit tube exits from the bottom portion of the container and leads to an inlet tube of the paintball gun. A spring is contained within the feed mechanism. The spring compresses during rotational deceleration of the feed mechanism and releases to expand prior to acceleration of the feed mechanism.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and its numerous objects and advantages will become more apparent to those

skilled in the art by reference to the following drawings, in conjunction with the accompanying specification, in which:

FIG. **1** is a side elevational view of a rapid feed paintball loader constructed in accordance with the teachings of the present invention and operatively attached to a representative paintball gun illustrated in phantom;

FIG. **2** is a **[**side view illustrating**]** *cross-sectional view showing a simplified schematic illustration of* an interior portion of a feed mechanism in the preferred embodiment of the present invention;

FIG. **3** is a top cross section view **[**of the drive cone of FIG. **2]** *showing a simplified schematic illustration of the interaction between the pressure wall, retaining wall, and spring of the feed mechanism of the present invention*;

FIG. **4** is a top view of a drive cone having a plurality of fins;

FIG. **5** is a top view of an agitating device having a plurality of paddles;

FIG. **6** is a top view of a feed mechanism utilizing a coiled spring in an alternate embodiment of the present invention;

FIG. **7** is a *more detailed* bottom perspective view of the **[**drive cone**]** *feed mechanism* of FIG. **2**;

FIG. **8** is **[**an**]** *a more detailed* exploded front perspective view of the feed mechanism of FIG. **2**; and

FIG. **9** is **[**an**]** *a more detailed* exploded bottom perspective view of the feed mechanism of FIG. **2**.

DETAILED DESCRIPTION OF EMBODIMENTS

A spring-loaded feed mechanism for use on a paintball loader for rapidly delivering paintballs is disclosed. FIG. **1** is a side elevational view of a rapid feed paintball loader **40** constructed in accordance with the teachings of the present invention and operatively attached to a representative paintball gun **20** illustrated in phantom. The paintball gun **20** includes a main body **22**, a compressed gas cylinder **24**, a front handgrip **26**, a barrel **28**, and a rear handgrip **30**. The paintball gun also includes an inlet tube **32** leading to a firing chamber (not shown) in the interior of the main body and a trigger **34**. The front handgrip projects downwardly from the barrel and provides an area for gripping by an operator of the paintball gun. The compressed gas cylinder is typically secured to a rear portion of the paintball gun. The compressed gas cylinder normally contains CO_2, although any compressible gas may be used.

In operating the paintball gun **20**, the trigger **34** is squeezed, thereby actuating the compressed gas cylinder to release bursts of compressed gas. The bursts of gas are used to eject paintballs outwardly through the barrel **28**. The paintballs are continually fed by the paintball loader **40** through the inlet tube to the firing chamber. Although FIG. **1** depicts an automatic paintball gun, the paintball gun **20** may also be a semi-automatic gun.

The rapid feed paintball loader **40** includes a paintball container **42** having a container wall **44** forming an interior area **46**. The container is divided into an upper portion **48** and a lower portion **50**. An exit tube **52** leads from the bottom portion of the container to an outlet opening **54**. The exit tube is positioned on top of the inlet tube **32** of the paintball gun **20**.

FIG. **2** is a **[**side**]** *cross-sectional* view **[**illustrating an**]** *showing a simplified schematic illustration of the components of the* interior portion of a feed mechanism **100** in the preferred embodiment of the present invention. *More detailed illustrations of the components of the feed mechanism are shown in FIGS. 7-9.* The feed mechanism may be any device which feeds paintballs into the paintball gun **20**. As illustrated, a drive cone **102** is shown. The drive cone includes fins **104** which drives paintballs into the exit tube **52**. The drive cone includes a cylindrical opening **106** running longitudinally down a center portion of the drive cone. The drive cone is positioned over an axial member **108**. The axial member includes an inner spool **110** and an outer spool **112**. A spring chamber **114** providing a circular void between the inner and outer spools is used to house a spring **116**. Affixed to an interior outer spool wall **118** is a pressure wall **120**. On an outer inner spool wall **122** is affixed a retaining wall **124**.

FIG. **7** is a *more detailed* bottom perspective view of the **[**drive cone **102]** *feed mechanism 100* of FIG. **2**. FIG. **8** is **[**an**]** *a more detailed* exploded front perspective view of the feed mechanism **100** of FIG. **2**. An attachment bolt **130** is used to affix the drive cone to the axial member **108**. In addition, a collar **132** is positioned around the axial member. FIG. **9** is **[**an**]** *a more detailed* exploded bottom perspective view of the feed mechanism of FIG. **2**.

FIG. **3** is a top cross section view of the **[**drive cone **102** of FIG. **2]** *feed mechanism of the present invention showing a simplified schematic illustration of the interaction between the pressure wall 120, retaining wall 124 and spring 116. More detailed illustrations of the components of the feed mechanism are shown in FIGS. 7-9.* The inner spool **110** may rotate separate, as well as in an opposite direction, from outer spool **112**. The **[**outer**]** *inner* spool may be held in a stationary position by tension created by paintballs positioned between the fin's **104** when paintballs and loader are dormant. During this phase of operation, the **[**inner**]** *outer* spool may be rotated in a counter-clockwise direction, which causes the retaining wall *and the pressure wall* to compress the spring. The compression of the spring provides storage of the mechanical energy of the rotating drive, thereby storing potential energy for use during rapid rotational acceleration of the drive cone (e.g., stationary to fast a rotational rate).

With reference to FIGS. **1-3** and **7-9**, the operation of the feed mechanism **100** will now be explained. When an operator of the paintball gun discontinues firing the paintball gun **20**, the trigger **34** is released, causing the drive cone rotation to cease. Prior to the present invention, in order to immediately stop the rotation of the drive cone, a braking mechanism was required to abruptly stop the rotation of the drive cone. However, with the introduction of the spring/axial member assembly described above, the drive cone does not require the same level of braking action from the braking mechanism. As the drive cone decreases its rotation, the **[**outer**]** *inner* spool is held in place by the tension placed on the fins **104** by paintballs positioned in gaps between the fins. The **[**inner**]** *outer* spool continues to rotate, at a decreasing rate. The pressure wall located on the interior outer spool wall **118** and the retaining wall **124** located on the inner spool wall **122** compress the spring **116**. Since the **[**inner**]** *outer* spool is allowed to continue rotating for a longer period of time, the braking mechanism need not be applied in such an abrupt manner.

When the operator desires to commence firing the paintball gun, he squeezes the trigger **34**, which allows a paintball to enter the breech of the paintball gun. The removal of the paintball allows the release of the spring tension of the spring prior to the rotation of the drive cone. During rapid rotational acceleration of the drive cone, the startup is enhanced by the release of the **[**outer**]** *inner* spool, causing the spring **116** to assist in rotationally driving the inner spool in a counter-clockwise fashion. Thus, when the **[**outer**]** *inner* spool is released, the retaining wall **124** is rotationally forced in a counter-clockwise direction with the assistance of the spring expanding from its compressed configuration, thus enhancing the acceleration rate of the drive cone.

The spring configuration may be utilized by any agitating device for a paintball gun. For example, the dual spools with the spring may be utilized in a drive cone such as that disclosed in patent application Ser. No. 09/949,440. FIG. **4** is a top view of a drive cone **200** having a plurality of fins **202**. Preferably, the fins are constructed of elasticized rubber. Most drive cones are rotational driven through a center axis **204** to feed a plurality of paintballs **206** into a paintball gun. A paintball container wall **208** is also illustrated. The drive cone may be modified to include the inner spool **110**, the outer spool **112**, and the spring assembly located through the center axis **204**.

Likewise, the spring assembly may be utilized in any agitating device. FIG. **5** is a top view of an agitating device **300** having a plurality of paddles **302**. The agitating device typically rotates around a center axis **304**. The paintballs are rotationally driven into the paintball gun in a similar manner as the drive cone **200** of FIG. **4**. In a similar fashion as discussed in FIG. **4**, the agitating device may also be modified to incorporate a spring and dual spools.

The present invention may be incorporated on any agitating or feed (gravity or active) mechanism for use in a paintball loader. In particular, the present invention has the advantage of merely requiring the modification of the feed mechanism housed within the paintball container without any additional modifications to the gun, inlet/exit tubes, or the container.

Although a simple torsion spring is illustrated and described above, the spring/dual spool configuration is but one of many different configurations which utilize a spring to store mechanical energy. For example a coiled spring may be utilized. FIG. **6** is a top view of a feed mechanism **400** utilizing a coiled spring **402** in an alternate embodiment of the present invention. The feed mechanism may include an inner spool **404** and an outer spool **406**. A spring chamber **408** having a void large enough to accommodate the coiled spring is located between the inner and outer spool. The coiled spring is preferably attached in an outer spool wall **410** on one end of the spring. The coiled spring is then attached to an inner spool wall **412**. The coiled spring may be a conventional coil spring which is coiled about a center axis **414**.

With reference to FIG. **6**, the operation of the coiled spring within the feed mechanism **400** will now be explained. Typically, the feed mechanism is rotated by a motor (not shown) about the center axis **414**. When the operator desires to discontinue the firing of paintball gun **20**, the operator releases the trigger **34**, which removes power from the motor. Rather than employing a braking mechanism to immediately stop the rotation of the feed mechanism, while the **[**outer**]** *inner* spool rotation is stopped, the **[**inner**]** *outer* spool may be allowed to continue to **[**rotation**]** *rotate* for a specific angular distance to allow the coiled spring to compress. The compression of the coiled spring allows the spring to store the mechanism energy created during the deceleration of the feed mechanism. This stored energy may then be utilized to rapidly start the rotation of the feed mechanism.

Still referring to FIG. **6**, when the operator of the paintball gun **20** desires to fire paintballs, the operator squeezes the trigger **34** of the paintball gun, causing the activation of the motor *140*. The motor *140* rotates the feed mechanism. Since the coiled spring **402** is compressed, the rotational acceleration is increased by the expansion of the coiled spring. Thus, the spring assists the motor *140* in spinning the feed mechanism to the required rotational speed.

Although a coiled spring and a torsion spring are described, it should be understood that any spring may be utilized which stores the rotational energy during the deceleration of the feed mechanism of the paintball loader, as well as releasing the stored energy by allowing the spring to assist in increasing the acceleration rate of the feed mechanism during commencement of rapid fire of the paintball gun.

The present invention provides many advantages over existing paintball loaders. The present invention reduces the undesirable forces sustained by the paintball loader when firing of paintballs ceases from a rapid rate. Existing paintball loaders must utilize a braking mechanism to immediately stop rotation of the feed mechanism. However, by utilizing a spring, the rotation of the feed mechanism is not required to be immediately stopped. Rather, the feed mechanism may be allowed to continue to rotate for a specific angular distance to allow compression of the spring. Thus, the braking mechanism is not required to brake the feed mechanism so abruptly. In addition, the acceleration rate of the feed mechanism is increased when the spring is released during rapid accelerations of the paintball loader. Thus, the performance of the loader is dramatically enhanced.

It is thus believed that the operation and construction of the present invention will be apparent from the foregoing description. While the apparatus shown and described has been characterized as being preferred, it will be readily apparent that various changes and modifications could be made therein without departing from the scope of the invention as defined in the following claims.

What is claimed is:

1. A feed mechanism for use on a paintball loader, the feed mechanism comprising:

an axial member longitudinally positioned about a center axis, said axial member being rotatable by a motor;

a first spool *independently* rotatably mounted about the center axis, **[**said first spool being driven by the motor,**]** said first spool including a retaining wall on an exterior wall of the first spool;

a second spool surrounding said first spool, said second spool **[**independently rotatably mounted about the center axis from said first spool**]** *being driven by the motor*, the mounting of the second spool forming a void between said first and second spools, said second spool including a pressure wall located on an interior wall of the second spool;

a spring positioned within the void, said spring being compressed by the pressure wall and the retaining wall, said spring adapted to compress when the **[**agitating device**]** *first spool* rotationally decelerates *relative to the second spool*, and said spring assisting in the rotational acceleration of the **[**axial member**]** *first spool*.

2. The feed mechanism of claim **1** wherein said spring assists in the rotational acceleration of the **[**axial member**]** *first spool* by expanding prior to initiation of the rotation of said **[**axial member**]** *first spool*.

3. The feed mechanism of claim **1**, wherein said spring is a torsion spring, said torsion spring having a first end and an opposite second end.

4. The feed mechanism of claim **1**, wherein said spring is a coil spring wrapped around the first spool, said coil spring having a first end adjacent an exterior wall of the first spool and an opposite second end adjacent an interior wall of the second spool.

5. The feed mechanism of claim **1** further comprising a drive cone positioned over said axial member.

6. The feed mechanism of claim **1** further comprising an agitating device positioned over said axial member.

7. The feed mechanism of claim **6** wherein the agitation device includes a plurality of elasticized fins.

8. A feed mechanism for use on a paintball loader, the feed mechanism comprising:

an agitating device for feeding paintballs from the paintball loader to a paintball gun, said agitating device including an axial member longitudinally positioned about a center axis, said axial member being rotatable by a motor;

a first spool and a second spool;

[a**]** *the* first spool rotatably mounted about the center axis, said first spool **[**being driven by the axial member**]** *adapted to independently rotate about the center axis relative to said second spool*, said first spool including a retaining wall on an exterior wall of the first spool;

[a**]** *the* second spool surrounding said first spool, said second spool *being driven by the axial member and* adapted to independently rotate about the center axis relative to said first spool, said second spool forming a void between said first and second spools, a pressure wall located on an interior wall of the second spool**[**, said spring being compressed by the pressure wall and the retaining wall**]**;

a spring positioned within the void, said spring adapted to compress when the agitating device rotationally decelerates, *said spring being compressed by the pressure wall and the retaining wall,* and whereby said spring releases and assists in the rotational acceleration of the agitating device prior and during initiation of the rotation of the agitating device.

9. The feed mechanism of claim **8**, wherein said spring is a coil spring wrapped around the first spool, said coil spring having a first end adjacent an exterior wall of the first spool and an opposite second end adjacent an interior wall of the second spool.

10. The feed mechanism of claim **8**, wherein the **[**agitation**]** *agitating* device includes a plurality of elasticized fins.

11. A rapid feed paintball loader for use on a paintball gun, the paintball loader comprising:

a container for holding a plurality of paintballs;

a feed mechanism rotatably mounted on a bottom portion of said container;

at least one fin affixed to said feed mechanism;

said feed mechanism including an axial member, **[**a first spool engaged with the axial member for rotating in combination with the axial member about a center axis, said axial member and said first spool being driven by the motor, and**]** *a first spool being independently rotatable about the center axis relative to said second spool, said second spool surrounding at least a portion of said first spool,* a second spool **[**surrounding at least a portion of said first spool, said second spool being independently rotatable about the center axis relative to said first spool**]** *engaged with the axial member for rotating in combination with the axial member about a center axis, said axial member and said second spool being driven by a motor*, a void located between said first and second spools, and a spring positioned within the void;

a motor adapted to rotate said axial member of said feed mechanism;

an exit tube exiting from the bottom portion of said container and leading to an inlet tube of the paintball gun;

means for actuating said motor upon demand;

said first spool including a retaining wall on an exterior wall of the first spool, said second spool including a pressure wall located on an interior wall of the second spool, said spring being compressed by the pressure wall and the retaining wall, said spring adapted to compress when the agitating device rotationally decelerates, and said spring adapted to release and assist in the rotational acceleration of the agitating device prior and during initiation of the rotation of the agitating device.

12. The feed mechanism of claim **11**, wherein said spring is a coil spring wrapped around the first spool, said coil spring attached on a first end to an exterior wall of the first spool and attached on an opposite second end to an interior wall of the second spool.

13. The feed mechanism of claim **11**, wherein said fin is an elasticized fin.

14. A feed mechanism for use on a paintball loader, the feed mechanism comprising:

an axial member longitudinally positioned about a center axis, the axial member adapted to engage with and be rotatable by a motor;

a first spool and a second spool;

[a**]** *the* first spool **[**engaged with the axial member so as to be rotatable about the center axis in combination with the axial member**]** *being mounted so as to be independently rotatable about the center axis relative to the second spool*;

[a**]** *the* second spool positioned adjacent to the first spool, the second spool **[**being mounted so as to be independently rotatable about the center axis relative to the first spool**]** *engaged with the axial member so as to be rotatable about the center axis in combination with the axial member*, the mounting of the second spool defining a void between the first and second spools;

a spring positioned within the void, the spring having a first free end and a second free end, the first free end being positioned adjacent but unattached to the first spool, the second free end being positioned adjacent but unattached to the second spool, the first and second free ends adapted to connect with the first and second spools respectively upon activation of the feed mechanism.

15. The feed mechanism of claim **14**, wherein the first spool includes a retaining wall on an exterior wall of the first spool, and wherein the second spool includes a pressure wall on an interior wall of the second spool, the first free end of the spring positioned adjacent to and adapted to contact the retaining wall, and the second free end of said spring positioned adjacent to and adapted to contact the pressure wall.

16. The feed mechanism of claim **15**, wherein the **[**second**]** *first* spool is formed as **[**the**]** *a* lower surface of a drive cone, said pressure wall extending downwardly from the second spool.

17. The feed mechanism of claim **14**, further including a drive cone positioned over said axial member.

18. The feed mechanism of claim **14**, further including an agitating device positioned over said axial member.

19. The feed mechanism of claim **18**, wherein the **[**agitation**]** *agitating* device includes a plurality of elasticized fins.

20. A feed mechanism for use on a paintball loader, the feed mechanism comprising:

an agitating device for feeding paintballs from the paintball loader to a paintball gun, said agitating device including an axial member longitudinally positioned about a center axis, said axial member adapted to engage with and be rotatable by a motor;

a first spool and a second spool;

[a**]** *the* first spool rotatably mounted about the center axis, said first spool adapted to rotate **[**in combination with said axial member**]** *independently from said second spool*;

[a**]** *the* second spool positioned adjacent to said first spool, said second spool **[**adapted to rotate independently from said first spool**]** *adapted to rotate in combination with said axial member*, the first and second spools defining a void between them; and

a spring positioned within the void, said spring having a first free end and a second free end, said first free end positioned adjacent to said first spool and formed so as to releasably engage with the first spool, said second free end positioned adjacent to said second spool and located so as to releasably engage the second spool.

21. The feed mechanism of claim **20**, wherein said first spool includes a retaining wall on an exterior wall of the first spool, and wherein said second spool includes a pressure wall on an interior wall of the second spool, said first free end of said spring is positioned to contact the retaining wall and said second free end of said spring is positioned to contact the pressure wall, wherein the relative movement of said retaining wall and pressure wall with respect to one another controls winding of said spring.

22. The feed mechanism of claim **21**, wherein the **[**second**]** *first* spool is formed as the lower surface of a drive cone, said pressure wall extending downwardly from the second spool.

23. The feed mechanism of claim **21**, wherein said spring is a coil spring wrapped around the first spool, wherein the first and second free ends are legs that extend radially outward from the coil spring.

24. A rapid feed paintball loader for use on a paintball gun, the paintball loader comprising:

a container for holding a plurality of paintballs;

a motor for feeding paintballs;

an exit tube exiting from the bottom portion of said container and leading to an inlet tube of the paintball gun;

means for actuating said motor upon demand; and

a feed mechanism rotatably mounted on a bottom portion of said container, the motor being engaged with the feed mechanism, the feed mechanism including:

at least one fin affixed to said feed mechanism, said feed mechanism including an axial member engaged with the motor, *a first spool and a second spool*, **[**a**]***the* first spool **[**slidably disposed on the axial member for rotating in combination with the axial member**]** *adapted to rotate independently from the second spool*, **[**a**]** *the* second spool adjacent to the first spool, said second spool **[**adapted to rotate independently from said first spool**]** *slidably disposed on the axial member for rotating in combination with the axial member*, the first and second spools defining a void between them, and a spring positioned within the void, said spring having a first free end and a second free end, said first free end positioned adjacent to said first spool and formed so as to releasably engage with the first spool, said second free end positioned adjacent to said second spool and located so as to releasably engage the second spool.

25. The feed mechanism of claim **24**, wherein said first spool includes a retaining wall on an exterior wall of the first spool, and wherein said second spool includes a pressure wall on an interior wall of the second spool, said first free end of said spring is positioned to contact the retaining wall and said second free end of said spring is positioned to contact the pressure wall, wherein the relative movement of said retaining wall and pressure wall with respect to one another controls winding of said spring.

26. The feed mechanism of claim **25**, wherein the **[**second**]** *first* spool is formed as **[**the**]** *a* lower surface of a drive cone, said pressure wall extending downwardly from the second spool.

27. The feed mechanism of claim **25**, wherein said spring is a coil spring wrapped around the first spool, wherein the first and second free ends are legs that extend radially outward from the coil spring.

28. The feed mechanism of claim **24**, wherein said fin is an elasticized fin.

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