

Declaration of Amanda Bligh Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 8,640,683

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Splat-R-Ball, LLC, Daisy Manufacturing Company,
and S-Beam Precision Products Ltd.
Petitioners

v.

Spin Master, Inc.
Patent Owner

U.S. PATENT NO. 8,640,683

Case IPR2023-TBD

**DECLARATION OF AMANDA BLIGH UNDER 37 C.F.R. § 1.68 IN
SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 8,640,683**

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I, Amanda Bligh, do hereby declare as follows:

I. INTRODUCTION

1. I have been retained as an expert witness on behalf of Splat-R-Ball, LLC, Daisy Manufacturing Company, and S-Beam Precision Products Ltd. for the above-captioned Petition for *Inter Partes* Review (“IPR”) of U.S. Patent No. 8,640,683 (the “’683 Patent”). I am being compensated for my time in connection with this IPR at my standard consulting rate of \$350 per hour. My compensation is not affected by the outcome of this matter.
2. I have been asked to provide my opinions regarding whether Claims 1-14 of the ’683 Patent (“the Challenged Claims”) would have been obvious to a person having ordinary skill in the art at the time of the alleged invention.
3. The ’683 Patent issued on February 4, 2014, from U.S. Patent Appl. No. 13/761,082 (“the ’082 application”), filed on February 6, 2013. Ex. 1001 at Cover. The application that led to the ’683 Patent was a divisional application from the application that issued as the ’282 Patent.
4. For the purposes of my Declaration, I have used the alleged invention dates claimed by Patent Owner in the related ITC Investigation, specifically, February 21, 2010 as the date of the alleged invention for claims 1, 3, 4, and 11, April 8, 2010 as the date of the alleged invention for claim 14, and the ’282 Patent filing date of May 10, 2010 for claims 2, 5-10, and 12-13. Whether

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the date of alleged invention is February 21, 2010, April 8, 2010, or May 10, 2010 has no impact on the opinions I offer in this Declaration.

5. The face of the '683 Patent names Keith G. Meggs, Ronald Brawer, Michael G. Hoeting, and Neil Hamilton as the purported inventors, and identifies The Maya Group as the purported assignee. Ex. 1001 ('683 Patent) at Cover. I understand that Spin Master, Inc. alleges it currently owns the '683 Patent and Hasbro, Inc. alleges it has an exclusive license to the '683 Patent.
6. In preparing this Declaration, I have reviewed the '683 Patent, the file history of the '683 Patent, multiple prior art references, and technical and state of the art references from the time of the alleged invention.
7. I understand that claims in an IPR are construed using the same claim construction standard that would be used to construe the claim in a civil action, including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.
8. In forming the opinions expressed in this Declaration, I relied upon my education, training, knowledge, and experience in the relevant art, and have considered the viewpoint of a person having ordinary skill in the relevant art as of February 10, 2010, April 8, 2010, and May 10, 2010 ("POSITA"). I have further considered and relied upon the materials cited in this Declaration,

as well as a conversation with Dr. Wanat. My opinions are based, at least in part, on the following references, as well as the art and publications cited throughout this Declaration::

Reference	Date of Publication
JP2006-234191 to Nagayoshi (“Nagayoshi”) + English Translation (Ex. 1009)	September 7, 2006
ThinkGeek Spitballs (Ex. 1007)	November 27, 2009

II. BACKGROUND AND QUALIFICATIONS

9. I am a mechanical and industrial engineer. As a mechanical and industrial engineer, I have worked extensively on the analysis, design, manufacture, and improvement of mechanical systems. A copy of my curriculum vitae is submitted as Ex. 1004 and provides a description of my professional experience, my academic history, my patents, and my publications. I have been a practicing engineer for over 20 years and have a Bachelor of Science in Mechanical Engineering and a master’s and Ph.D. in Industrial and Systems Engineering. I have received four utility patents. My undergraduate thesis focused on the application of a product development process for product improvement of an electric scooter. My Master’s research focused on tool selection for use within the product development process based on industry

needs and market focus, including tools focusing on product improvement and ideation. My Ph.D. research focused on modeling the environmental impact of manufacturing for use in the design and selection of optimal mechanical products.

10. From April 2003 to June 2007, I served as a product engineer at Hasbro. I worked on design and development of a number of toy projectile launchers while at Hasbro. I also served as a subject-matter expert to assist Master's student candidates at the Massachusetts Institute of Technology (MIT) who were engaged in the design and development of toy projectile launchers for their theses, and gave them feedback on design directions.
11. I have worked within the area of design decision-making support using design for manufacturing and cost assessments at aPriori Technologies as a principal research scientist, consulting engineer, and solution architect, regularly presenting on and receiving rewards for my work. I currently work supporting engineering and manufacturing decision-making via the implementation of digital engineering tools at Re:Build Manufacturing as a senior principal scientist, publishing regularly internally on impactful projects I have led within the organization.
12. Through these positions, I have participated in the design, engineering, and product management of a variety of toy projectile launchers, including those

that shoot foam darts, foam balls, water, and ooze, and have received patents in this area. By 2010, I had more than one year of experience designing projectile launching systems.

13. I have also taught design for manufacturing (DFM) at the University of Rhode Island to graduate and undergraduate students. The discipline of DFM focuses on improving the design of products through the application of systematic analysis of materials, product embodiment, and manufacturing techniques to result in more marketable products via cost reduction and increased manufacturing and assembly quality. I additionally am a volunteer mechanic apprentice at Bikes Not Bombs, a non-profit building mechanical skills in bicycle repair, maintenance, and assembly for underserved members and youth of the Boston community. In this role, I regularly engaged in creative reassembly of bikes for resale and support the skill development of younger apprentices in mechanical activities.
14. Based my background in engineering design and manufacturing, including my experience designing projectile toys and launchers, I believe that I am qualified to offer opinions as an expert with respect to the projectile launchers described and claimed in the '683 Patent and the various prior art references discussed throughout this Declaration, and on the validity or invalidity of the Challenged Claims. Other details concerning my background, including

patents, professional service, and more, are set forth in my *curriculum vitae*.

Ex. 1004 (Bligh CV).

III. UNDERSTANDING OF PATENT LAW

15. I am not an expert in patent law, and am not offering any opinions on the legal standards. Below I provide my understanding of the law as it has been conveyed to me by counsel, and I applied this understanding when rendering my opinions in this Declaration.
16. I understand that the meaning of claim terms is a legal question that is decided by the Judge. I understand that patent claim terms are given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the alleged invention in view of the claims, patent specification, and patent prosecution history, which are referred to as the “intrinsic evidence.” I have done so in this report. Where I understand that Petitioner and Patent Owner have provided different constructions for a term, I have applied the constructions as set forth below.
17. I understand that the specification is highly relevant to how a POSITA would understand the terms of the claims. I also understand that a claim-term meaning that stays true to the claim language and most naturally aligns with the patent’s description of the invention is usually the proper construction. I further understand that books, other patents, articles, dictionaries, and expert

testimony (called “extrinsic evidence”) can also be useful in interpreting patent claims, but that extrinsic evidence cannot alter the plain meaning of a claim term as a POSITA would have understood it in the context of the intrinsic evidence.

18. I understand that prior art to the '683 Patent includes patents and printed publications in the relevant art that were published before the February 21, 2010, alleged invention date of the '683 Patent Claims 1, 3, 4, and 11, includes patents and printed publications in the relevant art that were published before the April 8, 2010, alleged invention date of the '683 Patent claim 14, and includes patents and printed publications in the relevant art that were published before the May 10, 2010 filing date of the '282 Patent for Claims 2, 5-10, and 12-13.
19. I understand that a claim is invalid if it is anticipated or obvious. Anticipation of a claim requires that every element of a claim be disclosed expressly or inherently in a single prior art reference, arranged in the prior art reference as arranged in the claim. I understand that a limitation is inherently disclosed if it is necessarily present. I understand that if any claim limitation is not disclosed by the single prior art reference, then that prior art reference does not anticipate the claim.

20. Obviousness of a claim requires that the claim be obvious from the perspective of a person having ordinary skill in the relevant art at the time the alleged invention was made. I understand that a claim may be obvious in view of a single prior art reference, or may be obvious based on a combination of two or more prior art references.
21. I understand that an obviousness analysis requires an understanding and consideration of the scope and content of the prior art, any differences between the alleged invention and the prior art, the level of ordinary skill in evaluating the pertinent art, and any secondary considerations of nonobviousness (if any).
22. With respect to secondary considerations, I understand that certain factors may support or rebut the obviousness of a claim, and these are often referred to as “secondary considerations.” I understand that such factors include, among other things, (i) commercial success of the alleged invention, (ii) skepticism of those having ordinary skill in the art at the time of the alleged invention, (iii) unexpected results achieved by the alleged invention, (iv) any long-felt but unsolved need in the art that was satisfied by the alleged invention, (v) the failure of others to make the alleged invention, (vi) praise of the alleged invention by others having ordinary skill in the art, and (vii) copying of the alleged invention by others in the field. I also understand that

contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

23. I understand that there must be a nexus—that is, a connection between the merits of the claimed invention and any submitted secondary considerations evidence—in order for the evidence to be pertinent to the obviousness inquiry.

I understand that if there is not a nexus between the secondary considerations evidence and the claimed invention, that is not indicative of nonobviousness.

24. I provide additional information regarding certain secondary considerations below:

- **Commercial Success:** I understand that a strong showing of commercial success can indicate non-obviousness, but only when commercial success is attributable to the novel or non-obvious aspects of the claimed invention. I also understand that commercial success has minimal relevance to the obviousness inquiry unless the features of the product that drove the alleged commercial success was driven by the novel aspects of the claimed invention. The success must not be due to unrelated factors, such as look and feel of a product, advertising, design/ornamentation, or market power. I also understand that commercial success must have a nexus to features of the claimed invention not disclosed in the prior art. That is, the commercial success is material only if it comes from the merits of the claimed invention beyond what the prior art disclosed.
- **Industry Praise:** I understand that praise from others skilled in the art for the claimed invention may be indicative of nonobviousness. I understand that “industry praise” does not include marketing materials or self-praise by the patent owner. I further understand that, like commercial success, praise is only relevant if it relates to the novel or non-obvious aspects of the claimed invention. Praise for unrelated

factors and unclaimed features, or praise of features known in the prior art, is not indicative of nonobviousness.

- **Copying:** I understand that evidence that others copied the patented invention, as opposed to a prior art device, may indicate non-obviousness. In order to be considered “copying” for purposes of secondary considerations, it is not enough to merely assert that the allegedly copycat product infringes; the Patent Owner must show the alleged copycat had access to a patented product and actually copied it.
- **Commercial Acquiescence:** I understand that the willingness of others in the industry to license the patent at issue may indicate non-obviousness. I understand that the motivation for others to obtain a license is important, because a licensee’s respect for the invention differs from a desire to avoid litigation. For example, I understand that it is often less expensive to take a license than to defend charges of patent infringement. I also understand that the existence of one or more licenses is not necessarily a significant consideration.
- **Simultaneous Invention:** I understand that evidence of other, independently made, simultaneous inventions occurring within a comparatively short space of time are evidence that the claimed invention was the product of only ordinary skill, and can further support a finding of obviousness.

25. I understand that even if there is secondary considerations evidence that has a nexus to the Challenged Claims, that does not mean that the patent claims must be nonobvious. Rather, it is one element that must be considered in the overall obviousness analysis. I understand that weak secondary considerations evidence may not overcome a strong showing of obviousness in view of the prior art.

26. I further understand that a claim is obvious if it unites old elements with no change to their respective functions, or alters prior art by mere substitution of

one element for another known in the field, and that combination yields predictable results. While it may be helpful to identify a reason for this combination, common sense should guide the analysis and no rigid requirement of finding a teaching, suggestion, or motivation to combine is required. When a product is available, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person having ordinary skill in the relevant art can implement a predictable variation, obviousness likely bars its patentability. For the same reason, if a technique has been used to improve one device and a person having ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious. I understand that a claim may be obvious if common sense directs one to combine multiple prior art references or add missing features to reproduce the alleged invention recited in the claims.

IV. SUMMARY OF MY OPINIONS

27. In my opinion, Claims 1-3, 10, 11, and 13 of the '683 Patent are anticipated by ThinkGeek Spitballs.
28. In my opinion, claims 1-12 and 14 of the '683 Patent are rendered obvious by the combination of Nagayoshi and ThinkGeek Spitballs.

V. BACKGROUND OF THE '683 PATENT AND PROSECUTION HISTORY

A. Summary of the '683 Patent

29. The '683 Patent is directed to “soft-projectile launching devices” that launch “super absorbent polymer projectiles.” Ex. 1001 at 1:12-16. The '683 Patent explains that projectile launching devices were well known in the art in 2010 and included “a variety of different types of launching toys” including popular Nerf-branded “blasters.” Ex. 1001 at 1:20-30. The '683 Patent state that some toy projectile launchers, like those made by Nerf, used foam or foam like materials as projectiles because of their “soft and light” properties so that they can be “fired from toy weaponry with little risk of injury.” Ex. 1001 at 1:37-48. The '683 Patent recognizes that paint ball guns and airsoft guns were also well-known and were used both for “gaming” and for “professional training purposes.” Ex. 1001 at 1:63-67.
30. In my opinion, the '683 Patent is not directed to any particular type of “projectile launcher.” Instead, the '683 Patent states that the “[t]he present patent document discloses and teaches projectile launching devices, such as toys, amateur guns and weaponry that use projectiles formed from a super absorbent polymer (SAP).” Ex. 1001 at 3:54-57. The '683 Patent further explains that “projection device 10 can be a bow, crossbow, sling shot, hand

gun, machine gun, futuristic weapon, catapult, or shaped as any other type of weaponry” and can be made of various materials “including metals, rubbers and plastics.” Ex. 1001 at 5:3-17. Likewise, the “firing mechanism” of projection device 10 “may be based on any of the known ways of firing or launching projectiles or ammunition from a projection device.” Ex. 1001 at 5:18-28.

31. According to the '683 Patent, however, foam materials, like used with Nerf-branded guns, have “significant drawbacks when use as projectiles for projectile launching toys.” Ex. 1001 at 1:49-62. The '683 Patent explains that foam projectiles are “highly susceptible to air forces” and are negatively impacted by air resistance and drag. Ex. 1001 at 1:49-62. While the specification does not indicate that the projectiles used with paint ball guns or airsoft guns have the same susceptibility to air forces as foam projectiles, it explains that they “are for adult use only due to the energy imparted to the projectile and the ability of the projectile to do serious harm.” Ex. 1001 at 1:63-67.
32. The '683 Patent suggests that a projectile launcher that launches super absorbent polymers “may increase the user experience as compared to foam-based projectile toys, yet [] remain safe for children to use.” Ex. 1001 at 3:10-13.

B. Summary of the Prosecution History

33. I have reviewed the prosecution history of the '683 Patent, as well as the related U.S. Patent Nos. 8,272,282 (the "'282 Patent") (for which I prepared a separate declaration) and 8,596,255 (the "'255 Patent").
34. The application that led to the '282 Patent was the first filed application, and there were no Office Actions—which I understand are communications from the patent Examiner relating to the application—addressing prior art during prosecution of the application. Ex. 1024. The Patent Office did not comment on the prior art submitted with the application or found by the Examiner. Ex. 1024. The Patent Office did issue several restriction requirements, which were communications where the Examiner requested that the applicant select between claims directed toward “ammunition” and claims directed to “a launcher and ammunition.” Ex. 1024 at 88. The applicant selected to pursue claims directed to “ammunition” and dropped the claims directed to “a launcher and ammunition.” Ex. 1024 at 94. The claims then issued without a substantive rejection, after an Examiner’s amendment adding the underlined text to claim 1: “Ammunition configured for use with a projectile launcher comprising...” Ex. 1024 at 174. This appears to be consistent with the restriction requirement, in that the Examiner was indicating that the

“projectile launcher” is required by the claim, but rather the claim is directed to ammunition.

35. The '683 Patent was filed as a divisional application from the application issued as the '282 Patent. I understand from counsel that this means the '683 and '282 Patents are related and share the same specification. Like the '282 Patent, there were no Office Actions or rejections addressing the prior art during prosecution of the '683 Patent. Ex. 1002. The Examiner amended claim 1 to add the requirement that the ammunition is “substantially spherical,” but did not explain why the amendment was made. Ex. 1002 at 64.
36. U.S. Patent No. 8,596,255 is a continuation-in-part of the '282 Patent, which I understand means it includes additional material in the specification compared to the '282 Patent. In the '255 prosecution history, the Patent Office issued an obviousness rejection. Ex. 1052 at 93-104. The Patent Office relied on, among other references, U.S. Patent No. 6,386,293 (“Bartlett”). Ex. 1052 at 93-104. The Examiner explained that “Bartlett, however, teaches of a device (Figs. 1,3, 6 and 8) for projecting super absorbent polymer (Cl. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the super absorbent polymer material of Bartlett with the disclosure of Zulloff to launch a projectile comprised of super absorbent polymer.” Ex. 1052 at 97. In response to this rejection, the applicants argued

that (1) fire retardant is a “different[] field of endeavor” that has nothing to do with soft projectiles, and (2) it does not disclose projectiles “having the same shape”:

A fire retardant solution that includes super absorbent polymers is not the same as soft-projectile made from a super absorbent polymer. It would not have been obvious to one skilled in the art at the time of the invention to take a material used as part of a fire retardant solution and use it to make soft-projectiles because they are completely different fields of endeavor. The field of fire retardants has nothing to do with the field of soft-projectiles. Bartlett does not teach, suggest, or make obvious “a plurality of soft-projectiles having the same shape, each soft-projectile being formed from a hydrated super absorbent polymer” but rather discloses an adapter for a fire hose to spray a mixture or slurry that includes super absorbent polymers onto a surface. There is absolutely no relationship between the fire retardant patent of Bartlett, and the claimed soft-projectiles for a projection device. Furthermore, the super absorbent polymer in Bartlett is slurry and is not “a plurality of soft-projectiles having the same shape.”

Ex. 1052 at 114. In response to this argument, the Examiner allowed the claims. The applicants, however, did not provide the Examiner with prior art toys that shot super absorbent polymer and did not provide the Examiner with prior art demonstrating that spherical super absorbent polymer projectiles

were well known when arguing that Bartlett's polymers do not have the same shape (e.g., ThinkGeek Spitballs). Ex. 1052.

37. ThinkGeek Spitballs, Nagayoshi, Peev, and Meggs were not before the Examiner during prosecution of any of the '282, '683, or '255 Patents. Ex. 1052.

VI. LEVEL OF ORDINARY SKILL IN THE PERTINENT ART

38. I have been advised by counsel that there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the educational level of the inventor; (2) the type of problems encountered in the art; (3) the prior art solutions to those problems; (4) the rapidity with which innovations are made; (5) the sophistication of the technology; and (6) the educational level of active workers in the field. I am not a lawyer, and do not offer any opinion on the applicable legal standard.
39. I understand that Petitioner proposed, in a related proceeding before the International Trade Commission (ITC), that a person of ordinary skill in the art at the time of the alleged invention of the '683 Patent ("POSITA") would be someone who (i) had a Bachelor's degree in Industrial Design or Mechanical Engineering or (ii) a toy designer with at least five years' experience designing toys (including launchers), with both of (i) and (ii)

having access to a chemist knowledgeable regarding super absorbent polymers.

40. I agree with Petitioner's proposed level of skill, and have applied it throughout this Declaration (both through my own knowledge and via my access to Dr. Wanat, a chemist knowledgeable regarding SAPs). The prior art contains several types of toy launchers that launched various projectile types. A person with a Bachelors in Industrial Design or Mechanical Engineering would be familiar with and able to design launchers and ammunition. They would also be able to collaborate with others to develop different kinds of projectiles for various toy projectile launchers. Further, innovations within the toy industry are made rapidly because the technology is typically simple and well known.
41. I understand that Patent Owner proposed, in a related proceeding before the International Trade Commission (ITC), that a person of ordinary skill in the art at the time of the alleged invention ("POSITA") of the '683 Patent would (1) have had a Bachelor's degree in mechanical engineering, industrial design, or an equivalent, with at least one year of relevant experience designing projectile launching systems and (2) be a member of a team, which would include a person with a Bachelor's in materials science, chemistry, or equivalent, or has at least one year experience working with materials for use in consumer products.

42. In my opinion, Patent Owner’s proposed level of skill has many similarities to Petitioners. I do not agree that a POSITA would necessarily need a technical degree as long as they had experience designing toys (*e.g.*, a toy designer with at least five years’ experience designing toys (including launchers)). Many toy components, including in toy launchers, have been well known for decades, if not longer, such that experience working with and designing toys can substitute for educational experience.
43. In any event, as I noted, Patent Owner’s and Petitioner’s definitions of the POSITA are similar, and my opinions in this Declaration would not change if I used Patent Owner’s definition of the POSITA rather than Petitioner’s definition.

VII. CLAIM CONSTRUCTION

1. “super absorbent polymer”

44. I understand Patent Owner has proposed a construction of “polymer that can absorb an extremely large amount of liquid relative to its own mass.” Ex. 1038. I understand there is a dispute as to whether “extremely large” requires 10x absorbency or 100x absorbency. For purposes of the Petition, however, I understand this dispute is irrelevant because ThinkGeek Spitballs discloses that Spitballs “absorb water and grow up to 200 times their original size,” Ex. 1007 at 8, and if “200 times the size” refers to mass, 200 exceeds 100x and

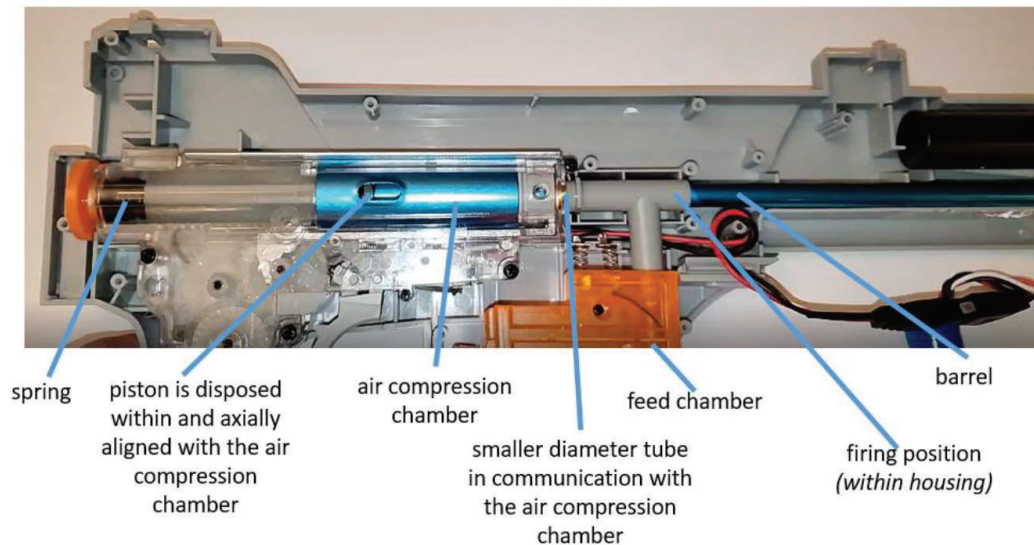
exceeds 10x, and if “200 times the size” refers to volume, I understand from Dr. Wanat that a POSITA would understand that the corresponding mass increase is 138.3, which exceeds 100x and exceeds 10x.

2. “a firing mechanism that directly applies a force to a soft-projectile” / “a firing mechanism that directly applies a force to the ammunition”

45. In the related ITC Investigation, I understand that Patent Owner argued that generation of air pressure by a spring and a piston to launch a projectile is a “direct” application of force of a firing mechanism to the projectile. Specifically, Patent Owner argues that several allegedly infringing products are “designed to use air pressure to launch the soft-projectiles,” that those devices use a spring, piston, and air compression chamber to generate the air pressure, and that these devices all “directly appl[y] a force to the soft-projectile ammunition” as depicted in Patent Owner’s infringement contentions, excerpted below:

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SRB400 (SRB-PHYS_000001) is designed to use air pressure to launch the soft-projectiles.



SRB400 (SRB-PHYS_000001):



firing mechanism directly applies a force to the ammunition (*in housing*)

Ex. 1070, 27-35. For purposes of this IPR, I understand that Petitioners adopt Patent Owner's interpretation that the application of air pressure constitutes a "firing mechanism that directly applies a force to the soft-projectile," and I have applied Patent Owner's construction in this Declaration.

3. “magazine”

46. The '683 Patent provides a definition for magazine in the specification: “The term ‘magazine’ is used herein to refer to any container that holds super absorbent polymer projectiles for a projectile toy gun or other projectile weaponry. The magazine could be of any shape size or Volume and have any number of openings as long as it holds Super absorbent polymer projectiles in a useable manner for a corresponding super absorbent polymer projectile launching device.” Ex. 1001 ('683 Patent) at 3:38-45. I understand that the patentee can act as its own lexicographer and define terms as they are used in the patent. In my opinion, a POSITA reading the '683 Patent would apply this definition of “magazine.” I therefore apply the '683's definition of magazine in this Declaration.

DETAILED INVALIDITY ANALYSIS

47. I have been asked to provide an opinion as to whether Claims 1-14 of the '683 Patent are invalid in view of the prior art. The discussion below provides a detailed invalidity analysis of how the prior art references identified in Section I invalidate the Challenged Claims, either by anticipation or obviousness.
48. When conducting my obviousness analysis, I considered the scope and content of the prior art, any differences between the alleged invention and the prior art, the level of ordinary skill in evaluating the pertinent art, and

secondary considerations. I likewise considered whether any differences between the alleged invention and the prior art are such that the subject matter, as a whole, would have been obvious to a person having ordinary skill in the art at the time of the alleged invention. I took the time of the alleged invention to be February 21, 2010 for claims 1, 3, 4, and 11, April 8, 2010 for claim 14, and May 10, 2010 for claims 2, 5-10, and 12-13. Whether the date of alleged invention is February 21, 2010, April 8, 2010, or May 10, 2010 has no impact on the opinions I offer in this Declaration.

49. I describe in detail below the scope and content of the prior art, as well as any differences between the alleged invention and the prior art, on an element-by-element basis for the Challenged Claims.

VIII. SCOPE AND CONTENT OF THE PRIOR ART

50. I provide a summary of the scope and content of the prior art below.

A. Background of the Field, Prior Art, and Knowledge of a POSITA Relevant to the '683 Patent

51. Projectile launchers, including the categories of projectile launchers described by the '683 Patent (*e.g.*, “[p]rojection device 10 can be a bow, crossbow, sling shot, hand gun, machine gun, futuristic weapon, catapult, or shaped as any other type of weaponry,” Ex. 1001 at 5:10-13), were well established going back more than a century before 2010. For example:

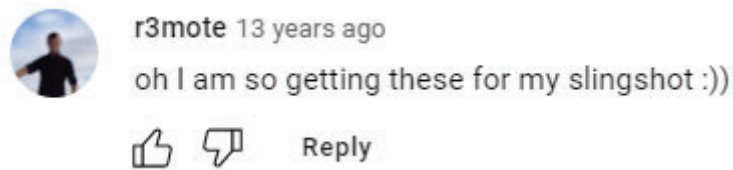
- **Bows:** Date back approximately 72,000-60,000 years ago. Ex. 1065, *available at* https://en.wikipedia.org/wiki/Bow_and_arrow (“The oldest known evidence of the bow and arrow comes from South African sites such as Sibudu Cave, where likely arrowheads have been found, dating from approximately 72,000–60,000 years ago.”)
- **Slingshots:** Have been commercially available since around 1918. Ex. 1067, *available at* <https://en.wikipedia.org/wiki/Slingshot> (“[C]ommercially made slingshots date from at latest 1918.”)
- **Hand / Machine Guns:** Have been used since at least World War I. Ex. 1066, *available at* https://en.wikipedia.org/wiki/List_of_infantry_weapons_of_World_War_I (providing various examples of handguns and machine guns used by troops in World War I).

52. Likewise, projectile launchers that used a spring, piston, and air compression chamber to launch a projectile were well known for more than a century before the '683 Patent was filed. I describe several examples of such launchers below in Sections Background on NagayoshiVIII.C-VIII.G.
53. For purposes of the '683 Patent, a POSITA would have access to a chemist knowledgeable regarding super absorbent polymers (or, per Patent Owner's proposal, would be on a team with a person with a Bachelor's degree in materials science, chemistry, or equivalent). I have spoken with Dr. Robert Wanat, who has a Ph.D. in Chemistry from Cornell University. I understand Dr. Wanat has expertise in polymer science and materials chemistry and is knowledgeable regarding super absorbent polymers. I understand from my discussion with Dr. Wanat that it was known to POSITAs prior to 2010 that

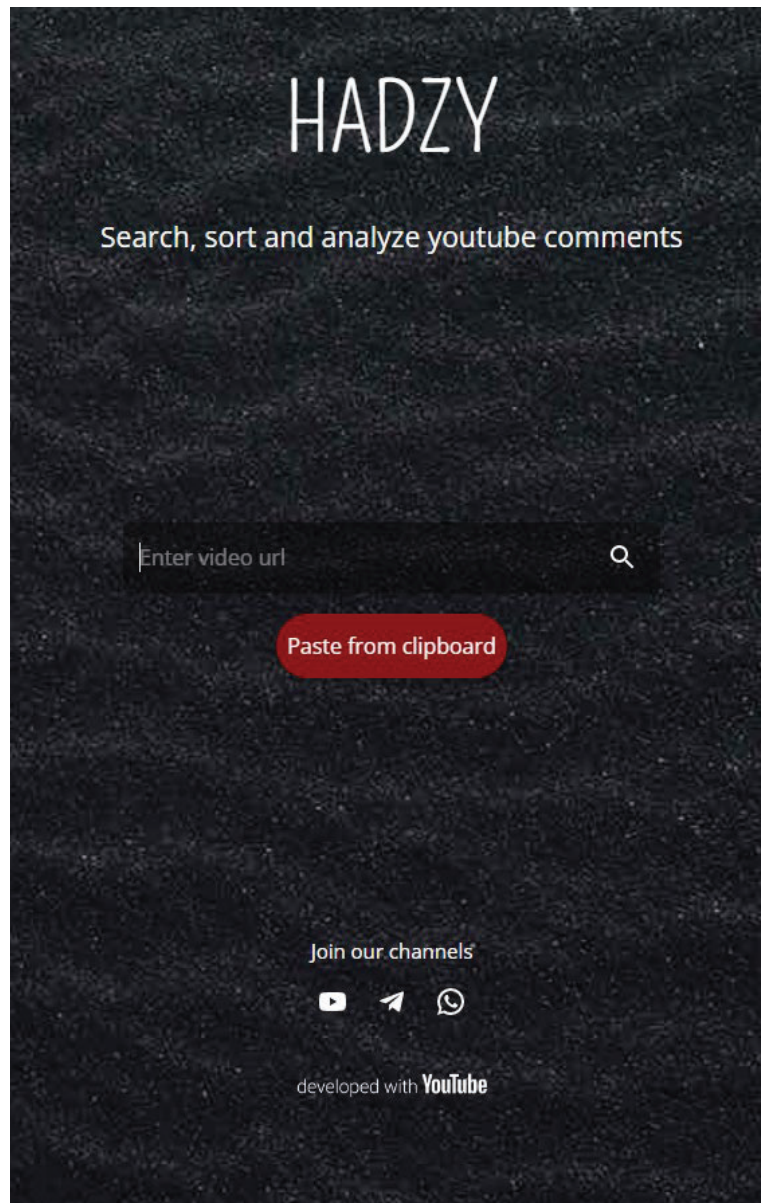
super absorbent polymers (“SAPs”) are a class of polymers that can absorb large quantities of water to form a gel-like material that would be soft/squishy, but can withstand some compressive force (*e.g.*, when squeezed by fingers or bounced). I also understand from Dr. Wanat that POSITAs understood that SAPs can be manufactured in various ways and in various shapes, including spheres. I also understand from Dr. Wanat that the size of a fully-hydrated super absorbent polymer can be adjusted based on how it is manufactured (*e.g.*, by making the initial bead smaller, using a different type of SAP, or using more or less crosslinker (which will increase or decrease the final size)). I further understand from Dr. Wanat that the size of a fully-hydrated SAP can be adjusted after it is manufactured by soaking the bead in different liquids, such as salt water for smaller beads or distilled water for larger beads. And I understand that the size of the hydrated SAP can be adjusted by removing the SAP from the water before it is fully grown.

54. The Asserted Patents recognize that super absorbent polymers, generally, “were first invented by the United States Department of Agriculture (USDA) in the 1960’s and are commonly used in personal disposable hygiene products such as diapers, protective underwear, and sanitary napkins.” However, the Asserted Patents do not mention that super absorbent polymers were used and marketed as toy projectiles prior to the May 2010 filing date.

55. For example, by April 2008, a “spudgun” related website suggested shooting hydrated SAP from a diaper using the air pressure from a potato gun. Ex. 1015 at 81-85; *see* Section VIII.H.
56. Similarly, the idea of launching hydrated SAPs, *e.g.* via a slingshot, was described on the internet prior to February 21, 2010. For example, a YouTube video posted on November 5, 2009, shows “Liquid Marbles” that were “hydrated” in “distilled water.” One user commented: “oh I am so getting these for my slingshot :))”:

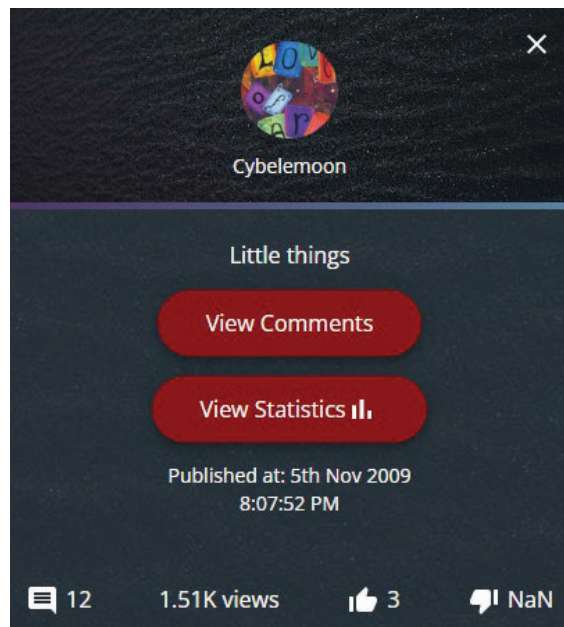
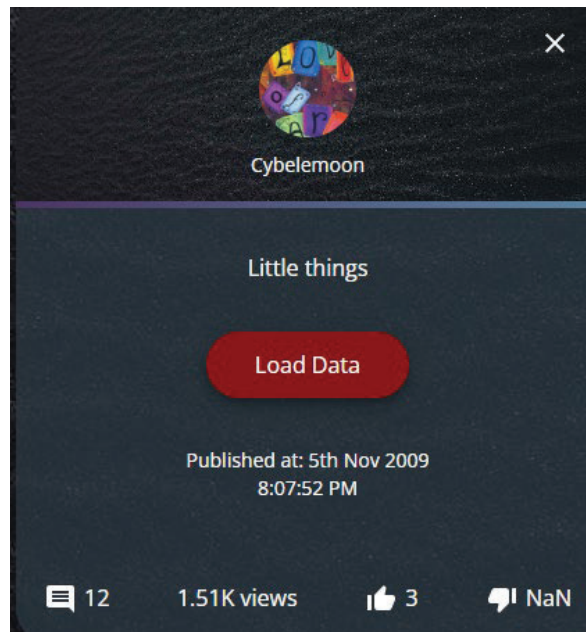


Exs. 1030, 1031, *available at* https://www.youtube.com/watch?v=Us-LpPp9HUc&lc=UgyTGvGXd3eo8c4_tyB4AaABAg. While YouTube just lists the comment as being posted “13 years ago,” publicly available tools will identify the exact date of the comment. I went to Hadzy.com, which was “developed with YouTube” and allows you to “Search, sort and analyze youtube comments.”



I entered the URL for the “Little Things” video, and clicked on “Load Data”
and then on “View Comments”:

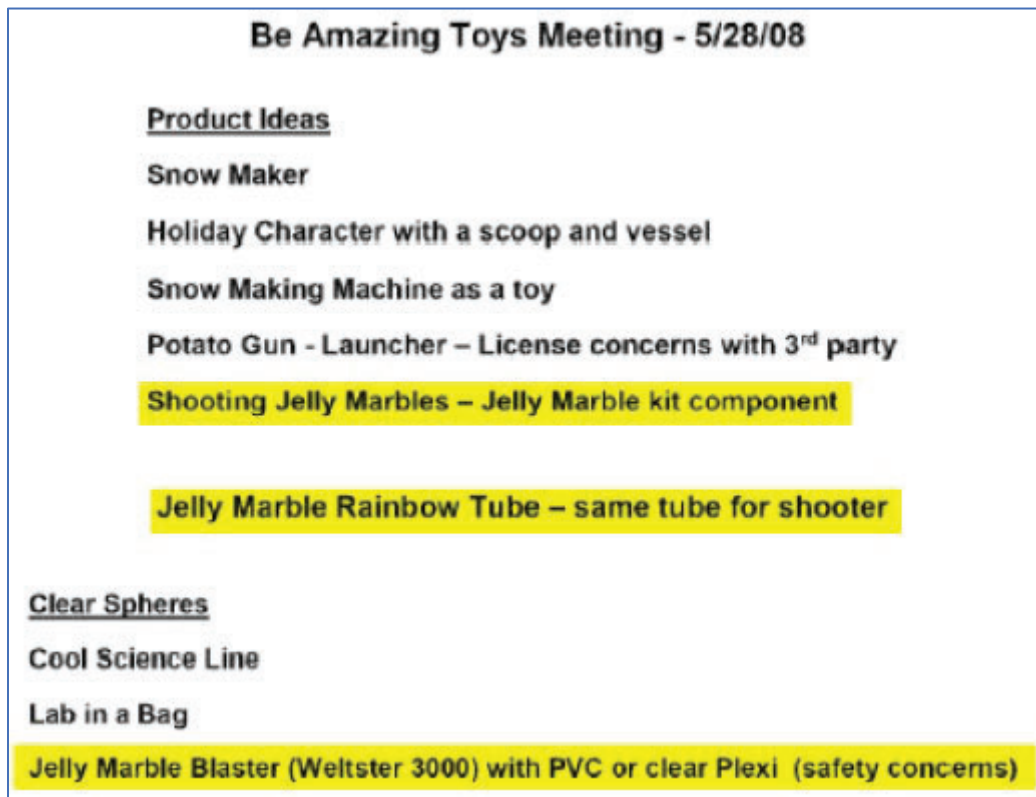
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The “oh I am so getting these for my slingshot :))” comment was posted on
“19th Feb 10”:



57. I further understand that science instructor and toy maker Steve Spangler invented, shared, and publicly demonstrated a launcher for hydrated spherical SAP projectiles on or before July 10, 2010. For example, Steve Spangler sold a product called, interchangeably, “Clear Spheres” and “Jelly Marbles” prior to 2010. Ex. 1044, Spangler Dep. Tr. at 78:2-19. By May 28, 2008, Steve Spangler had invented the concept of “Shooting Jelly Marbles,” a “Jelly Marble Rainbow Tube – same tube for shooter,” and “Jelly Marble Blaster (Weltster 3000) with PVC or clear Plexi” and presented the idea to Be Amazing Toys company:

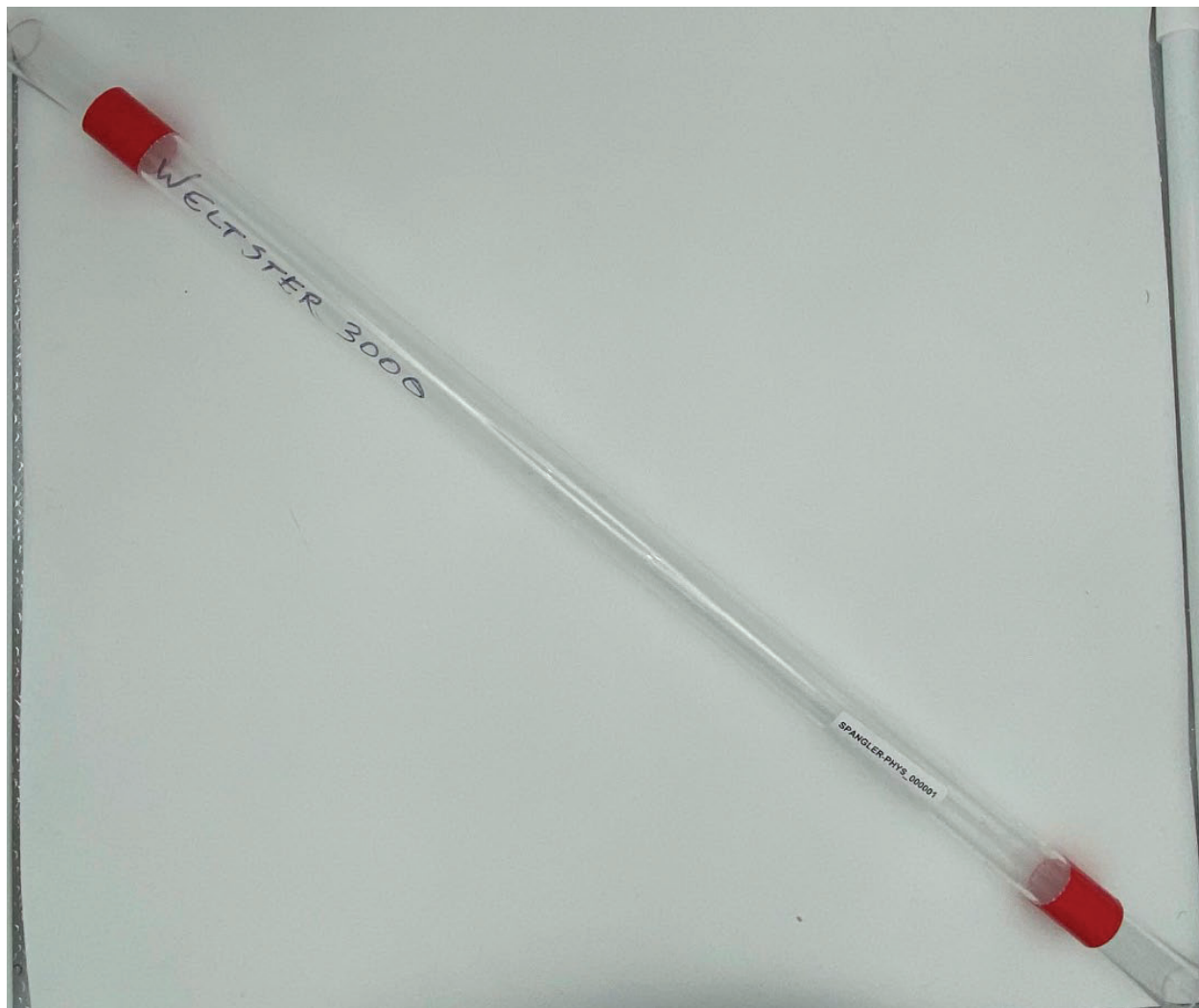


Ex. 1043. Steve Spangler testified that what he demonstrated to Be Amazing Toys in 2008 was using air pressure to launch the Jelly Marble:

Q. So the idea that you presented to Be Amazing Toys was taking Spangler physical 1 [i.e., the Weltster 3000], putting a jelly marble at the end and blowing it out, correct?

A. That is what I showed them in this meeting was how to launch a jelly marble using the Weltster 3,000.

Ex. 1044, Spangler Dep. Tr. at 83:15-84:2. The Weltster 3,000 is a blow gun tube (Ex. 1048):



Steve Spangler prepared a video showing how Jelly Marbles are launched using a blow gun tube, *see* Exhibit 1046.

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Hydrated Clear Sphere
loaded into launcher



Clear Sphere in
Free Flight



58. Then, at Steve Spangler's Science in the Rockies 2008 conference on July 10, 2008, Steve Spangler and dozens of conference attendees used the tube from the Spangler Potato Gun (Ex. 1048 at 2) as a blow gun to launch hydrated SAP Jelly Marbles / Clear Spheres. Steve Spangler testified that numerous persons, including teachers, the media, toy company representatives, salespeople, and bloggers attended Science in the Rockies: "There were a number of attendees, so in addition to teachers and administrators there were other people who were at Science in the Rockies. The media would come to Science in the Rockies, bloggers, salespeople, Be Amazing Toys, people from stores could come to Science in the Rockies to see how their products were being used in a room of 170 teachers. So there was a lot of people at Science in the Rockies." Ex. 1044, Spangler Dep. Tr. At 46:16-47:13. Steve Spangler testified that a Jelly Marbles fight broke out at the conference:

Q. And do you remember back then demonstrating blowing out a jelly marble through a acrylic tube or a polycarbonate tube?

A. Yes, I do.

Q. And can you describe that demonstration?

A Yeah. Just as you saw on the video I put a jelly marble in the tube and used my air to push it out and taught the people in the room how to do that, and chaos ensued.

Q What do you mean by "chaos ensued"?

A Just that, teachers become like kids that they teach. So you can imagine that the idea was seeded and they had a blast.

Q So the teachers had the clear polycarbonate tube and were blowing out jelly marbles?

A Yes, they were.

Ex. 1044, Spangler Dep. Tr. At 47:3-48:8. Ellen Peterson was an attendee of the Science in the Rockies conference in 2008. Ex. 1064, Peterson Dep. Tr. at 9:21-10:18. She testified that she took photographs at the event and kept them (Ex. 1064, Peterson Dep. Tr. at 12:3-17), and that the photographs show the aftermath of a Jelly Marble launcher fight that broke out at the 2008 Science in the Rockies conference:

Q. And -- and what's being shown in Exhibit 1, the one with the Bates number Peterson_0001?

A. So that is Steve Spangler on the presentation platform at Science in the Rockies 2008. He's holding the -- the polycarbonate tube from the potato launcher in his left hand. There are jelly marbles broken and scattered all over the floor there. In the background, you can see a graduated

cylinder with a water gel -- water gel crystals or water jelly marbles in them. There's other presentation materials that are on the table that we used during the course of the workshop.

Q. Okay. And so you're saying that on the floor there were jelly marbles?

A. Yes.

Q. How did those jelly marbles get there?

A. So they were thrown or launched from various places around the -- the conference room.

Q. Who -- who threw them?

A. So I can tell you that I was responsible for some of them, but there were about 100-150 teachers in that room all seated around round tables interacting with conference materials, so I couldn't tell you all of the people who were involved. I could -- I can tell you that lots of people were throwing jelly marbles or launching them from their potato tubes.

Q. Okay. And then you said people were launching them as well?

A. Yes.

Q. How were they launching them?

A. So I -- it kind of depends. So I saw some folks put one marble down the polycarbonate tube of their -- of their potato launcher and blowing on the end of it to launch it with their mouths. Then -- then from there, it follows that there were people who put more than one inside their launcher at the same time to see what the effect of that would be. We then had some people who took the jelly marbles and put them in the tubes, then used the other half of that potato launcher, which is called a plunger, to use air pressure to push them out of the tube.

Ex. 1064, Peterson dep. Tr. at 16:16-18:17. The photographs she was discussing have metadata showing they were taken on July 10, 2008, and show Jelly Marbles scattered on the floor of the stage with Steve Spangler on stage holding a Potato Gun, which Ellen Peterson testified is what happens to Jelly Marbles when they break up on contact after being launched (Ex. 1064, Peterson Dep. Tr. at 24:9-25:5 (“So when the jelly marbles hit something they – they fracture into all of the tiny pieces that you see laying around in the pictures)):

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59. And as discussed below in Section VIII.B, ThinkGeek SpitBalls taught super absorbent polymers that could be hydrated, launched, and used for “war” prior to 2010.

B. Background on ThinkGeek Spitballs (“ThinkGeek Spitballs” or “Spitballs”)

60. ThinkGeek Spitballs describes “Spitballs” as a toy projectile that can be launched using a launcher and that was listed for sale and described by toy retailer ThinkGeek by at least November 27, 2009. Ex. 1007. I reviewed a printout of the product packaging and description from the Wayback Machine, dated November 27, 2009. Ex. 1007. I understand that the Wayback Machine archives webpages as they existed on a given date, and includes within the URL the exact year/month/day/hour/minute/second on which the webpage was archived, such that the webpage in Ex. 1007 is a saved version of the webpage as it existed at the identified date and time.
61. In my opinion, prior to February 21, 2010, POSITAs interested and ordinarily skilled in the art of projectile launchers, exercising reasonable diligence, could have located the ThinkGeek Spitballs publication. Before 2010, ThinkGeek was a well-known toy retailer, in particular with respect to airsoft and nerf-type foam rocket launchers. During my time at Hasbro, me and other Hasbro employees frequently bought products from ThinkGeek for inspiration when

designing new toy projectile launchers. For example, I reviewed one 2006 article that highlighted a ThinkGeek Airsoft gun, explaining that “[t]oy guns have come a long way from the days of Nerf. This one, the Airsoft Submachine Gun featured on ThinkGeek, is about as far from those neon-green pistols as they get. It has freaking LASER SIGHT. And an illuminator flashlight built in. And it’s so awesome, it comes with protective goggles. ... If you’re one of those types who’s so hardcore that you play paintball in tanks, then yeah, maybe you’ll like this.” Ex. 1019; Ex. 1020.

62. The Wall Street Journal’s 2006 buying guide, dated December 23, 2006, highlighted the ThinkGeek.com USB Missile launcher that could “aim and fire foam ordinance” as “one of [ThinkGeek’s] top selling toys” under the category “Tech: Desk Toys.” Ex. 1021 at 3. The article further noted that ThinkGeek’s offering was one of “three popular examples” of a “growing category” of toys. Ex. 1021 at 1. In fact, I had the ThinkGeek USB turret on my desk when I was employed to design projectile launchers for Hasbro. And an inventor used the ThinkGeek missile launcher components to design a “USB AirSoft Turret” in December 2006. Ex. 1022 at 1-2 (A December 10, 2006 InventGeek posting titled “USB AirSoft Turret” that, for the turret base, “[w]e picked this USB missile launcher up from thinkgeek.com for 40.00 USD”).

63. The GreenHead, a website that helps browsers “Find[] Cool New Stuff!,” includes a May 22, 2006 “R/C Missile Launcher” for “Unstoppable Cube Warfare” that is available from ThinkGeek.



R/C Missile Launcher - Unstoppable Cube Warfare! Find It

PREV ITEM NEXT ITEM

Awaken your Imagination 

Shop Online Or Request A Custom Unit, we make the process simple - installs in 90 minutes

 Open

R/C Missile Launcher - Unstoppable Cube Warfare!

Office | May 22, 2006

Here's another wonderful office toy of mass destruction, the **R/C Missile Launcher** from ThinkGeek. Simply grab the remote control and maneuver the vehicle into position, angle the missile turret at your target and unleash hell on your fellow co-workers from up to 15 feet away. You can either launch one foam missile at a time or launch a rapid fire barrage. Take that Cindy in Accounting!

Ex. 1023.

64. In November 2006, Thinkgeek.com featured a separate category for “warfare” that included 20 items, including an airsoft gun, a foam rocket launcher, a

rubberband-powered launcher, a catapult, an indoor paintball simulator, an air-powered marshmallow shooter, and other launchers. Ex. 1020; Ex. 1025. Once at Thinkgeek.com, a POSITA could navigate to “geek toys” (Ex. 1008 at 9-11), and from there to “Science Toys” (Ex. 1008 at 4-8), to find the Spitballs listing (Ex. 1008 at 6). A POSITA designing a projectile launcher in February 2010 would have reviewed all the “Geek Toys” category listings, including the “Science Toys” listing, as there were a small set (8 total categories), there was a “View All” option to allow users to view all 8 categories at once for easy browsing, and toy designers frequently draw inspiration from a variety of toys that have come before. Further, the “Science Toys” listing featured launchers, including “Wooden War Engine Kits” on the first page, and ammunition (including Spitballs, as discussed further below):

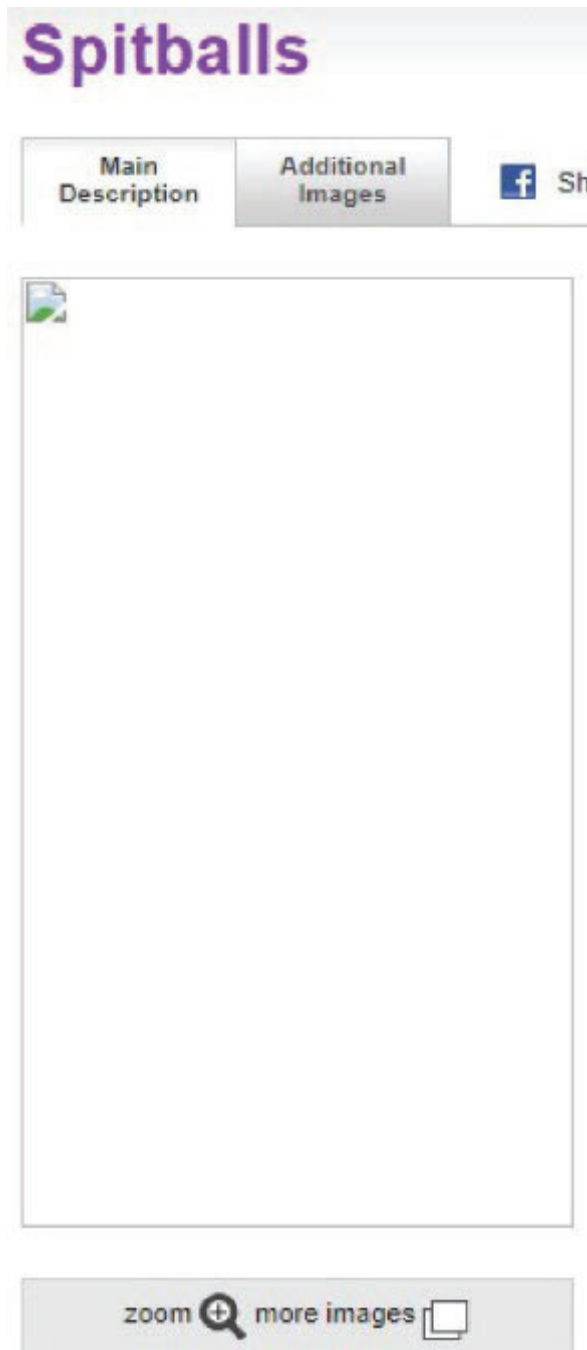


**Wooden War
Engine Kits**

\$19.99 - \$34.99

Ex. 1008 at 5.

65. The ThinkGeek page contained an image of the Spitballs packaging which is available by clicking the blank image. Ex. 1007 at 5, 8. In my opinion, a POSITA would recognize that the box contains an image that is part of the Spitballs listing by virtue of the “Zoom” icon beneath the image and the image icon in the upper left corner, and the adjacent tab noting that “*Additional Images*” are available.



Ex. 1007 at 8. Both captures are from November 27, 2009, such that a POSITA would have had access to both these materials by virtue of their being published together as part of the same product listing on the same date. Ex. 1007 at 5, 8. A

POSITA would treat these as a single reference. Further, in my opinion, to the extent Patent Owner argues these are different references, it would be obvious to a POSITA to combine the teachings of both. A POSITA would look to both the packaging of the product (which includes images of the product and demonstrations of possible uses, such as launching the product through a tube) and the textual description on the product listing (which provides further detail on how to use the product and characteristics of the product) to understand the full scope of the disclosure and would apply the teachings from both. Both were accessible through the same URL and would be considered holistically by the POSITA.

66. Based on my review of the packaging and product description on ThinkGeek's website, ThinkGeek Spitballs are spherical in shape. They are described as projectiles that can be launched out of a projectile launcher, such as a straw or blow gun:



Ex. 1007 at 5.

67. The product description teaches that POSITAs using ThinkGeek Spitballs can “Grow em and chuck em.” Ex. 1007 at 8. Indeed, the product description explains that the Spitballs are “gobs of squishy stuff flying through the air,” instructing users to fling “awesome spherical polymers at your friends and/or coworkers.” Ex. 1007 at 8. A POSITA would understand from the Spitballs

listing that Spitballs are projectiles and are designed to be launched at targets (e.g., friends, coworkers, etc.) as part of a fun play pattern.

68. According to the product packaging, Spitballs are designed to be hydrated in water and then launched: “*Spitballs* start off as small hard little spheres. Soak them in water for about 4 hours (or overnight for best results) and they will absorb water and grow up to 200 times their original size.” Ex. 1007 at 8. Based on the pictures provided on the packaging and product description I reviewed, ThinkGeek Spitballs teaches a plurality of Spitballs. Ex. 1007 at 8(stating that each package contains “2g of Spitballs (about 150 or so).”



Ex. 1007 at 5.

C. Background on Nagayoshi (Ex. 1009)

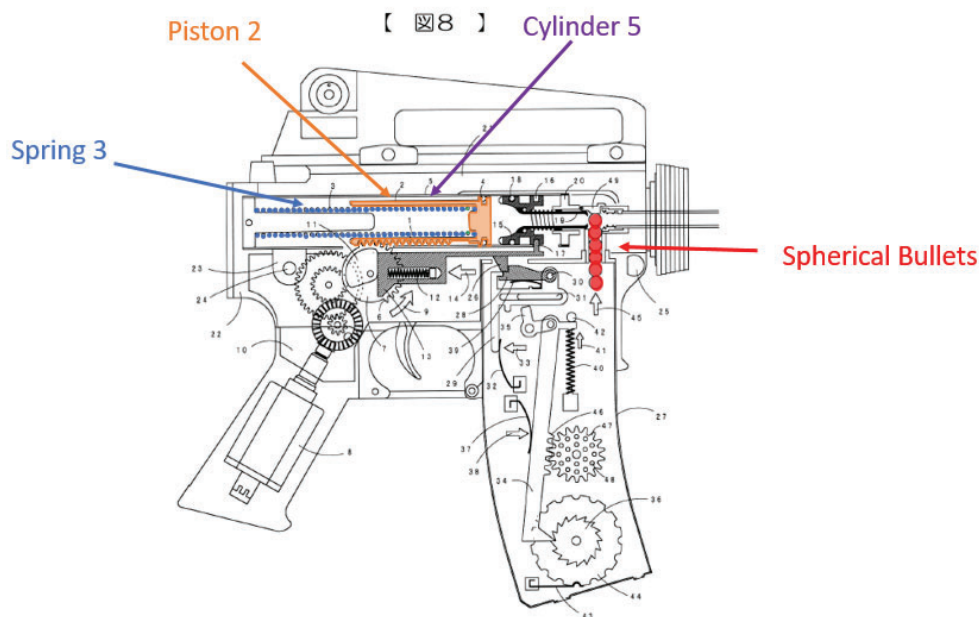
69. Nagayoshi is a Japanese patent application that was published on September 7, 2006. I understand that Nagayoshi is prior art under pre-AIA 35 U.S.C. § 102(b) because it was published more than 1 year before May 10, 2010. I was provided a certified translation of Nagayoshi, and I understand Patent Owner has not challenged the reliability of the translation in the ITC proceeding. My citations are to the English-language translation.
70. A POSITA would understand that Nagayoshi is directed to “a toy gun having a function for continuously shooting spherical bullets, a magazine used attached to the toy gun, and the structure of dedicated parts used in the toy gun and magazine.” Ex. 1009 ¶ [0001]. Nagayoshi teaches a “continuous bullet supply mechanism for continuously feeding spherical bullets” that “is provided inside the magazine.” Ex. 1009 ¶ [0001]. Based on the teachings and Figures of Nagayoshi, a POSITA would recognize that Nagayoshi is describing a gun commonly referred to as an “airsoft gun” as of 2006. A POSITA would understand that these guns typically fired either metal BBs or plastic 6 mm airsoft ammunition (*e.g.*, the “polymer balls with a diameter of 6 mm” as taught in Peev, Ex. 1011 at 23).
71. Nagayoshi discloses multiple embodiments directed to a toy gun for continuously launching spherical bullets. In the majority of those

embodiments, including in Embodiment 1, Nagayoshi teaches firing a projectile using an electric-powered motor that turns a partially-toothed gear that draws a piston rearwardly in an air compression chamber while at the same time compressing a spring. Ex. 1009 ¶¶ [0029]-[0044]. Once the partially-toothed gear reaches the non-toothed portion in its rotation cycle, the gear releases the piston and the spring drives the piston forward. Ex. 1009 at Figs. 8-10, ¶¶ [0030], [0036], [0040]. The piston then compresses air in the air compression chamber into a small diameter tube (i.e., a nozzle and the barrel), which fires the projectile. *Id.*

72. For example, regarding the first embodiment, Nagayoshi discloses that “[a] **spring 3** continuously presses a **piston 2** provided with a recessed and protruding section 1 corresponding to a rack gear toward the muzzle. A packing 4 is provided at the front periphery of the piston 2, **maintaining an airtightness** in the interval **with a cylinder 5**. A rotary drive member 7 having a recessed and protruding section 6 that meshes with the recessed and protruding section 1 is made to rotate in the direction of an arrow 9 by a motor 8 and a series of reduction gears. The recessed and protruding section 1 of the piston 2 and the concave-convex part 6 of the rotary drive member 7 begin to mesh in conjunction with rotation of the rotary drive member 7, pulling the

piston 2 backward. FIG. 8 depicts three sets of the concave and convex parts meshed, and the piston 2 is slightly retracted.” Ex. 1009 ¶ [0030].

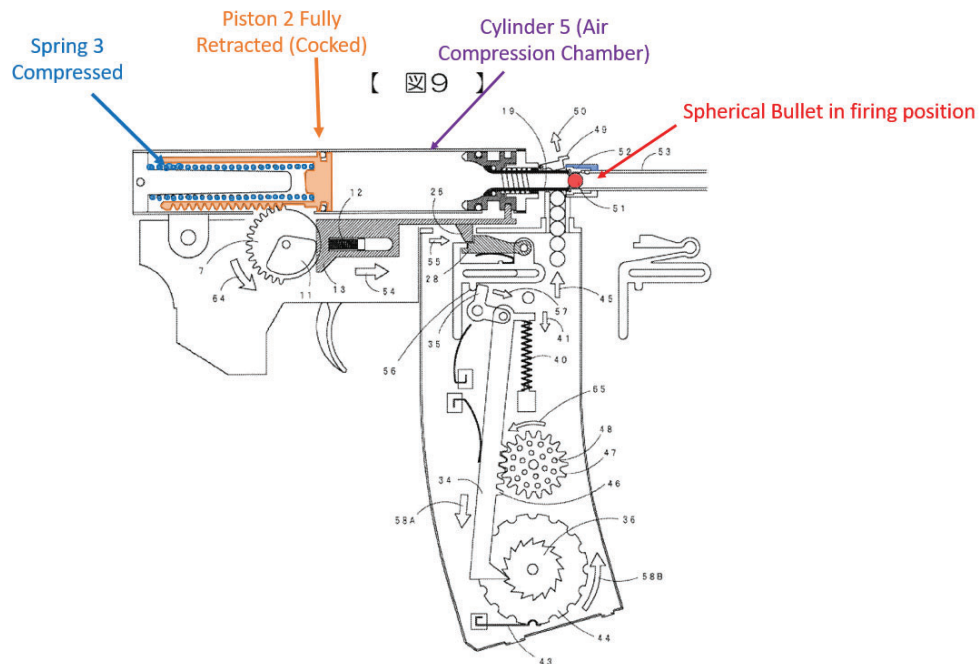
73. Nagayoshi Figures 8-10 show the firing sequence of the first embodiment. I have annotated those figures below. Regarding Figure 8, a POSITA would understand this depicts the gun shortly after the trigger has been pulled and the firing cycle has begun. When the gear rotates in the direction of arrow 9, the toothed portion of the gear is engaged with the toothed portion connection to the piston, which draws the piston backwards.



Ex. 1009 at Fig. 8 (annotated).

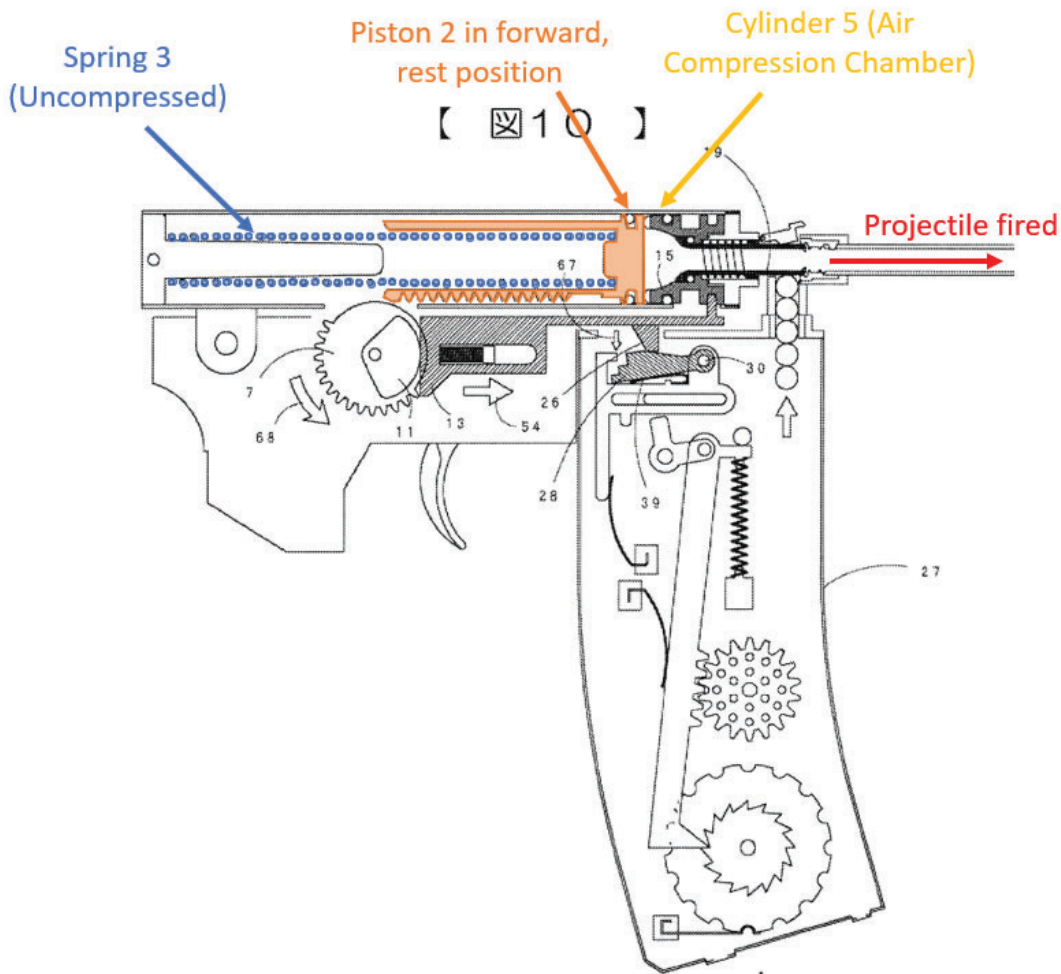
74. In Figure 9, the partially-toothed gear has rotated to the end of the toothed portion. At this point, the piston is fully retracted to a cocked position, the spring is compressed, and the projectile has been advanced slightly forward

by the nozzle (which a POSITA would understand prevents air pressure from
being lost down the magazine feed channel):



Ex. 1009 at Fig. 9 (annotated).

75. In Figure 10, the gun is depicted after the projectile has been fired, near the end of the firing cycle. At this point, the piston is fully forward and in its resting position. The spring is uncompressed and the bullet has been fired:



Ex. 1009 at Fig. 10 (annotated).

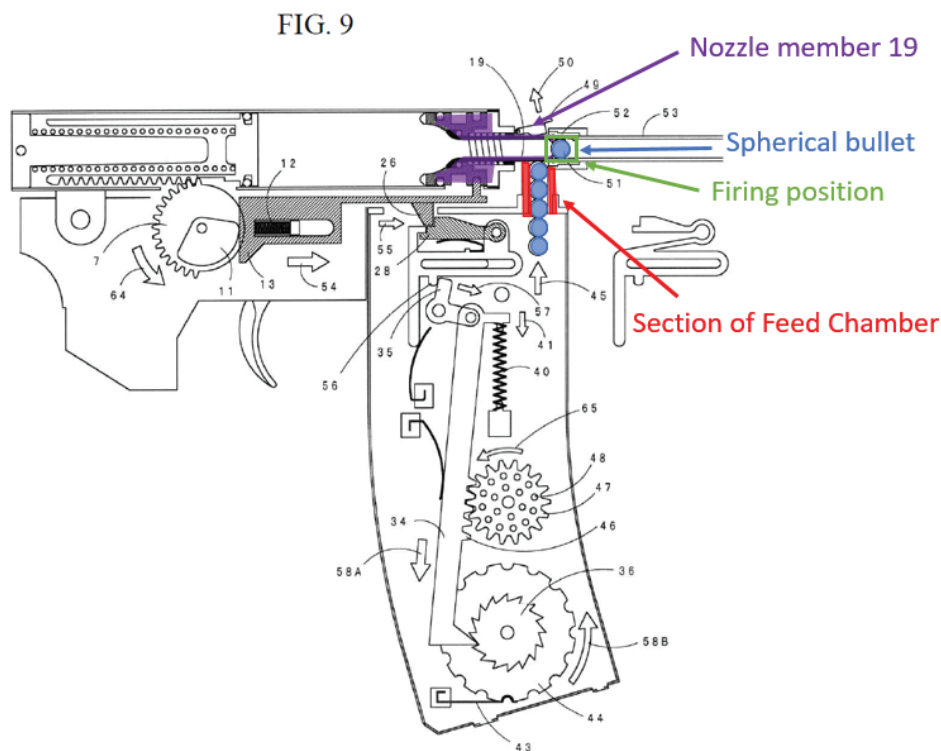
76. In my opinion, it was well known to POSITAs prior to 2010 that air guns using a spring, piston, and air compression chamber to generate air pressure to launch projectiles, such as described in Nagayoshi, could be designed to fire at differing speeds by adjusting the spring strength, diameter of the air compression chamber, and/or diameter of the barrel. For example, a stiffer spring can drive the piston forward more rapidly, providing a faster compression of air (and vice-versa). Similarly, using a narrower air

compression chamber would decrease the ratio between the diameter of the air compression chamber and the diameter of the nozzle/barrel, such that less air pressure would be applied to the projectile (and again, vice-versa).

77. I have reviewed Complainants' infringement contentions filed in the ITC Action that accuse projectile launchers with airsoft-style firing mechanisms of infringement. Ex. 1042, Patent Owner's '282 Patent Infringement Contentions; Ex. 1070, Patent Owner's '683 Patent Infringement Contentions. In my opinion, Patent Owner's infringement allegations further support my opinion that Nagayoshi—which has the same magazine-style feed mechanism, the same reciprocating nozzle to allow bullets to enter the barrel and move them into a firing position, and the same spring, piston, air compression chamber, and smaller diameter tube configuration to generate air pressure—discloses all of the claim elements relating to the projectile launcher. For example, what Patent Owner points to as the “feed chamber” is identical to what I have pointed to as the “feed chamber” and firing mechanism of Nagayoshi:



feed chamber for loading the soft-projectiles within the projectile launcher



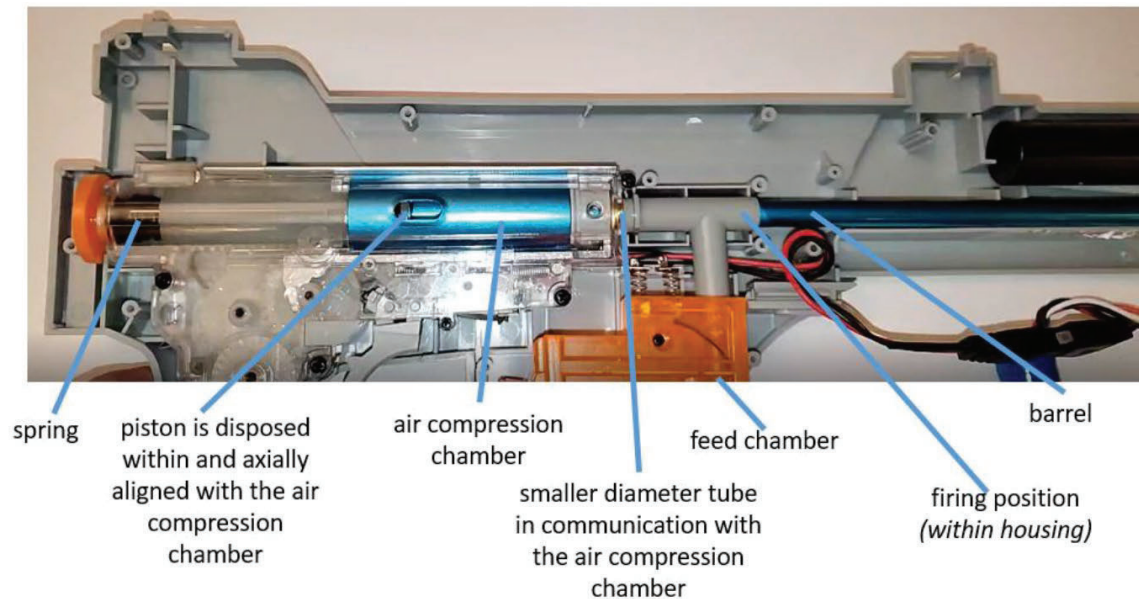
Ex. 1070, '683 Infringement Contentions at 21-22; Ex. 1009, Nagayoshi Fig. 9.

Similarly, Patent Owner's infringement contentions accusing the accused products

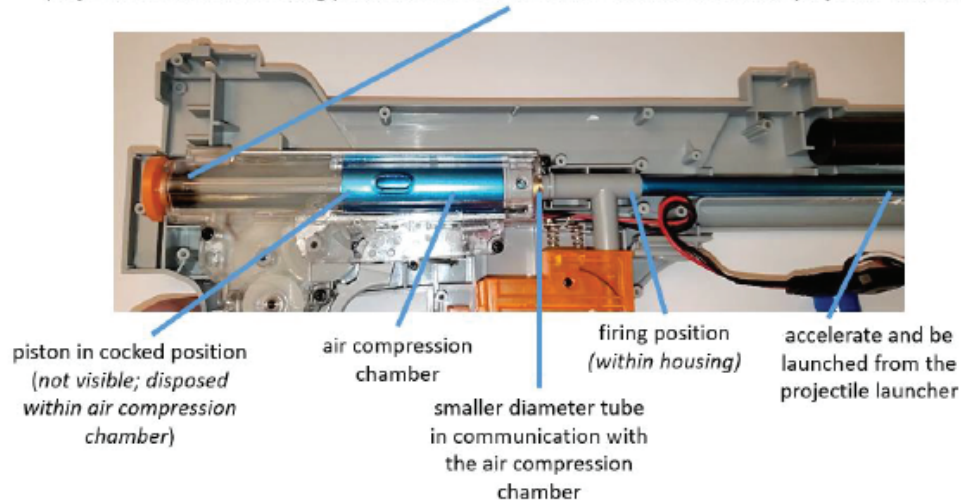
Declaration of Amanda Bligh Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 8,640,683

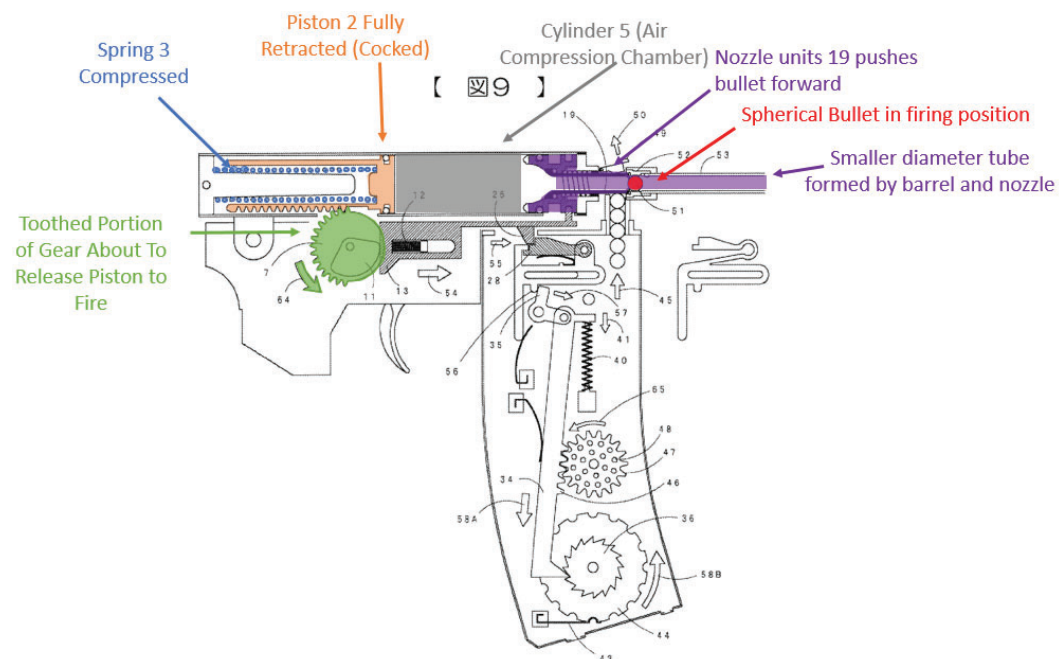
of infringing claim 11 of the '683 Patent and Claims 19 and 20 of the '282 Patent

identify the same elements that I have identified in Nagayoshi:



biasing force of the spring is sufficient to cause the piston to move from the cocked position to the rest position to force air from the air compression chamber into the smaller diameter tube and cause a soft-projectile located at the firing position to accelerate and be launched from the projectile launcher





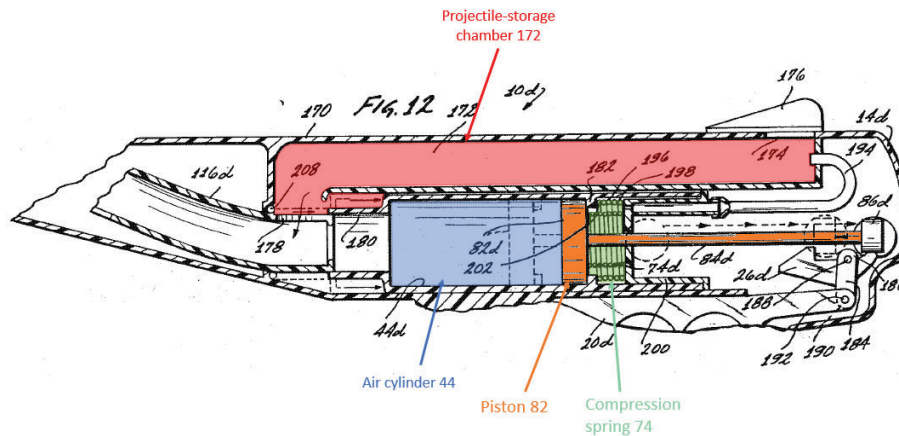
Ex. 1070, '683 Infringement Contentions at 28; Ex. 1042, '282 Infringement Contentions at 47; Ex. 1009, Nagayoshi Fig. 9.

D. Background on U.S. Patent No. 3,521,616 (“Meggs”) (Ex. 1010)

78. Meggs issued on July 28, 1970 and names Richard Shih-Teng Chang, Daniel H. Meggs, and John W. Ryan as inventors. Meggs is titled “Toy Gun With Means for Controlling the Trajectory of its Projectile.” Ex. 1010. It states that the “invention pertains generally to the field of toy guns....” Ex. 1010, Meggs at 1:25-29.
79. Meggs discloses that “[p]rojectile-firing gun toys are known,” but that they “have the disadvantage that the projectiles usually have sufficient mass and density to be painful to a child when struck by a projectile fired from such a gun toy.” Ex. 1010, Meggs at 1:32-35. Meggs further teaches that “Projectile

115” has “the shape of an oblate sphere and is preferably made from a low-density material such as sponge rubber or the like to minimize the likelihood of a child being injured by gun toy 10.” Ex. 1010, Meggs at 3:37-41. In my opinion, Meggs is a good example of the versatility of spring, piston, and air compression chamber based launchers. While airsoft guns, such as Nagayoshi, generally fire plastic rounds, a spring, piston, and air compression chamber were well known to be able to fire softer rounds (such as “low-density material”) as described in Meggs. POSITAs as of February 2010 knew that air guns were versatile and could be used with a wide array of ammunition categories.

80. Meggs discloses multiple embodiments. In one embodiment, which is depicted in Figures 12 and 13 of Meggs, the “gun toy 10d includes of a pistol grip 12d, a trigger housing 14d, a gun barrel 116d and a deflector 124d. Gun toy 10d also includes a housing 170 provided with a projectile-storage chamber 172 into which a plurality of projectiles 114 may be loaded through an aperture 174 provided in housing 170 beneath a slide able gate 176.” Ex. 1010, Meggs at 5:7-14.



Ex. 1010, Meggs at Fig. 12.

81. Meggs teaches a feed chamber for holding and loading ammunition into the projectile launcher barrel. For example, Meggs discloses that “[p]rojectiles 114 may be caused to drop into barrel 116d through an aperture 178 provided therein by sliding air cylinder 44d rearwardly to the position shown in FIG. 12 moving a sleeve 180 away from aperture 178. Cylinder 44d may be moved to its FIG. 12 position by moving a cocking-lever 16d rearwardly.” Ex. 1010, Meggs at 5:7-19. The gun toy also includes a “trigger 20d which is slidably mounted in a trigger guard 38d and which carries a sear 26d engageable with a button 86d on piston rod 84d.” Ex. 1010, Meggs at 5:25-28. Meggs teaches that the launcher can be fired by pressing the trigger to release the piston, generating air pressure to fire the projectile: “Gun toy 10d may [] be fired by squeezing trigger 20d releasing piston 82d so that it will pressurize gun barrel

116d forcing projectile 114 into engagement with the deflector 124d for imparting a spin to projectile 114.” Ex. 1010, Meggs at 5:45-48.

E. Background on Peev (Ex. 1011)

82. Peev describes “[e]lectric airsoft gun[]” technology that was well known to POSITAs prior to 2010. Ex. 1011, Peev at 23. Peev explains that airsoft guns “contain a body with a magazine and a barrel, in the rear part of which is located a mechanism for compressing the air.” Ex. 1011, Peev at 23. Peev discloses that, when the trigger is pulled, “The sector gear engages the teeth of the piston and pulls it back, pulling the spring behind it. As the piston is pulled back, the side pin of the gear pulls back the connecting plate, which pulls back the nozzle, which opens the chamber of the barrel and allows a pellet of the magazine to enter it. On further rotation of the sector wheel, the side pin drops the connecting plate, which is pulled by the spring and pushes the nozzle forward. In this way, the ball is inserted into the barrel. When the last tooth of the sector wheel drops the last tooth of the piston, it, under the pressure of the spring and accelerating forward, compresses the air in the cylinder and through the nozzle into the barrel, thus firing the ball into it.” Ex. 1011, Peev at 24. Peev teaches that electric airsoft guns commonly fire “polymer balls with a diameter of 6 mm” using “compressed air.” Ex. 1011, Peev at 23. It was well known to POSITAs prior to 2010 that the typical,

standard airsoft ammunition came as spherical plastic beads 6 mm in diameter. I discuss examples of this further in the claim mapping below.

83. I have annotated Figures 1-3 of Peev below. Like Nagayoshi, Peev discloses a spring (spring 46 annotated in green) and piston (piston 47 annotated in orange) within an air compression chamber (cylinder 48 annotated in blue) that compresses air from the air compression chamber into a smaller diameter tube formed by the nozzle and barrel to launch the spherical polymer balls 22 ammunition (annotated in red). Ex. 1011, Peev at Figs. 1-3. Specifically, “When making one complete revolution, the sector wheel 5 pulls back the piston 47, tightens the spring 46, pulls back the nozzle 45 through the connecting plate 44 and allows the ball 22 under the pressure of the spring 23a to enter the chamber 20 of the barrel 21 (Fig. 2). At the moment when the side pin 34 drops the connecting plate 44, it, under the influence of a spring 44a, returns forward, pushing the nozzle 45 forward, and it inserts the ball 22 into the barrel 21. At the moment when the last tooth of the sector wheel 5 wears the last tooth of the piston 47, the latter, under the pressure of the spring 46, accelerates forward and compresses the air in the cylinder 48, inserting it through the nozzle into the barrel 21 and firing the ball 22” (Ex. 1011, Peev at 31-32):

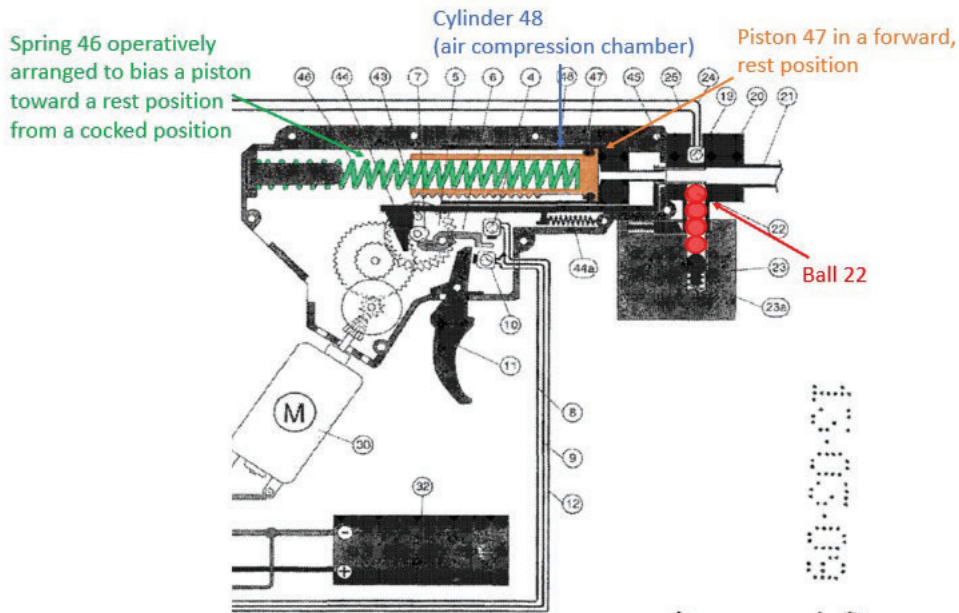


FIGURE 1
[hw:] 10110343
[signature]

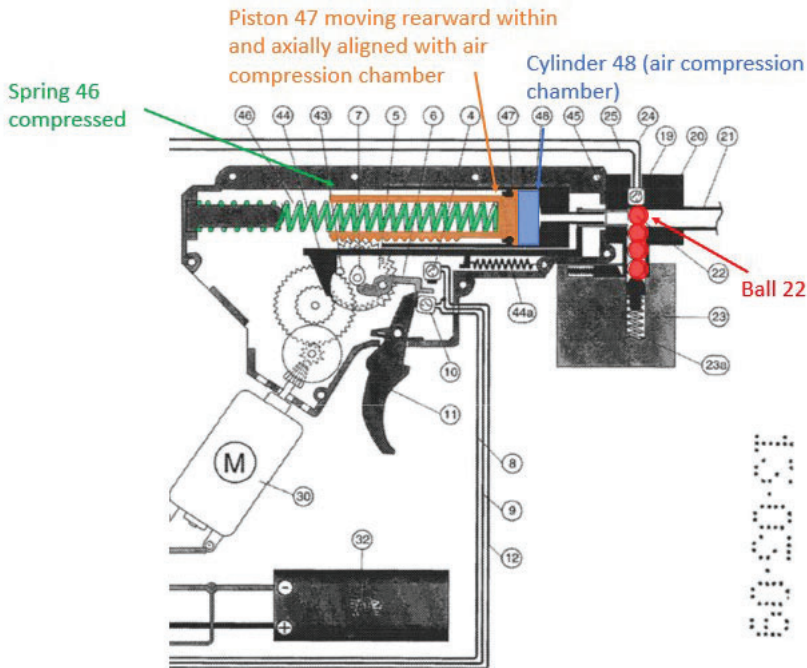


FIGURE 2

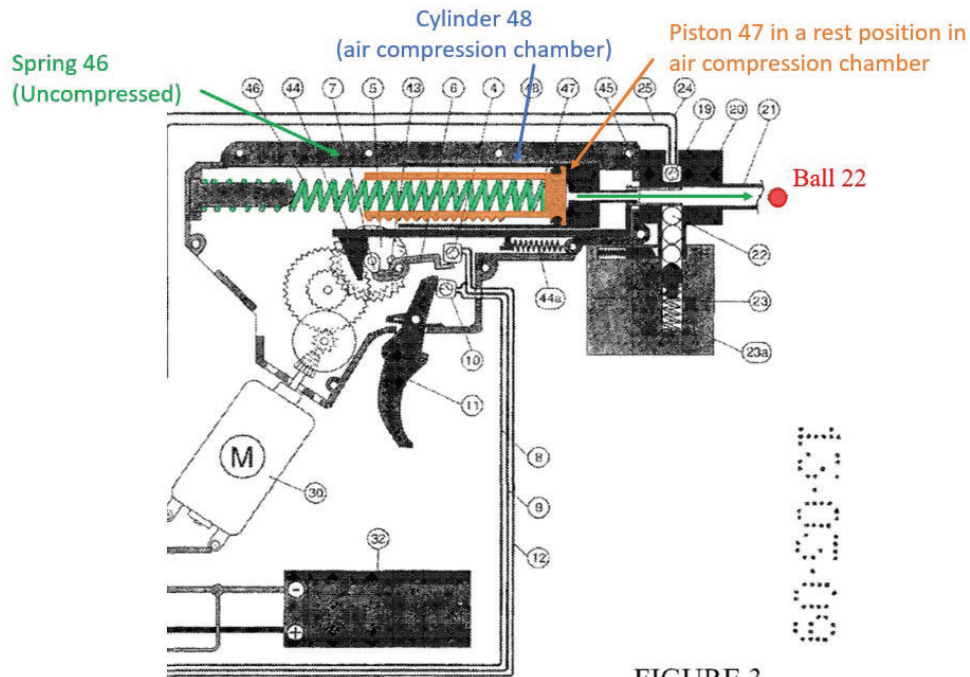


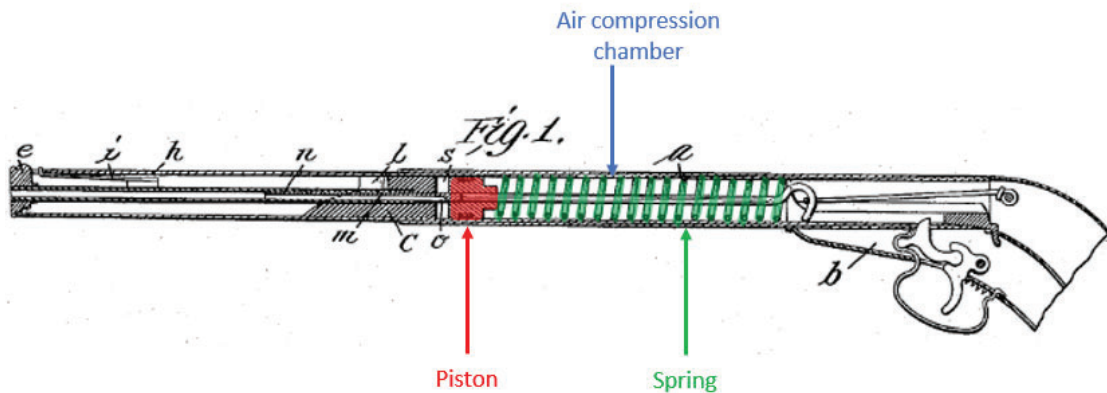
FIGURE 3

Ex. 1011, Peev at Figs. 1-3.

F. U.S. Patent No. 683,431 (“Bennett”) (Ex. 1013)

84. Bennett is a U.S. Patent that issued in 1901, over a century before the alleged February 2010 invention date of the '683 Patent. Bennett describes a “gun” with “an air-compression chamber [] formed at the rear of the true barrel, in which a spring-pressed plunger works, which is operated substantially as disclosed in Patent No. 408,971 [Hamilton].” Ex. 1013 at 1:13-20. I describe Hamilton in turn in the section below. I have annotated Figure 1 of Bennett below. Figure 1 shows the piston is disposed within and axially aligned with the air compression chamber, and the spring a is operatively arranged to bias the piston toward a rest position (as depicted) from a retracted, cocked

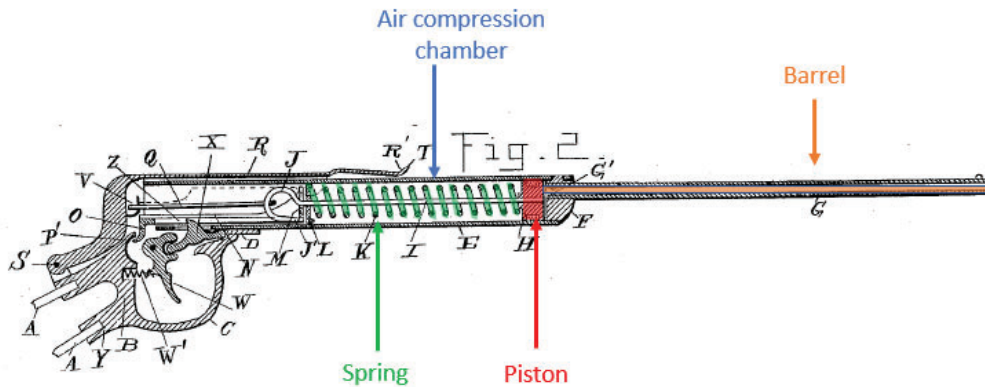
position (not shown) within the air compression chamber. Ex. 1013. When the spring drives the piston forward from a cocked position to a rest position, air is forced from the air compression chamber into the smaller diameter barrel, which causes a projectile to launch from the gun. Ex. 1013.



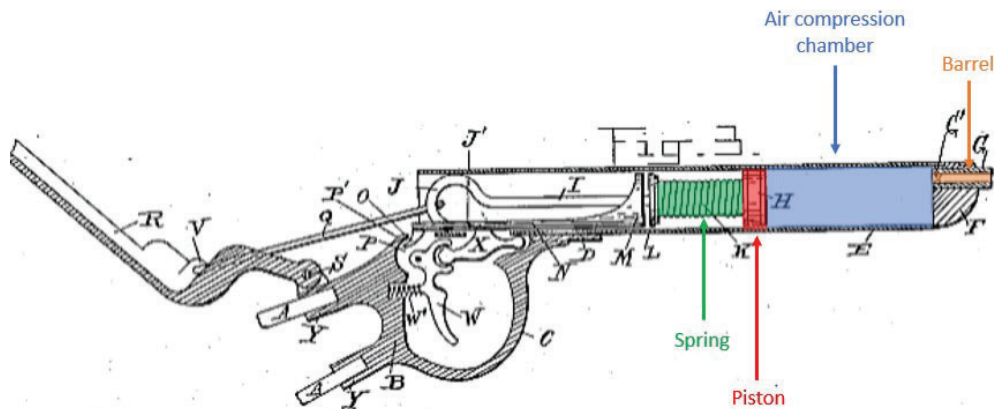
Ex. 1013 at Fig. 1.

G. U.S. Patent No. 408,971 (“Hamilton”) (Ex. 1014)

85. Hamilton is a U.S. Patent that issued in 1889, well over a century before the alleged February 2010 invention date of the '683 Patent. Hamilton describes a projectile launcher that launches projectiles using “coil-spring K” (annotated in green) and a “piston H” (annotated in red) located within an air compression chamber (annotated in blue) that is in communication with the smaller-diameter “true barrel G” (annotated in orange), as shown in annotated Figure 2 below. Ex. 1014, Hamilton at 2-3, Fig. 2.



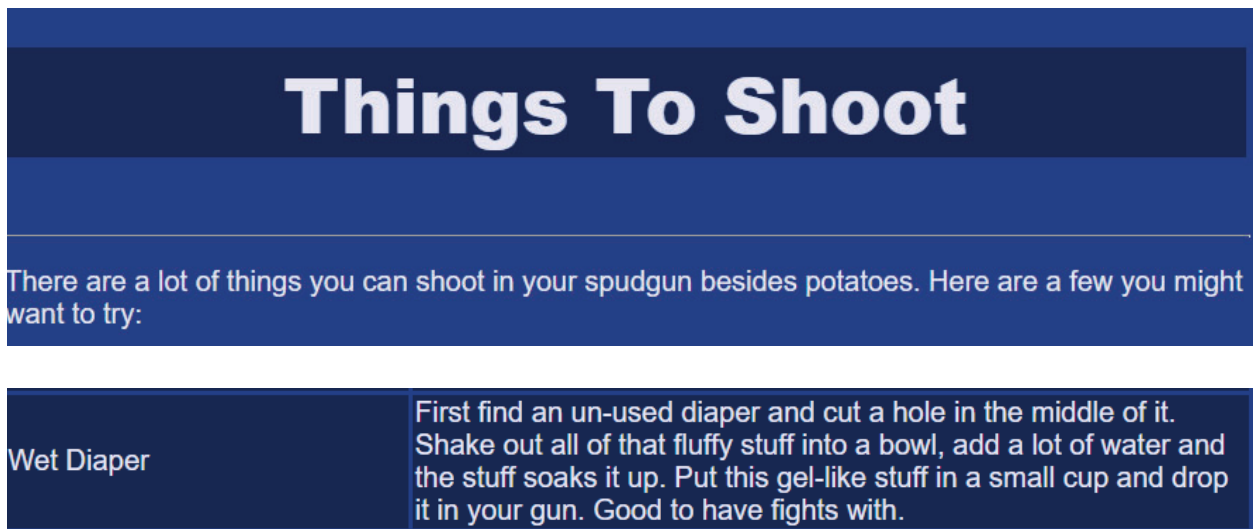
In Figure 3, Hamilton depicts the gun in a cocked state. The piston is retracted, the spring is compressed, air has filled the air compression chamber, and the gun is ready to compress air from the air compression chamber into the smaller diameter barrel to accelerate and launch a projectile:



Ex. 1014, Hamilton at Fig. 3; *see also* Hamilton at page 1, column 1, lines 19-22 (“Fig. 3 is a similar view as Fig. 2, on a larger scale, and with the parts in position when in the act of compressing the spring.”)

H. Background on “Spudgun” SAP Launcher Webpage

86. By April 2008, a “spudgun” related website suggested shooting hydrated SAP from a diaper using the air pressure from a potato gun. Ex. 1015 at 81-85. In my opinion, the Spudgun SAP Launcher is in the same field of endeavor as the ’683 Patent, as it relates to projectile launchers (*e.g.*, a spudgun) for a wide array of various ammunitions. A POSITA would look to public disclosures, like the Spudgun webpage, when designing a toy projectile launcher. By clicking on the link titled “things to shoot,” a POSITA would see a variety of categories of potential ammunition. The list includes “the fluffy stuff” from “an un-used diaper” soaked in water, which I understand from Dr. Wanat is a hydrated super absorbent polymer:



Ex. 1015 at 84-85.

IX. CLAIMS 1-14 ARE INVALID

87. It is my opinion that Claims 1-14 of the '683 Patent are invalid for the following reason:

- **Ground 1:** ThinkGeek Spitballs anticipates claims 1-3, 10, 11 and 13.
- **Ground 2:** Claims 1-12 and 14 are obvious based on the combination of Nagayoshi and ThinkGeek Spitballs.

A. Claims 1-3, 10, 11, and 13 Are Anticipated by ThinkGeek Spitballs.

1. Claim 1 Mapping

- a. Preamble: “A projectile launching system comprising:”**

88. In my opinion, to the extent the preamble is limiting, ThinkGeek Spitballs discloses a projectile launching system. For example, ThinkGeek Spitballs discloses projectiles (for example, the hydrated SAP Spitballs) and a launcher (for example, a blowgun), as I describe in detail in Sections IX.A.1.b-IX.A.1.c.

89. For example, the front of the ThinkGeek Spitballs packaging depicts a person using a tube-shaped projectile launcher to launch a spherical projectile:



- Ex. 1007 at 5. In my opinion, a POSITA would understand from this image that the product in the packaging (i.e. Spitballs) are being launched as ammunition from an air-pressure-based projectile launcher.
90. In my opinion, the name “spitball” itself is further teaching that the product is part of a projectile launching system. It was well-known to POSITAs by 2010 (and, in fact, was well-known by adults and children generally) that a “spitball” can be, and often is, launched from a tube with air pressure. Indeed, “Spitballs” would immediately invoke for a POSITA the concept of launching the Spitballs SAPs from a projectile launcher—several dictionaries confirm that “Spitballs” is used to mean a projectile. Ex. 1035 (2001 New Oxford American Dictionary: “spitball—a piece of paper that has been chewed and

shaped into a ball *for use as a missile*”); Ex. 1036 (2005 Webster’s II New College Dictionary 3d ed.: “spitball-Paper chewed and shaped into a lump *for use as a projectile*). The theme of the packaging, the depiction of a Spitball being launched from a straw, and the name “Spitballs” confirm for a POSITA that the Spitballs are projectiles for use with a projectile launching system, and are ammunition configured for use with a projectile launcher.

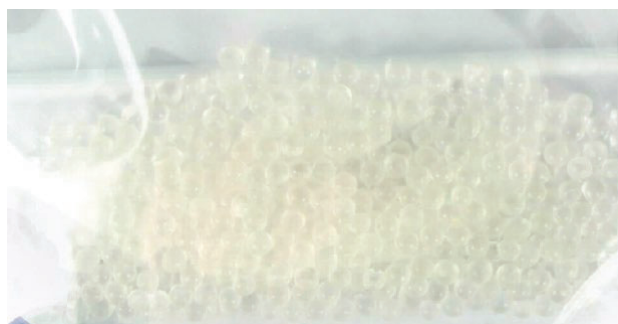
91. The product description further discusses other ways to launch the Spitballs product. For example, ThinkGeek Spitballs discloses that Spitballs are “fun to throw!” and “What if instead of real excretations, you flung awesome spherical polymers at your friends and/or coworkers?” Ex. 1007 at 8. Spitballs further teaches that, after they are hydrated in water, they “are now ready for war.” It further teaches that Spitballs “[w]ill bounce and/or explode into mushy parts *on impact* (depending on the force you throw them).” Ex. 1007 at 8. In my opinion, a POSITA would have understood from this disclosure that Spitballs are configured for use with a projectile launcher, such as an air-pressure-powered projectile launcher as depicted on the product packaging, because they either “bounce and/or explode [] on impact” depending on how hard they are launched. Thus, in my opinion, a POSITA would understand that Spitballs can withstand compressive forces (such as those associated with bouncing), without breaking apart, from which a

POSITA would understand that they can also withstand compressive forces associated with air pressure applied from a projectile launcher.

92. The product description also states that the Spitballs can “bounce and then explode on target.” Ex. 1007 at 8. In my opinion, a POSITA would understand that that because the Spitballs either bounce or explode on impact, depending on how hard they are launched, the Spitballs can withstand some level of launching force without breaking apart, and are therefore configured for use with an air-powered launcher.

b. “a plurality of substantially spherical soft-projectiles formed from hydrated super absorbent polymer; and”

93. In my opinion, ThinkGeek Spitballs discloses a plurality of substantially spherical soft-projectiles formed from hydrated super absorbent polymer.
94. In my opinion, ThinkGeek Spitballs discloses that the Spitballs are substantially spherical. For example, Spitballs discloses that “Spitballs are awesome *spherical* polymers.” Ex. 1007 at 8. Spitballs’ packaging, which I’ve depicted below, shows multiple (that is, a “plurality”) of dehydrated Spitballs in a bag, and a plurality of hydrated Spitballs in the bottom-left corner. Ex. 1007 at 5. Both the dehydrated Spitballs and the hydrated Spitballs are clear polymer beads having a substantially spherical shape.



Ex. 1007 at 5. The webpage likewise teaches that Spitballs include a plurality of projectiles, for example: “Contains: 2g of Spitballs (*about 150 or so*).” Ex. 1007 at 8. Spitballs’ webpage further shows images of a plurality of hydrated Spitballs that are all substantially spherical.



Ex. 1007 at 8.

95. In my opinion, Spitballs discloses that the Spitballs are soft-projectiles. As described above in Section VIII.B, Spitballs are projectiles that are designed to be launched. Further, a POSITA would understand that Spitballs are soft. As shown in the image above, they are “***Squishy*** Fun.” Ex. 1007 at 8. The ThinkGeek webpage teaches that “*Spitballs* start off as small hard little spheres. Soak them in water for about 4 hours (or overnight for best results) and they will absorb water and grow up to 200 times their original size.” Ex. 1007 at 8. After soaking in water, the Spitballs become “slimy and squishy,” and “[i]f you throw them gently, they will bounce” or [i]f you throw them hard enough, they will explode into mushy pieces.” Ex. 1007 at 8. A POSITA would have understood that a “slimy and squishy” sphere that bounces and can “explode[]” when it hits a target is a “soft-projectile.” Specifically, when a projectile impacts a person, if the projectile bounces off the person, the force of the impact is entirely absorbed by the person and redirects the projectile to bounce off the body. But if it explodes, the projectile is compressed and breaks, and the impact force is distributed over a wider area and partially redirected into fracturing the projectile. In my opinion, both the “squishy” nature of the projectile and the ability to “explode” on impact will reduce the force of the impact as compared to, for example, a plastic airsoft round or a metal BB. A POSITA would have understood that Spitballs are softer on

impact than, *e.g.*, a rigid plastic projectile that is not “squishy,” and would have considered hydrated SAP Spitballs a soft projectile.

96. Spitballs are hydrated polymers. For example, they are described as “awesome spherical *polymers*.” Ex. 1007 at 8. The packaging teaches that the Spitballs “Grow[] 200x Their Size!” Ex. 1007 at 5. ThinkGeek Spitballs also explains that if soaked “in water for about 4 hours (or overnight for best results),” the Spitballs “will absorb water and grow up to 200 times their original size.” Ex. 1007 at 8. A polymer that grows 200 times its size exceeds the 100 times absorbency proposed in Petitioners’ construction of SAP, and is an order of magnitude larger than Patent Owner’s construction of 10 times absorbency. I further understand from my conversations with Dr. Wanat that whether the reference to “200 times their original size” refers to 200 times the *volume* or 200 times the *mass* is irrelevant, because if the Spitballs grow 200 times their *volume* when they absorb water, that is an increase of 138.3 times the mass.

97. Further, in my opinion, based on my discussion with Dr. Wanat, the description of Spitballs further confirms for a POSITA that Spitballs have well-known properties associated with hydrated SAPs. For example, Spitballs deform under pressure (which a POSITA would understand from the disclosure that they are “squishy” and “mushy”) yet retain their shape without

losing water when compressed (which a POSITA would understand from the disclosure that Spitballs are “squishy” and “bounce”). Ex. 1007 at 8. Further, Spitballs break apart (“explode”) under sufficient pressure, which I understand from Dr. Wanat is likewise a characteristic of a hydrated SAP—specifically, instead of losing water, they break apart after a certain amount of force is applied.

c. “a projectile launcher for launching the ammunition in free flight.”

98. In my opinion, ThinkGeek Spitballs discloses a projectile launcher for launching the ammunition in free flight. The front of the ThinkGeek Spitballs packaging depicts a person using a tube-shaped projectile launcher to launch a spherical projectile into free flight:



Ex. 1007, at 5. In my opinion, a POSITA would understand from this image that the product in the packaging (i.e. Spitballs) are being launched into free flight as ammunition from an air-pressure-based projectile launcher.

99. As discussed above in Section IX.A.1.a, the name “Spitballs” also teaches the POSITA a projectile launching system for launching the Spitballs SAPs from a projectile launcher into free flight—several dictionaries confirm that “Spitballs” is used to mean a projectile. Ex. 1035 (2001 New Oxford American Dictionary: “spitball—a piece of paper that has been chewed and shaped into a ball *for use as a missile*”); Ex. 1036 (2005 Webster’s II New College Dictionary 3d ed.: “spitball—Paper chewed and shaped into a lump *for use as a projectile*). The theme of the packaging, the depiction of a Spitball being launched from a straw, and the name “Spitballs” confirm for a POSITA that the Spitballs are intended to be used as projectiles that are launched into free flight.

100. The product description also states that the Spitballs can “bounce and then explode on target.” Ex. 1007 at 8. In my opinion, a POSITA would understand that to hit a target, the projectiles are launched into free flight. Additionally, a POSITA would understand that because the Spitballs either bounce or explode on impact, depending on how hard they are launched, the

Spitballs can withstand some level of launching force without breaking apart, and are therefore configured for use with an air-powered launcher.

2. Claim 2 Mapping

a. “The system of claim 1, further comprising a sealed container for storage of the ammunition.”

101. As explained in Section IX.A.1, ThinkGeek Spitballs discloses the system of claim 1. Further, in my opinion, ThinkGeek Spitballs discloses a sealed container for storage of the ammunition. The image of the Spitballs packaging depicts a group of dehydrated Spitball projectiles that is contained in a sealed, zip-lock style bag:



Ex. 1007 at 5. This sealed, zip-lock style bag is a sealed container for the storage of the Spitball ammunition, and would hold Spitballs whether dehydrated or hydrated. A POSITA would recognize that using this bag to

store Spitballs, as disclosed in the image of the packaging, would ensure they do not get lost and also enable easy transport—for example, because they can “slip,” “slide,” and “bounce” (Ex. 1007 at 5) and when wet can be “slimy” and “squishy” (Ex. 1007 at 8).

3. Claim 3 Mapping

a. “The system of claim 1, wherein the projectile launcher is a toy.”

102. As explained in Section IX.A.1, ThinkGeek Spitballs discloses the system of claim 1. Further, in my opinion, ThinkGeek Spitballs discloses the projectile launcher is a toy. For example, the Spitballs packaging emphasizes the toy aspects of the product. It discloses “gobs of squishy stuff flying through the air is fun,” that the product is “fun to throw!,” and describes the Spitballs as “awesome spherical polymers.” Ex. 1007 at 8. The packaging also indicates that Spitballs are for “Ages: 3 and up,” which a POSITA would have understood to indicate the product was meant to be played with as a toy by children ages 3 and up. Ex. 1007 at 8. Additionally, the packaging of Spitballs is styled with a cartoon image of a person launching the Spitballs through a tube, which is further evidence to a POSITA that the disclosed Spitballs launcher is a toy:



Ex. 1007 at 5.

4. Claim 10 Mapping

- a. **“The system of claim 1, wherein the super absorbent polymer has a cross linking density sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher.”**

103. As explained in Section IX.A.1, ThinkGeek Spitballs discloses the system of claim 1. Further, in my opinion, Spitballs discloses the system of claim 1, wherein the super absorbent polymer has a cross linking density sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher.

104. I understand that Patent Owner has asserted in its infringement contentions in the ITC Action that “[t]he cross linking density is sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher, in that the plurality of soft-projectiles do not break apart when launched from the projectile launcher.” Ex. 1070 at 26. In other words, Patent Owner applies this claim to mean that if the soft-projectile does not break apart when launched, that is sufficient to show that the crosslinking density is sufficient to prevent the soft-projectiles from breaking apart when launched.
105. In my opinion, Spitballs discloses “the super absorbent polymer has a crosslinking density sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher.” A POSITA would understand from the Spitballs webpage that Spitballs can withstand compressive forces, such as bouncing. Ex. 1007 at 8 (“If you throw them gently, they will bounce”; “Will bounce ... on impact.”). Spitballs discloses that they can “explode into mushy parts *on impact.*” Ex. 1007 at 8. And the Spitballs packaging teaches this in the context of projectiles shown being launched via air pressure:



Ex. 1007 at 5. In my opinion, because Spitballs can withstand compressive forces associated with bouncing, can fly through the air and explode *on impact*, and are shown being launched through an air-powered launcher, a POSITA would understand that Spitballs will not break apart when launched from a projectile launcher. Thus, Spitballs discloses that the crosslinking density of the hydrated SAP projectiles is sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher.

106. In my opinion, even if not explicit on the packaging of Spitballs, it would have been obvious to a POSITA in view of Spitballs and the knowledge of a POSITA to design and use hydrated SAP projectiles that do not break apart when launched from a projectile launcher. Because the Spitballs packaging teaches that Spitballs can “bounce,” in my opinion a POSITA would have understood that they can withstand force (*e.g.*, air-pressure launching forces). Ex. 1007 at 5, 8. In my opinion, a POSITA would have understood that if a hydrated SAP broke apart when launched, routine modifications could be made to the hydrated SAP and/or the projectile launcher to prevent the projectile from breaking apart. I understand from my discussions with Dr. Wanat that such modifications to the SAP would have been simple for a POSITA at the time of the invention. Specifically, I understand that a POSITA would have known that hydrated SAPs can be designed to withstand greater compressive forces (*e.g.*, air pressure supplied during firing) by increasing the crosslinking of the polymer. Additionally, a POSITA would have known that modifying the firing force of the projectile launcher would reduce the likelihood of the projectile breaking apart during launch. For example, a POSITA would have known how to easily reduce the firing force of an air gun by using a lighter spring and/or reducing the difference in diameter between the air compression chamber and the barrel, or a

combination of both. *See* Paragraph 76 A POSITA also would have known to modify the force used to blow the Spitball out of a tube so that the projectile did not break apart when used with the blowgun-type launcher.

5. Claim 11 Mapping

- a. “The system of claim 1, wherein the projectile launcher is designed to use air pressure to launch the soft-projectiles.”**

107. As explained in Section IX.A.1, ThinkGeek Spitballs discloses the system of claim 1. Further, in my opinion, Spitballs discloses the system of claim 1, wherein the projectile launcher is designed to use air pressure to launch the soft-projectiles. The Spitballs packaging depicts a person launching a Spitball using a projectile launcher powered by air pressure (*e.g.*, a blowgun):



Ex. 1007 at 5. As discussed above in Section IX.A.1.a, “Spitballs” would immediately invoke for a POSITA the concept of launching the Spitballs SAPs from a projectile launcher using air pressure. The theme of the packaging, the depiction of a Spitball being launched from a straw, and the name “Spitballs” indicate that the projectile (Spitball) is intended to be launched from a projectile launching device (*i.e.*, a straw or blowgun) via air pressure (*i.e.*, the person blowing into the straw/blowgun).

6. Claim 13 Mapping

a. “The system of claim 1, wherein the projectile launcher comprises a firing mechanism that is incapable of storing energy independent of a user.”

108. As explained in Section IX.A.1, ThinkGeek Spitballs discloses the system of claim 1. Further, in my opinion, ThinkGeek Spitballs discloses the system of claim 1, wherein the projectile launcher comprises a firing mechanism that is incapable of storing energy independent of a user.

109. The Spitball packaging depicts a person holding a projectile launcher (*e.g.*, a straw/tube) up to their mouth and launching a Spitball by blowing into the straw/tube, like a blow gun.



Ex. 1007 at 5; *see also* my discussion in Sections IX.A.1.c and IX.A.5.a; Ex. 1007 at 8. The projectile launcher is powered by air pressure which the user supplies from their lungs when they blow into the straw/tube. A POSITA would be well aware that in a blowgun-style projectile launching system, the user supplies all of the energy that is necessary to launch the projectile (specifically, by physically blowing into the launcher). Therefore, in my opinion, Spitballs discloses a projectile launching system that is incapable of storing energy independent of the user. The launcher does not store energy independent of the user; the energy is provided by the user (*e.g.*, blowing into the tube) and not stored.

**B. Claims 1-12 and 14 Are Obvious in View of the Combination of
Nagayoshi and ThinkGeek Spitballs**

110. It is my opinion that claims 1-12 and 14 would have been obvious to a POSITA at the time of the alleged invention in view of the combined teachings of Nagayoshi and ThinkGeek Spitballs. The combination of Nagayoshi and ThinkGeek Spitballs discloses each and every element of claims 1-12 and 14, arranged as claimed, and a POSITA would have been motivated to make the combination and would have had a reasonable expectation of success in doing so. In my opinion, the combination renders claims 1-12 and 14 invalid as obvious.

1. Combining Nagayoshi and ThinkGeek Spitballs

111. In my opinion, a POSITA would have been motivated to combine the teachings of Nagayoshi and ThinkGeek Spitballs. In my opinion, Nagayoshi and Spitballs are in the same field of endeavor. Nagayoshi teaches a “toy gun” for “continuously shooting spherical bullets” (Ex. 1009, ¶0001), and ThinkGeek Spitballs teaches spherical ammunition that can be launched from a launcher (Ex. 1007, and as discussed above in Section IX.A). Thus, both Nagayoshi and Spitballs are directed to toy launchers that use spherical ammunition. A POSITA would consider using other spherical ammunition, such as Spitballs, with Nagayoshi’s gun for shooting “spherical bullets.”

112. As discussed above in Sections VIII.B and IX.A, ThinkGeek Spitballs includes an image depicting a person launching a hydrated super absorbent polymer through a tube using air pressure, and teaches a POSITA to launch, “fl[i]ng,” and “throw” Spitballs and use them in “war.” Ex. 1007 at 8. In my opinion, a POSITA would be motivated by the teachings of Spitballs to design an air-pressure based launcher for Spitballs, such as the launcher disclosed in Nagayoshi. Further, there are express teachings in the prior art that provide additional motivation to make an air-power based projectile launcher for Spit Balls. As I discussed above in detail in Paragraphs 57-58, which I incorporate fully here, Steve Spangler invented and publicly used an air-powered blow gun to launch hydrated SAPs (specifically, Clear Spheres / Jelly Marbles) at Science in the Rockies in 2008. In my opinion, this public disclosure of an air-powered SAP launcher, similar to what is depicted in the ThinkGeek Spitballs listing, not only provides further motivation to a POSITA to make an air-powered launcher for Spitballs, it also provides that person a reasonable expectation of success, as a person had already successfully launched hydrated SAPs using air pressure.
113. In my opinion, a POSITA would have understood that Spitballs are projectiles and would have immediately recognized that several, well-known

technologies, including blow guns and other air-powered projectile launchers, could be used to launch them.

114. In my opinion, a POSITA would understand that a launcher for these soft, squishy SAP projectiles (specifically, Spitballs) that can be used in “war” would be fun, but would also understand that there are clear drawbacks to using blow guns as opposed to other air-pressure launchers. For example, Spitballs teaches “don’t try to eat them.” Ex. 1007 at 8. Yet, a POSITA would recognize that a blow gun has an opening that the user must blow through to launch the SAP, but which could also enable a hydrated SAP to enter the user’s mouth, creating a potential risk that they will be eaten or enter the windpipe creating a choking hazard. Similarly, a POSITA would understand that blowing into a tube every time they want to launch a projectile can be physically tiring. A POSITA would likewise recognize that the duration of play could be limited by the user’s own breathing capacity (*e.g.*, persons with asthma or other breathing issues may not be able to participate in the play for very long), and can also result in varied performance as a user is unlikely to be able to precisely control the force of the breath with each shot. Therefore, while a POSITA would appreciate that Spitballs can be launched from a tube as expressly taught by the ThinkGeek Spitballs listing (including the

packaging depicting such use), doing so has safety and performance drawbacks associated with it that a POSITA would recognize.

115. In my opinion, a POSITA would also have found using century-old air gun technology that, instead of using human lungs to generate air pressure, uses mechanical components (a spring, piston, and air compression chamber) to be an obvious choice. Such air guns using springs, pistons, and air compression chambers to generate air pressure to launch a projectile were very well known in the prior art and in fact had been known for over a century before the '683 Patent's May 10, 2010 filing date. Ex. 1014 (Hamilton, discussed in Section VIII.G), Ex. 1013 (Bennett, discussed in Section VIII.F), Ex. 1010 (Meggs, discussed in Section VIII.D), Ex. 1011 (Peev, discussed in Section VIII.E); Ex. 1009 (Nagayoshi, discussed in Section VIII.C); *see* Sections VIII.C-VIII.G. In my opinion, therefore, a POSITA would know that air-pressure-based launchers are versatile and can work with a wide array of ammunition, from heavy projectiles, like BBs, to "polymer balls" described in Peev (Ex. 1011 at 23), to "low-density, light-weight projectiles" taught in Meggs (Ex. 1010 at 1:53-55). The fact that air guns work with a variety of ammunition categories would further motivate a POSITA to try the combination, and would give them a reasonable expectation of success in making it.

116. In my opinion, a POSITA would likewise recognize that the safety risks and physical exertion drawback associated with launching a hydrated SAP through a tube / straw can be easily solved by using a mechanical launcher that substitutes user-provided air pressure with mechanically generated air pressure. It was general knowledge to a POSITA that air guns (such as Peev, Nagayoshi, Meggs) were available, and a POSITA would have immediately recognized the benefits of these guns over blow guns. The first benefit includes the ability to launch the projectile with air pressure without blowing into a tube, thereby limiting physical exertion. For example, Nagayoshi teaches and claims an “electric air gun” that launches a projectile with air pressure. Ex. 1009 Cls. 21-30, ¶¶ [0001], [0029]-[0044] (Embodiment 1). The second benefit a POSITA would recognize is eliminating the risk that the Spitball could be drawn back into the user’s mouth from the tube, because the user no longer needs to place their mouth near the projectile to fire it, which significantly reduces the risk of accidentally swallowing or choking on the Spitballs. A third benefit a POSITA would recognize is the ability to use the widely-known advantages of mechanical projectile launchers, including improved aim and accuracy (by virtue of being able to look down the barrel to line up a shot), being able to shoot farther distances (because the POSITA can control the power with which a mechanical spring, piston, and air

compression chamber fire, as discussed above in Paragraph 76), and the ability to hold a large number of projectiles and feed them into the launcher to launch multiple projectiles in rapid succession, for example as described in Nagayoshi. Ex. 1009 ¶ [0001] (teaching “a toy gun having a continuous shooting function such as that continuously shoots hundreds of bullets with one trigger pull” with a “bullet supply mechanism for continuously feeding spherical bullets”); Ex. 1009 Fig. 17 (depicting numerous rounds of ammunition in the magazine). Similarly, Peev teaches that “[e]lectric airsoft guns... contain a body with a magazine and a barrel, in the rear part of which is located a mechanism for compressing the air and a means of controlling the fire, interacting with the trigger of the airsoft rifle,” and in particular, the electric air gun described in Peev has an “automatic fire” mode. Ex. 1011 at 199.

117. In my opinion, A POSITA would have understood that being able to launch many Spitballs in a short timeframe would increase the fun of launching Spitballs, and that using well-known, century-old launcher technology to do so would likewise address the choking concern. For example, a POSITA would understand that using a tube/blowgun as depicted on the Spitballs packaging would require the user to carry ammunition and load each round before firing. This would interrupt the play of launching. Although a user can

load more than one into the tube, in that circumstance the user would shoot them all out at once, with one breath, and would still need to reload for the next shot. The “slimy” and slippery nature of Spitballs would also require a lot of manual dexterity to get them into the tube, and increases the chances that the ammo will be dropped, causing it to bounce away and be lost. Ex. 1007 at 5, 8. Thus, in my opinion, a POSITA would look to well known launchers that had the ability hold multiple SAP balls, had the ability to load them without requiring a human to use their fingers, and allowed them to fired in sequence.

118. Further, a POSITA would understand that using human power (such as blowing into the tube) to launch Spitballs limits the performance of the launcher and creates inconsistencies from shot to shot. For example, the launcher is limited to the lung capacity of the person launching it, and each shot will be inconsistent, depending on how out of breath a person might be and because it is difficult to blow with the exact same force every single time the user shoots. In my opinion, a POSITA would understand that mechanical launchers, like Nagayoshi, can provide a far more consistent level of air pressure and reliability, shot after shot.

119. A POSITA would likewise be motivated to improve on prior art air guns, like Nagayoshi, and would look to Spitballs to do so. In my opinion, a POSITA

reviewing Nagayoshi, Peev, and similar air gun references would have been motivated to preserve the fun of airsoft play, while reducing injury risk by using softer ammunition. Before February 2010, it was well known to POSITAs that air guns were fun toys that children and adults can use to play. For example, both Nagayoshi and Peev emphasize the toy / game aspect of air guns. Peev states that “[e]lectric airsoft guns find application in the sporting gun industry and are used for military emulations or training, or for fun when conducting airsoft games.” Ex. 1011 at 23. Similarly, Nagayoshi states that “[t]he present invention relates to a toy gun having a function for continuously shooting spherical bullets...” and refers to the launcher as “toy gun” throughout the patent. Ex. 1009 ¶ [0001], *see generally* Ex. 1009. Indeed, every claim of Nagayoshi is to a “toy gun.” Ex. 1009, Claims 1-39. And while Nagayoshi discloses “spherical bullets” (e.g., Ex. 1009 ¶ [0001]), a POSITA would recognize that Nagayoshi does not specify or limit the type of material that may be used to form those “spherical bullets.”

120. However, it was also known to POSITAs as of February 2010 that, while fun, air guns had the potential to cause injury as a result of the metal BB or plastic airsoft pellets typically used with such air guns. I reviewed multiple articles published in the 2000s that discuss potential safety concerns with air guns. For example, WebMD published an article titled “BB, Pellet, Paintball Guns

Dangerous to Kids: Experts Say Don't Characterize Them as Toys" on November 1, 2004. Ex. 1026. The article explains that "BB, paintball, and pellet guns can cause injuries and death, even though they're not traditional firearms, according to the American Academy of Pediatrics (AAP)." Ex. 1026 at 1. It goes on to state that "[i]n 2000, emergency rooms in the U.S. treated more than 21,000 injuries from air rifles and BB, paintball, and pellet guns, collectively called nonpowder guns. About a fourth of these were to the head and neck (excluding the eye); more than one in 10 injuries affected the eye." Ex. 1026 at 1. A POSITA would understand that improving upon the safety of these guns would be a great benefit.

121. As another example, I also reviewed an article from The Washington Post that published on November 26, 2004 and is titled "Not Your Dad's BB Gun." Ex. 1027. The article starts by describing the fun associated with air guns. Ex. 1027 at 1. It discusses that "Humorist Jean Shepherd's 'A Christmas Story,' a short story and movie classic about growing up in the '40s, is practically a boy's paean to BB guns. The only thing on 10-year-old Ralphie Parker's Christmas list is a Daisy 'Red Ryder' -- the carbine-action, 200-shot lightning loader, range-model air rifle with a shock-proof, high-adventure combination trail compass and sundial built into the stock. It is, Shepherd proclaimed, 'the Holy Grail of Christmas gifts.'" Ex. 1027 at 2. The article,

however, recognizes that “[a]s indicated by the recent spate of BB gun sniping in Northern Virginia and the report this month from the American Academy of Pediatrics attributing about 21,000 injuries annually to BB guns and other air guns, America's Norman Rockwell-like nostalgia for the seemingly benign BB gun may be off target.” Ex. Ex. 1027 at 1. While the article contains some discussion relating to more modern, adult-focused air guns, it also discusses air guns sold for kids, and notes that they are capable of “penetration in a human skin” at certain velocities, can be “very harmful or lethal” at higher velocities, and still are capable of “limited harm” at lower velocities:

The Youth Line guns, which Daisy recommended for kids 12 and older with adult supervision, fire BBs or pellets at a velocity of less than 350 feet per second, he says. Ralphie’s Red Ryder, Daisy’s second-best seller, was 280 to 350 fps. The “hardest hitting” of Daisy’s traditional BB guns, Beeman says, was the Model 25 -- 25 million sold in 58 variations from 1914 to 1979 - - which fired in the 400 fps range.

“Around 350 feet per second is a figure you want to keep in mind,” says Beeman. “At 300 to 400 fps, that’s where penetration occurs in a human skin. Below 350 fps, it’s generally considered capable of only limited harm. Above 350 is considered very harmful or lethal. You go into the skull at probably around 500.”

Ex. 1027 at 3.

122. As another example, I reviewed an August 11, 2008 article titled “Airsoft Guns: A Double-Edged Sword.” Ex. 1028. The article teaches that airsoft guns can be dangerous and can “crack the skin” and cause “bleeding”: “There’s also the dangers involved in fighting airsoft wars. The rounds are made of hard plastic and are sold in sizes up to .25 grams in diameter. Airsoft guns can shoot these rounds at velocities up to 450 feet per second (the legal limit). While this may not seem dangerous, it can be enough to crack the skin and cause minor bleeding.” Ex. 1028 at 2-3. The article, however, also recognizes that airsoft guns are fun despite the potential safety risks:

Beyond all the risks and dangers associated with airsoft guns, there is also a lot of really fun aspect to them. They look and behave exactly like real guns so that it feels like you’re firing a real gun. But you don’t deal with the life-threatening danger of bullet-firing real guns. Plus they’re a great, safer alternative to real guns for teenagers who shouldn’t be shooting them yet. I imagine it’s a lot of fun to shoot airsoft guns with your friends in the backyard. It doesn’t take a rocket scientist to figure out why young boys like them so much.

Ex. 1028 at 3.

123. Therefore, in my opinion, it was well known to POSITAs at the time of the invention that, while air guns were known to be fun, they came with the

drawback of potentially causing injury, “bleeding,” “cracked skin,” and similar potential injury risk. Therefore, in my opinion, a POSITA would have been highly motivated to search for alternative ammunition for toy air guns, like those taught by Nagayoshi, with the goal of reducing the risk of accident or injury while maintaining the fun and entertainment of air guns.

124. In my opinion, a POSITA would have understood that hydrated super absorbent polymers could be used as a softer ammunition in toy projectile launchers than the plastic airsoft pellets and metal BBs commonly used in air guns in the early-mid 2000s, as described in the articles I discussed above, including based on the teachings of ThinkGeek Spitballs, the Steve Spangler Clear Spheres Launcher (see Paragraphs 57-58), and the Spudgun SAP launcher. ThinkGeek Spitballs and Steve Spangler disclosed spherical, hydrated-SAP projectiles that were launched using air pressure. Ex. 1007 at 5, 8; Paragraphs 57-58. Critically, unlike plastic airsoft ammunition and metal BBs, hydrated SAP projectiles are “squishy,” “bounc[y],” comprised mostly of water, and can “explode into mushy parts on impact.” Ex. 1007 at 5, 8. From this, a POSITA would understand that they are much softer and impart less impact force when fired at the same speed as compared to plastic airsoft ammunition or metal BBs. In my opinion, a POSITA would also have been attracted to Spitballs’ ammunition by the customizability of Spitballs

projectiles—the website teaches “the longer they absorb water, the bigger they grow.” Ex. 1007 at 8. A POSITA would also understand that the size of Spitballs—and any hydrated SAP projectile—was adjustable. Further, I understand from my discussion with Dr. Wanat that it was well known to POSITAs prior to 2010 that the size of a fully hydrated super absorbent polymer could be easily adjusted by soaking them in less water, or soaking them for less time, to make them smaller (e.g., 6 mm diameter, a standard air gun size (Ex. 1011, 190 (“Electric airsoft guns [1] externally represent a copy of real firearms, but instead of cartridges, polymer balls with a diameter of 6 mm are fired by compressed air.”))). I further understand from Dr. Wanat that a POSITA would have known that the size of the fully hydrated SAP projectile could be adjusted by adjusting the starting size of the dry bead, increasing/decreasing the amount of crosslinking used, or soaking them in a saltier solution.

125. In my opinion, a POSITA would have understood that Spitballs disclosed projectiles that were softer compared to plastic ammunition and gel-like, and which could be launched using air pressure. Ex. 1007 at 5, 8. And using hydrated SAP ammunition, as taught by Spitballs, with a toy air guns (e.g., as taught by Nagayoshi), would make air guns safer. Thus, in my opinion, a POSITA would be motivated to make the combination and would have a

reasonable expectation of success in doing so. Further, in my opinion, using Spitballs with Nagayoshi's air gun applies a known technique (hydrated SAP ammunition) to a known device ready for improvement (air guns) to yield predictable results (a safer toy gun).

126. In my opinion, it would have been obvious to a POSITA to try combining the toy gun in Nagayoshi with Spitballs. There were a finite number of available ammunition options (e.g., plastic, metal, foam, hydrated SAP), and hydrated SAPs, like Spitballs, offered well known benefits, including reducing the force of impact because, as Spitballs itself teaches, they are "soft," "squishy," and "explode ... on impact." Ex. 1007 at 5, 8. In my opinion, a POSITA would have a reasonable expectation of success in making the combination because both air guns and hydrated SAP projectiles are easily adjusted to arrive at the characteristics needed to make a successful launcher. I discussed hydrated SAP customizability above based on my understanding from Dr. Wanat, and air guns could be adjusted to fire harder or softer by adjusting the spring strength in the air compression chamber or the diameter of the air compression chamber compared to the nozzle/barrel, as I discuss in Paragraph 76.

127. In my opinion, a POSITA would recognize that combining air guns, such as the toy airsoft gun described in Nagayoshi, with hydrated super absorbent

polymer projectiles, such as taught by Spitballs, would be a simple substitution of one known element (spherical hydrated SAP soft-projectiles as taught by Spitballs) for another known element (Nagayoshi's "spherical bullets" that were known in the art to typically be made from plastic or metal) to obtain predictable results: specifically, a safer air gun that preserves the fun of the toy gun while using softer ammunition than the plastic airsoft ammunition known to POSITAs to cause injury.

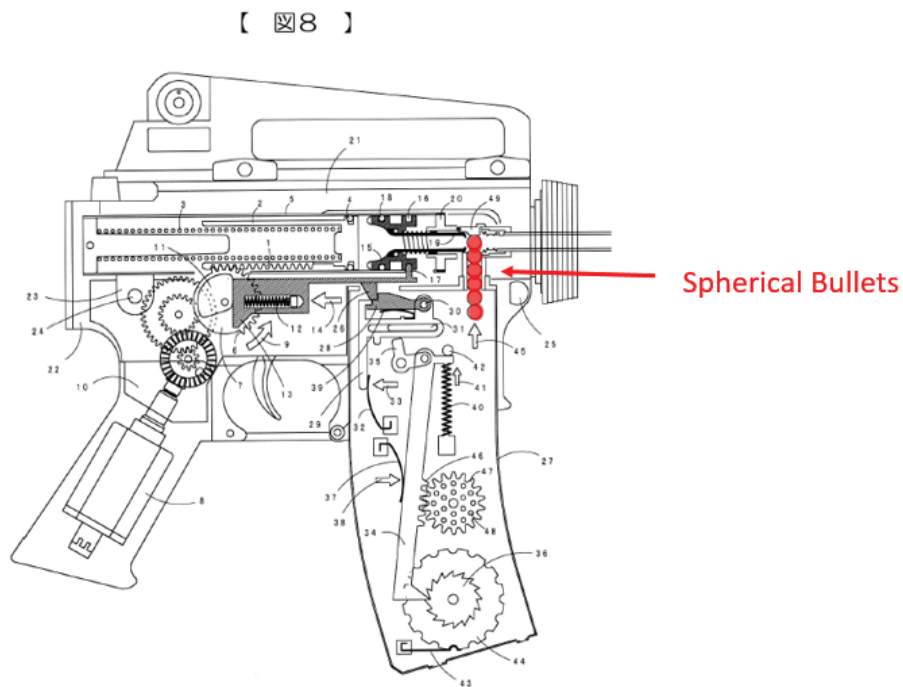
128. In my opinion, the evidence of simultaneous invention that I discuss below in Section X is further evidence that a POSITA would have a motivation to combine and a reasonable expectation of success in making the combination of hydrated SAP ammunition and air guns using a feed chamber, spring, piston, air compression chamber to load and fire a projectile.

2. Claim 1 Mapping

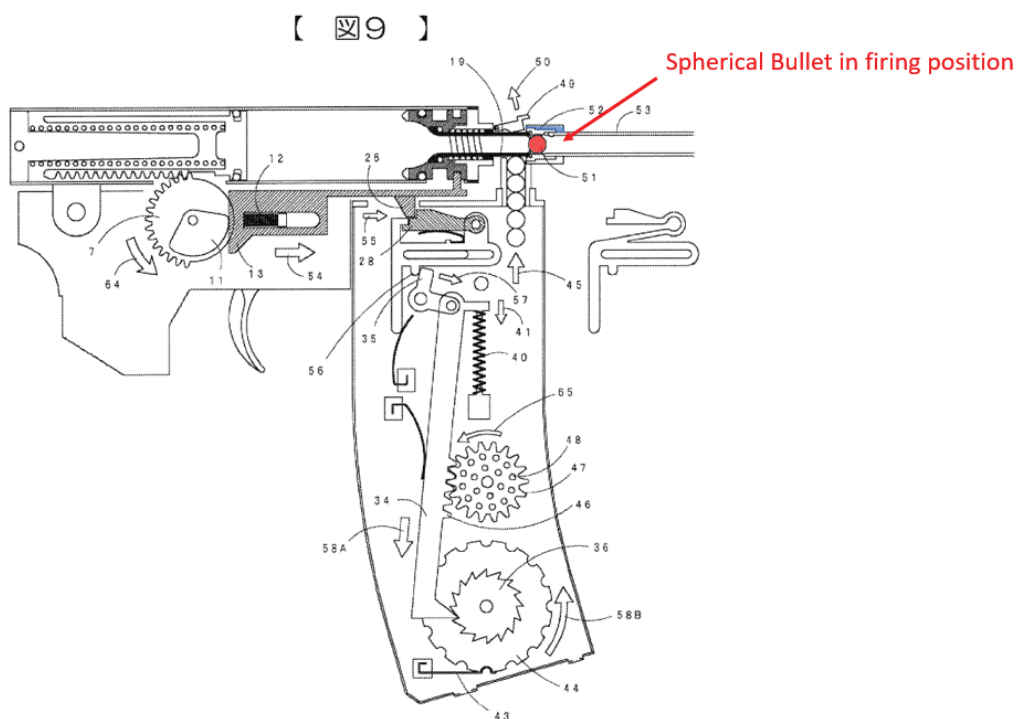
a. Preamble: "A projectile launching system comprising:"

129. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious "a projectile launching system." As I set forth above, Spitballs discloses a projectile launching system. IX.A.1.a. Nagayoshi also discloses "a projectile launching system."

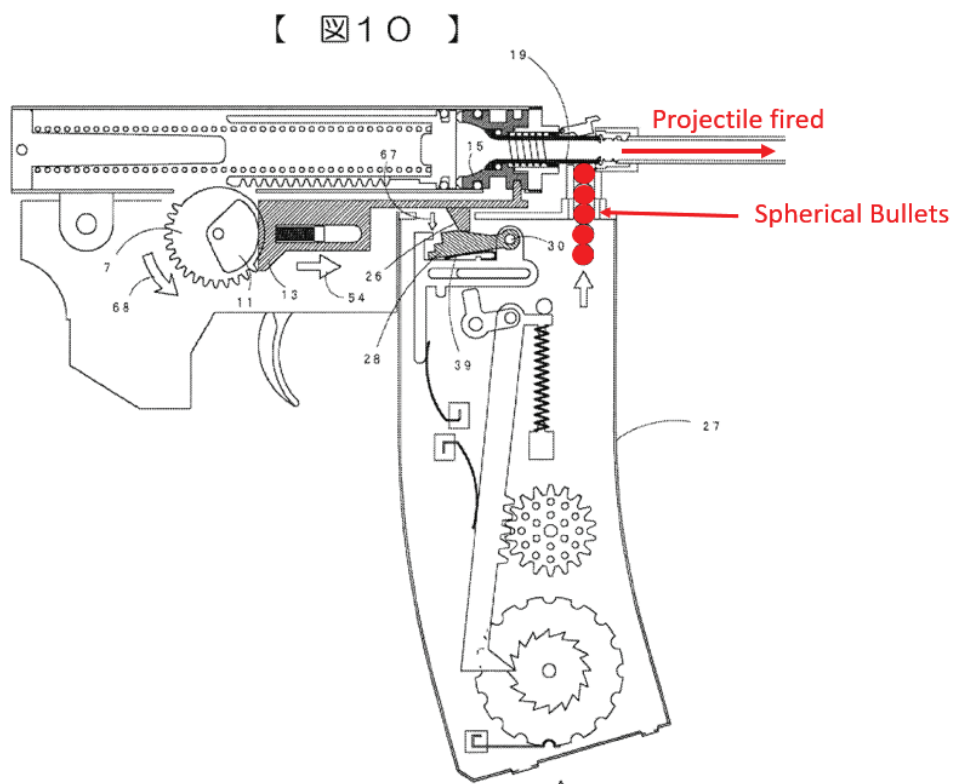
130. Nagayoshi discloses a “**toy gun** having a function for continuously **shooting spherical bullets.**” Ex. 1009 ¶ [0001]. I have annotated Figures 8-10 below to show the spherical bullets in red. As shown, the spherical bullets are being launched from a projectile launcher, which a POSITA would understand is a projectile launching system:



Ex. 1009 at Fig. 8.



Ex. 1009 at Fig. 9.

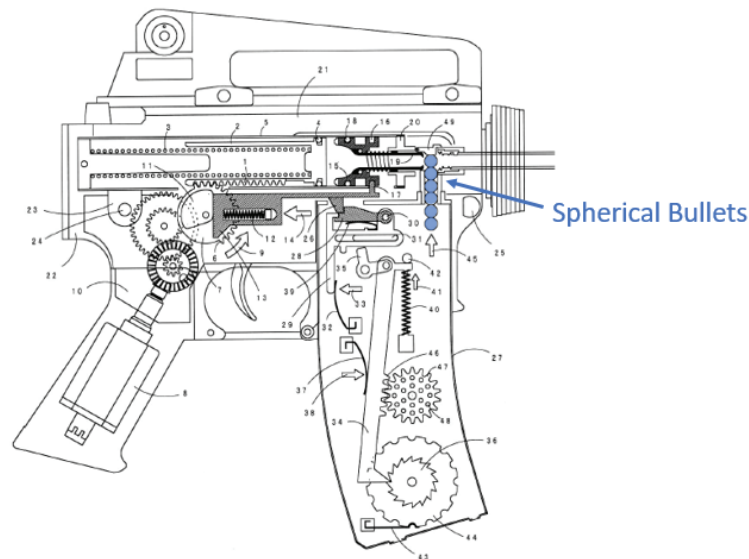


Ex. 1009, Fig. 10. In my opinion, because Nagayoshi discloses launching spherical bullets from the toy gun, it discloses a projectile launching system.

b. “a plurality of substantially spherical soft-projectiles formed from hydrated super absorbent polymer; and”

131. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious “a plurality of substantially spherical soft-projectiles formed from hydrated super absorbent polymer.” As discussed above in Section IX.A.1.b, ThinkGeek Spitballs discloses a plurality of substantially spherical soft-projectiles formed from hydrated super absorbent polymer.
132. Further, Nagayoshi discloses a plurality of substantially spherical projectiles (the “spherical bullets”). For example, Figure 8 (annotated below) teaches the spherical bullets are driven upward in a way that “ensure[s] the *spherical bullets* smoothly enter the sprocket and the like for feeding. Ex. 1009 ¶¶ [0033], [0035]–[0037].

[8]



Ex. 1009 at Fig. 8 (annotated). In my opinion, a POSITA would understand that by teaching the use of “spherical bullets,” Nagayoshi discloses using a plurality of projectiles having the same (spherical) shape.

133. Nagayoshi also teaches that using differently shaped ammunition may lead to problems with the feed mechanism. Figure 11 depicts an “abnormal spherical bullet 69” being “sandwiched by the nozzle member 19 preventing it from advancing into the barrel.” Ex. 1009 ¶ [0042]. Nagayoshi teaches that if the abnormal spherical bullet 69 is not removed, the nozzle tip of nozzle member 19 may break. Ex. 1009 ¶ [0042]. In my opinion, a POSITA would have understood that Nagayoshi teaches using projectiles with the same shape to promote the optimal performance of Nagayoshi’s toy gun. A POSITA

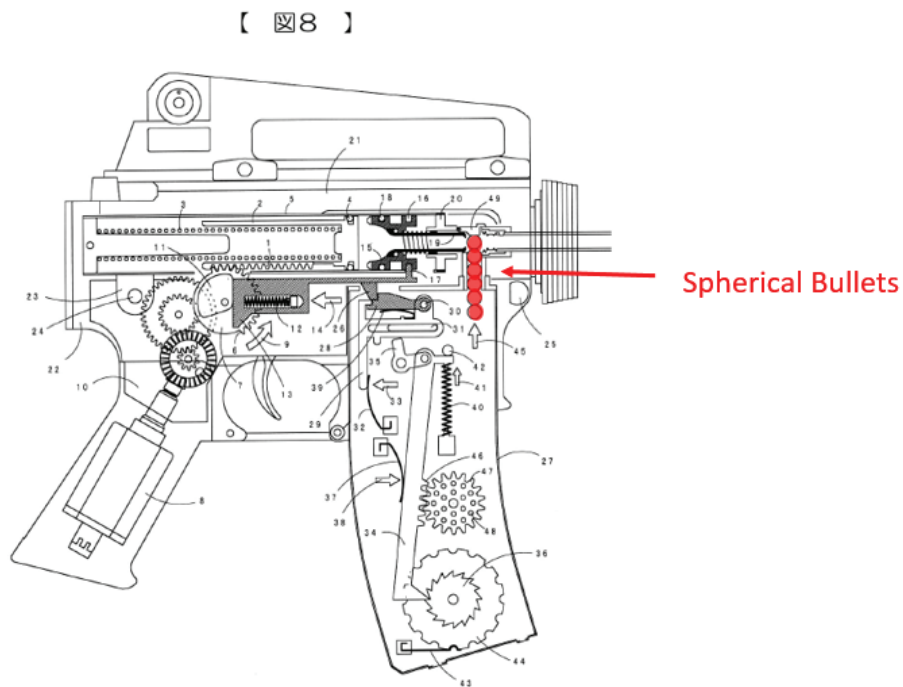
therefore would have been motivated to use spherical bullets having the same shape with Nagayoshi's toy gun.

134. Nagayoshi does not discuss soft projectiles, or projectiles being formed from hydrated super absorbent polymer. But, as I discussed above, in Section IX.A.1.b, ThinkGeek Spitballs discloses a plurality of substantially spherical soft-projectiles formed from hydrated super absorbent polymer. Further, as discussed above, a POSITA would have been motivated to combine Spitballs and Nagayoshi, resulting in a projectile launcher for soft projectiles formed from hydrated super absorbent polymer. Section IX.B.1. In my opinion, a POSITA would have been motivated to use a hydrated SAP projectile, such as taught by Spitballs, in place of the spherical bullets described by Nagayoshi. *See* Section IX.B.1.

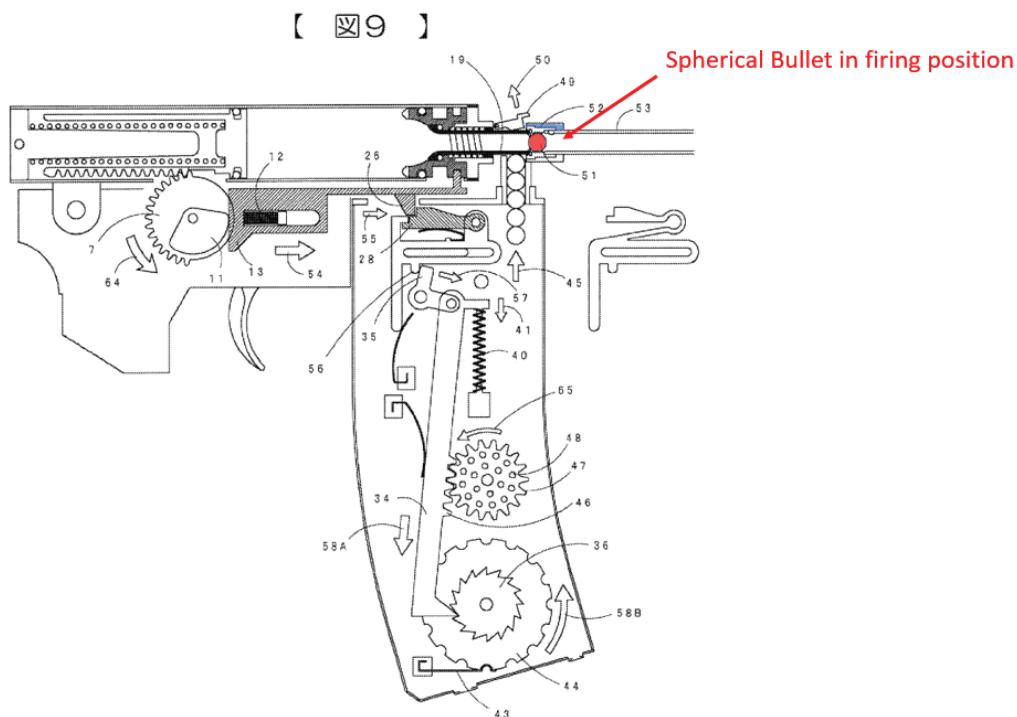
c. “a projectile launcher for launching the ammunition in free flight.”

135. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious “a projectile launcher for launching the ammunition in free flight.” As I set forth above, Spitballs discloses a projectile launcher for launching the ammunition in free flight. IX.A.1.c.
136. Further, Nagayoshi discloses a projectile launcher (the “toy gun”). Nagayoshi discloses a “*toy gun* having a function for continuously *shooting spherical*

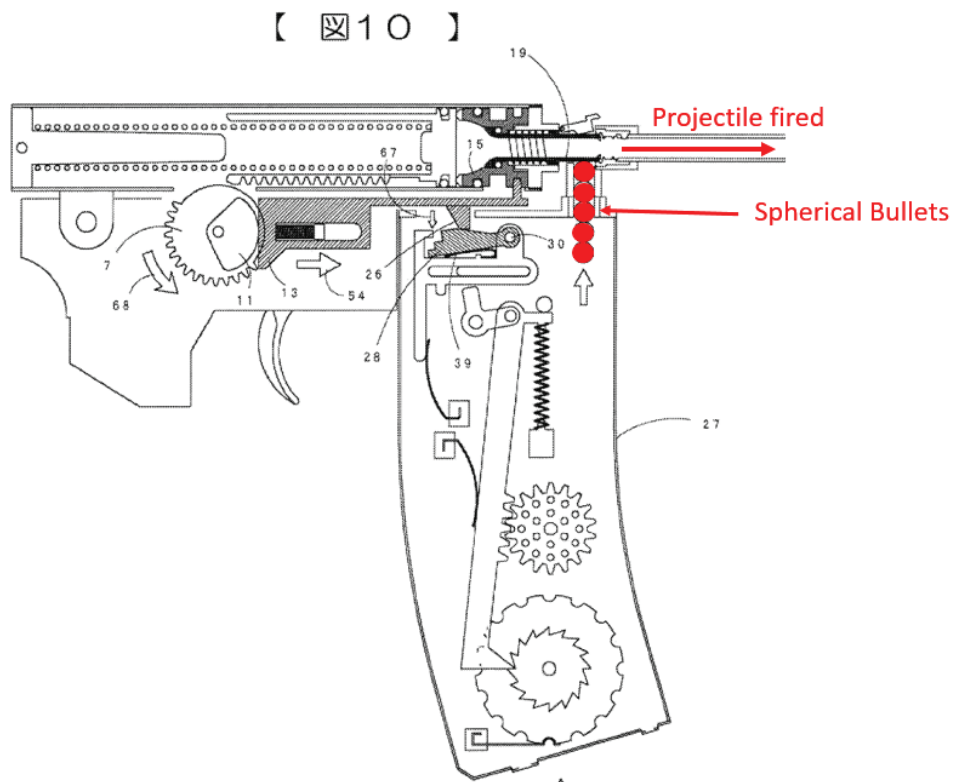
bullets.” Ex. 1009 ¶ [0001]. I have annotated Figures 8-10 below to show the spherical bullets in red. As shown, the spherical bullets are being launched from a projectile launcher, which a POSITA would understand is a projectile launching system:



Ex. 1009 at Fig. 8.

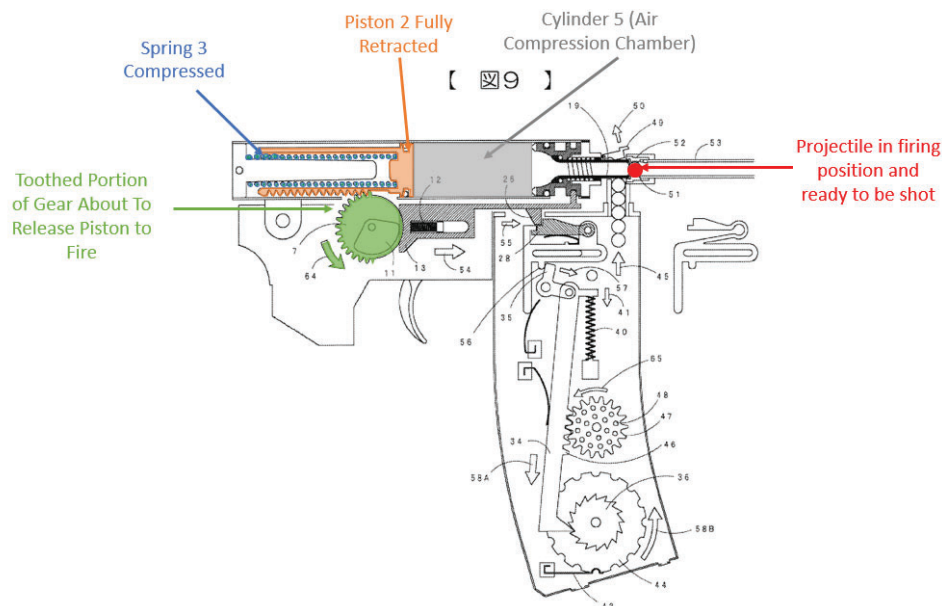


Ex. 1009 at Fig. 9.



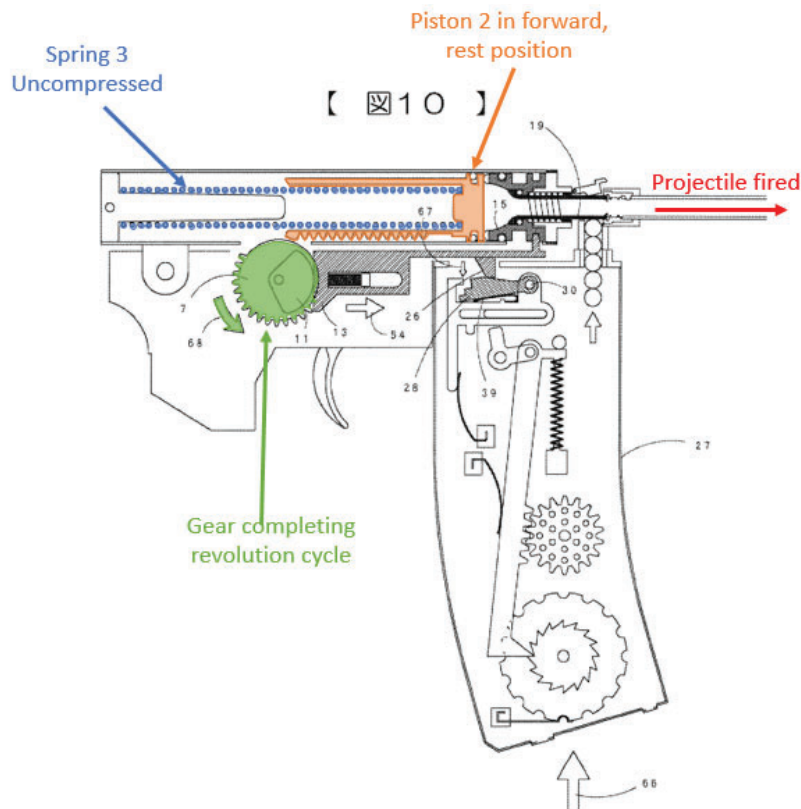
Ex. 1009, Fig. 10.

137. Further, Nagayoshi discloses that its projectile launcher can launch ammunition in free flight. As I set forth above, Nagayoshi discloses and claims an “electric air gun.” Ex. 1009, Cls. 21-30. Nagayoshi’s “Embodiment 1” described in Paragraphs [0029] through [0044] discloses that “[a] spring 3 continuously presses *a piston 2* provided with a recessed and protruding section 1 corresponding to a rack gear toward the muzzle. *A packing 4 is provided at the front periphery of the piston 2, maintaining airtightness in the interval with a cylinder 5.*” Ex. 1009, Nagayoshi ¶ [0030]. I have annotated Figure 9 below, which depicts Nagayoshi’s toy gun when rotary drive member 7 has continued turning and fully retracted piston 2 with airtight packing 4. Ex. 1009 ¶ [0036]:



Ex. 1009, Fig. 9. A POSITA would understand that when the piston is released by the partially-toothed gear, the spring will drive the piston forward, and the “airtightness” between the piston 2 and cylinder 5 will cause the air in the cylinder 5 to be compressed into the smaller diameter nozzle and barrel, launching the projectile into free flight.

138. Figure 10 (annotated below) shows this “shooting completion state” where the gear releases the piston and the piston is driven forward by the spring. The “airtightness” between the piston 2 and cylinder 5 causes the piston 2’s forward movement to compress air in the air compression chamber into the smaller diameter nozzle and barrel. That air pressure launches the projectile:



Ex. 1009 ¶ [0039], Fig. 10. In my opinion, a POSITA would understand that using hydrated SAP projectiles, as taught in ThinkGeek Spitballs, with an air gun as disclosed by Nagayoshi, results in a projectile launcher for launching the ammunition in free flight.

3. Claim 2 Mapping

a. **“The system of claim 1, further comprising a sealed container for storage of the ammunition.”**

139. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 1, further comprising a sealed container for storage of the ammunition. As discussed above, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 1. IX.B.2. In my opinion, ThinkGeek Spitballs discloses a sealed container for storage of ammunition, as discussed above. *See* Section IX.A.2.
140. Further, in my opinion, A POSITA would be motivated by the teachings of Spitballs to include a sealed container for storage of ammunition with the combined system of Spitballs and Nagayoshi to enable easy storage of the hydrated Spitballs. Specifically, ThinkGeek Spitballs are disclosed as being “slimy” and “mushy” when hydrated, and a POSITA would expect them to “*slip, slide*, bounce & explode!” as indicated on the packaging. Ex. 1007 at 5, 8. Therefore, a POSITA would have found, based on the teachings of

Spitballs and as a matter of common sense, that a sealed container for storage of the ThinkGeek Spitball ammunition should be used to contain hydrated ammunition prior to use. This is particularly so because Nagayoshi teaches that it can fire a lot of bullets (“hundreds”) in rapid succession, such that a POSITA would recognize many of them need to be brought to the play site. Ex. 1009 ¶ [0001] (disclosing “a continuous shooting function ... that continuously shoots hundreds of bullets with one trigger pull”). In particular, a POSITA would understand that a container should be used to reduce the risk that hydrated ThinkGeek Spitballs would slip, slide, and bounce away prior to use. Ex. 1007 at 5, 8. In addition, ThinkGeek Spitballs teaches “when the war is over, collect all the whole ones and let them dry out” and the dehydrated Spitballs can then “be reused at a later date.” Ex. 1007 at 8. In my opinion, it would have been extremely obvious to a POSITA to store the Spitballs to be “reused at a later date” in a sealed container to not lose them.

4. Claim 3 Mapping

a. “The system of claim 1, wherein the projectile launcher is a toy.”

141. In my opinion, Nagayoshi in view of ThinkGeek Spitballs discloses the system of claim 1, wherein the projectile launcher is a toy.” As discussed

above, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 1. IX.B.2.

142. As I set forth above, ThinkGeek Spitballs discloses the system of claim 1, wherein the projectile launcher is a toy. Section IX.A.3.
143. Further, Nagayoshi discloses “wherein the projectile launcher is a toy.” For example, the invention of Nagayoshi is directed to a “toy gun having a function for continuously shooting spherical bullets.” Ex. 1009, Nagayoshi ¶ [0001]. Nagayoshi likewise teaches that “Fig. 8 is a drawing for explaining the structure of an *electric toy gun*.” Ex. 1009, Nagayoshi ¶ [0031]. And Claims 1-39 of Nagayoshi each claim a “toy gun.” Ex. 1009, Nagayoshi Cls. 1-39. Thus, in my opinion, Nagayoshi discloses a “toy gun having a function for continuously shooting spherical bullets.” A POSITA would have been motivated to combine ThinkGeek Spitballs and Nagayoshi, for example because both teach a toy.

5. Claim 4 Mapping

a. “The system of claim 1, wherein the projectile launcher is in the shape of a gun.”

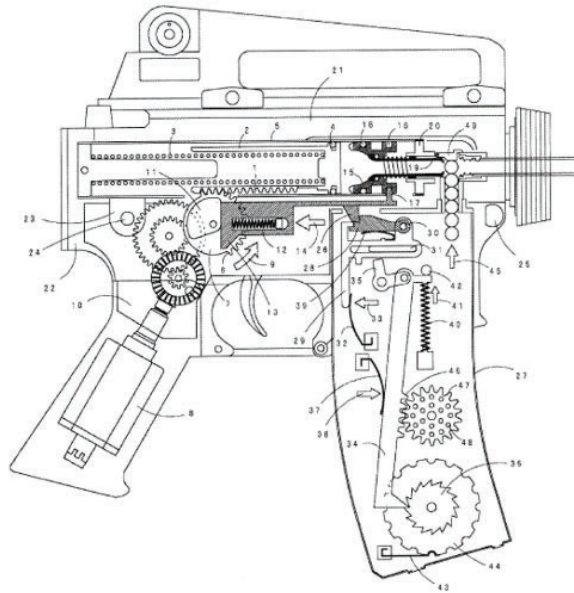
144. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious “the system of claim 1, wherein the projectile launcher is in the shape

of a gun.” As discussed above, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 1. IX.B.2.

145. Further, in my opinion, Nagayoshi discloses “wherein the projectile launcher is in the shape of a gun.” Nagayoshi discloses a “toy **gun** having a function for continuously shooting spherical bullets.” Ex. 1009 ¶ [0001] (emphasis added). Nagayoshi similarly teaches use of well-known gun models, like the M16 or M4, as the design for Nagayoshi’s toy gun: “Fig. 8 is a drawing for explaining the structure of an electric toy gun using as a model a gun officially adopted by the American army such as the M16 series or the M4 series. Recently, the M4 series has been a popular model, and FIG. 8 depicts only the areas near the essential machine parts of the M4”. Ex. 1009, Nagayoshi ¶ [0031]. And as I discussed above, Nagayoshi claims a “toy gun” in every claim. Ex. 1009, Cls. 1-39. And as shown below, a POSITA would immediately recognize that Figures 8-10 of Nagayoshi depict a gun-shaped projectile launcher. Ex. 1009 at Figs. 8-10.

Projectile launcher in the shape of a gun

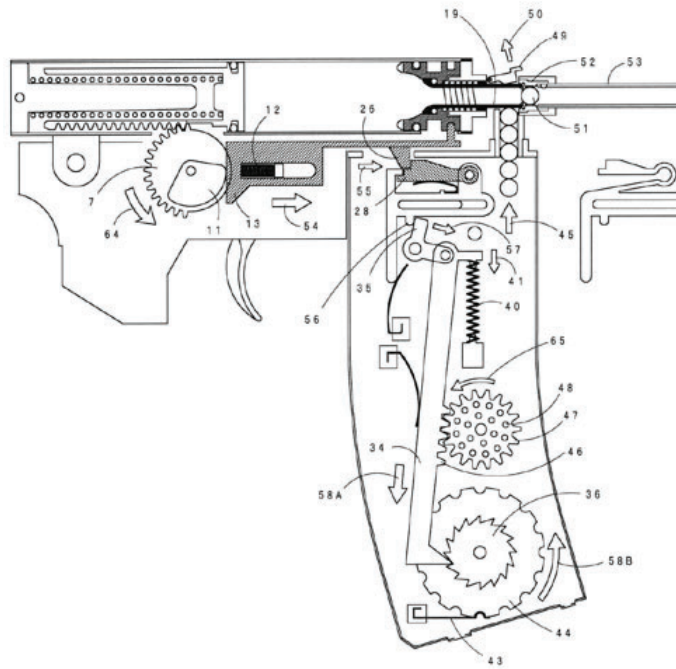
FIG. 8



Ex. 1009, Fig. 8.

Projectile launcher in the shape of a gun

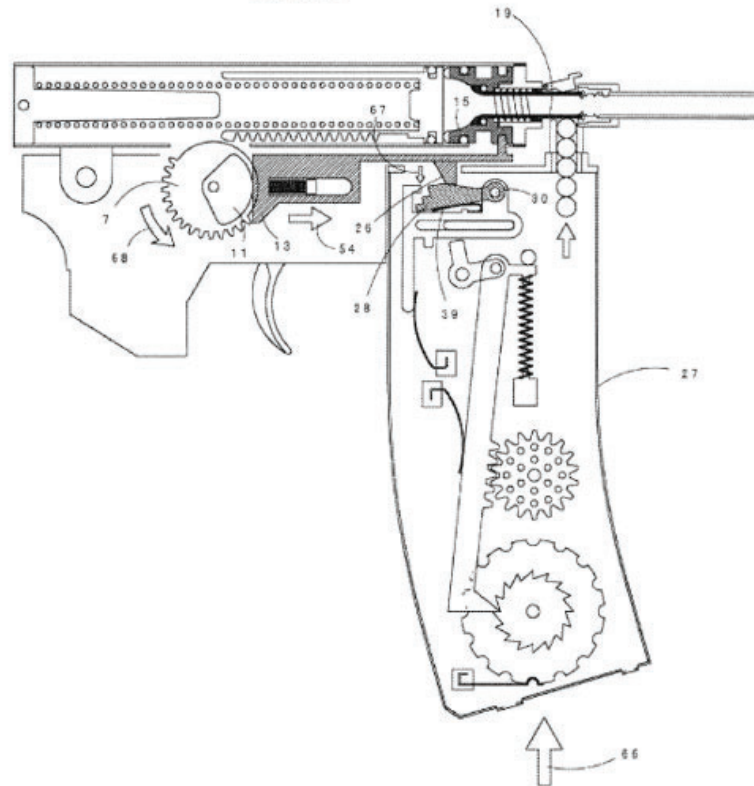
FIG. 9



Ex. 1009, Fig. 9.

Projectile launcher in the shape of a gun

FIG. 10



Ex. 1009, Fig. 10.

6. Claim 5 Mapping

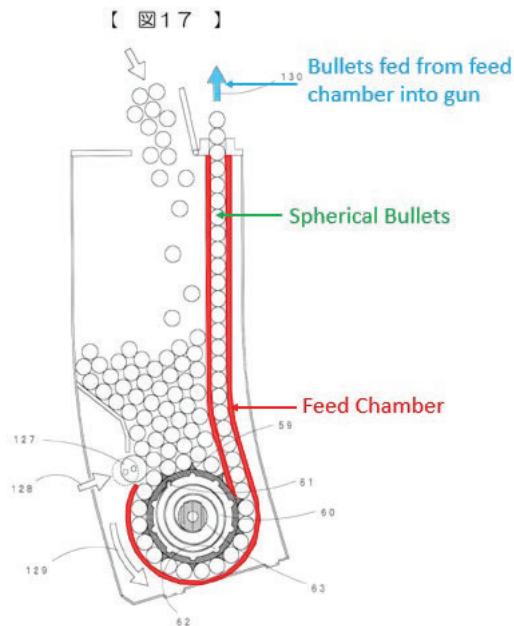
- a. **“The system of claim 1, wherein the projectile launcher includes a feed chamber for loading the soft-projectiles within projectile launcher.”**

146. In my opinion, Nagayoshi in combination with Spitballs renders obvious system of claim 1, wherein the projectile launcher includes a feed chamber for loading the soft-projectiles within projectile launcher. As discussed above,

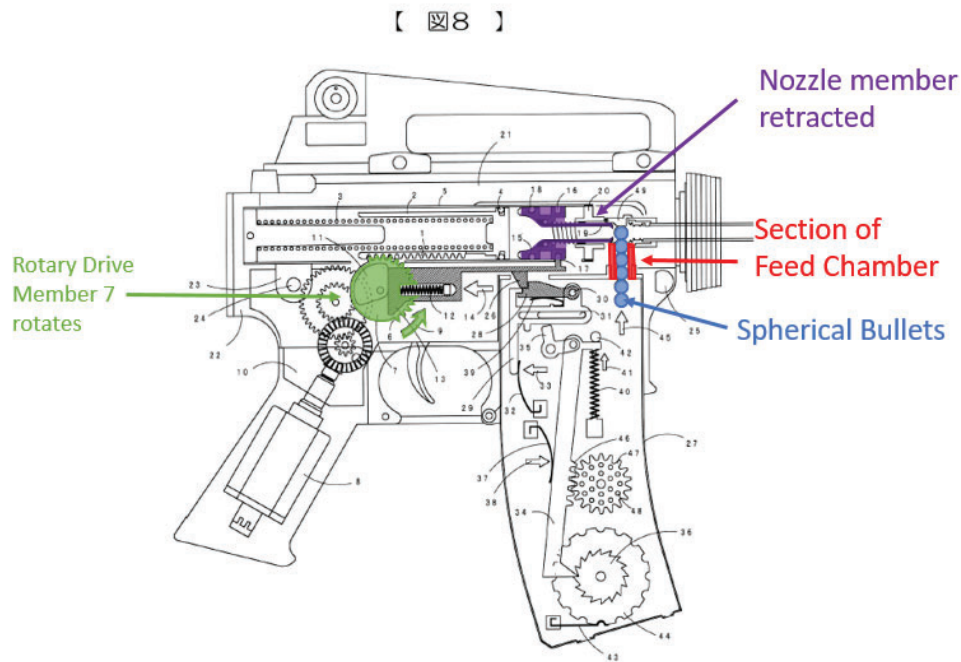
Nagayoshi in combination with Spitballs renders obvious the system of claim

1. *See* Section IX.B.2.

147. In my opinion, Nagayoshi discloses “wherein the projectile launcher includes a feed chamber for loading the soft-projectiles within projectile launcher.” Nagayoshi discloses a toy gun with “a continuous bullet *feed mechanism*” that includes “a drive member for moving a spherical bullet feed mechanism inside the magazine” so that “*bullets can be reliably fed* immediately following a shot even during high-speed continuous shooting.” Ex. 1009 ¶ [0027]. The “main concept” of Nagayoshi “is to provide, inside the magazine, a mechanism for appropriately feeding bullets” including “a magazine driving member for operating the bullet feed mechanism.” Ex. 1009 ¶ [0028]. For example, I annotated Figure 17 below, which shows “[a] number of the spherical bullets gather in the magazine.” Ex. 1009 ¶ [0033]. Then “spherical bullet feed sprocket 59 [] takes in 20 bullets at the outer periphery” in the magazine. Ex. 1009 ¶ [0036]. The ammunition then travels up an internal feed chamber (which I annotated in red) and is fed into the Nagayoshi gun barrel and loaded into the barrel, as shown by arrow 130. Ex. 1009 ¶ [0057].

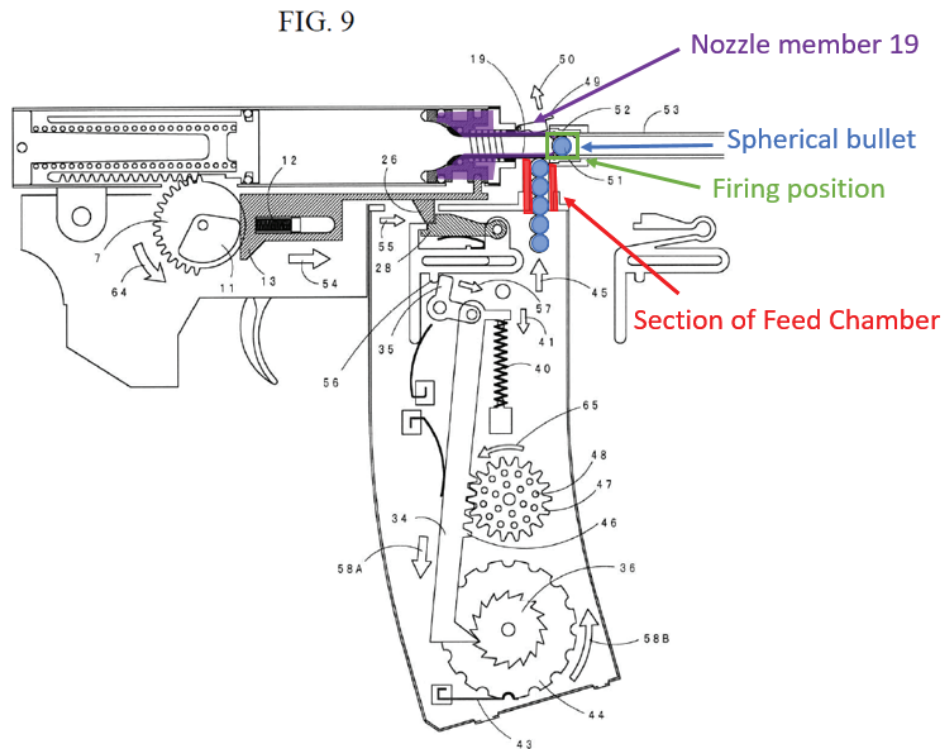


Ex. 1009, Fig. 17. I have also annotated Figure 8 below. With respect to Figure 8, Nagayoshi discloses that the “nozzle member” can “move ... backward and forward” (as shown between Figures 8 and 9). Ex. 1009 ¶ [0035]. Figure 8, annotated below, shows the nozzle retracted, which allows a bullet to be loaded from the feed chamber into the barrel of the projectile launcher:



Ex. 1009, Fig. 8.

148. Figure 9 shows the nozzle in a forward position with a bullet loaded into a firing position from the feed chamber just prior to being launched. Nagayoshi discloses that “Fig. 9 shows the state when the rotary drive member 7 rotates to an extent in the direction of an arrow 64 and...[a] spherical bullet 51 is pushed to the tip end section of the nozzle member 19 and *pushed inside a barrel packing 52.*” Ex. 1009 ¶ [0036]. I have annotated Figure 9 to show this configuration, below:



Ex. 1009, Fig. 9. Nagayoshi therefore discloses that the projectile launcher includes a feed chamber for loading the soft-projectiles within projectile launcher

149. As discussed above, in my opinion using super absorbent polymers, such as ThinkGeek Spitballs, in the feed chamber of Nagayoshi would have been obvious. *See* Section IX.B.1. A POSITA would have a reasonable expectation of success in making the combination. Spitballs teaches that they can “bounce,” meaning they can withstand compressive forces. Any forces associated with feeding the hydrated SAP into the barrel could be optimized for use with hydrated SAP ammunition by a POSITA through routine testing

(e.g., the force to load it from the feed chamber to the barrel, the force at which it is fired via air pressure), such that the ammo can travel from the feed chamber into the barrel and firing position and then be fired. I discuss in greater detail in Section IX.B.8.a, below why it would be obvious to use Spitballs with Nagayoshi's launcher and why a POSITA would understand that Spitballs would work in Nagayoshi's launcher (or, to the extent modifications were required, why such modifications would be routine effort for a POSITA), which I incorporate here. In my opinion, therefore, Nagayoshi in view of ThinkGeek Spitballs discloses the "the system of claim 1, wherein the projectile launcher includes a feed chamber for loading the soft-projectiles within projectile launcher."

7. Claim 6 Mapping

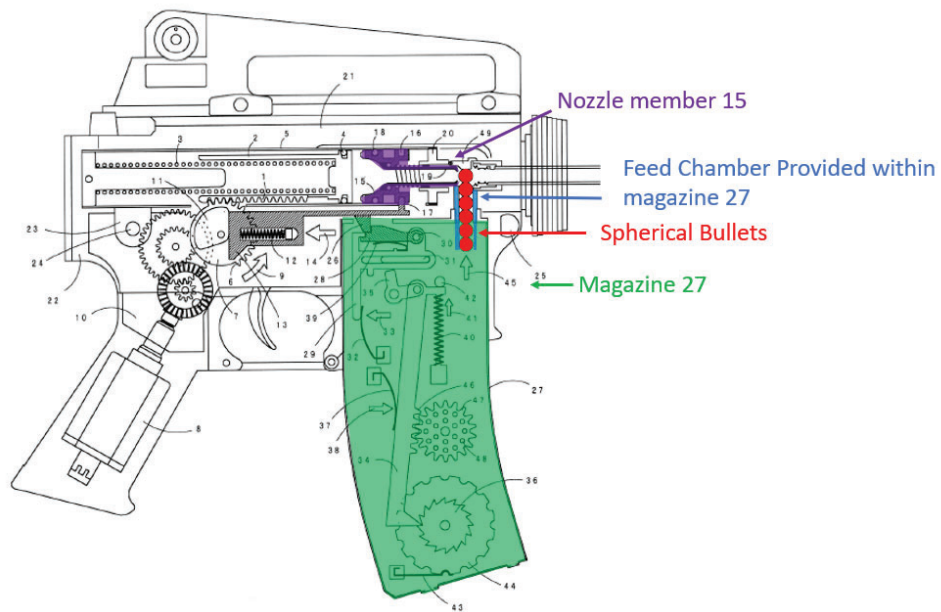
a. "The system of claim 1, wherein the feed chamber is provided within a magazine."

150. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious system of claim 1, wherein the feed chamber is provided within a magazine. As discussed above, Nagayoshi in view of ThinkGeek Spitballs renders obvious the system of claim 1. *See* Section IX.B.2.
151. Further, in my opinion, Nagayoshi discloses "wherein the feed chamber is provided within a magazine." Nagayoshi teaches that "[t]he present invention

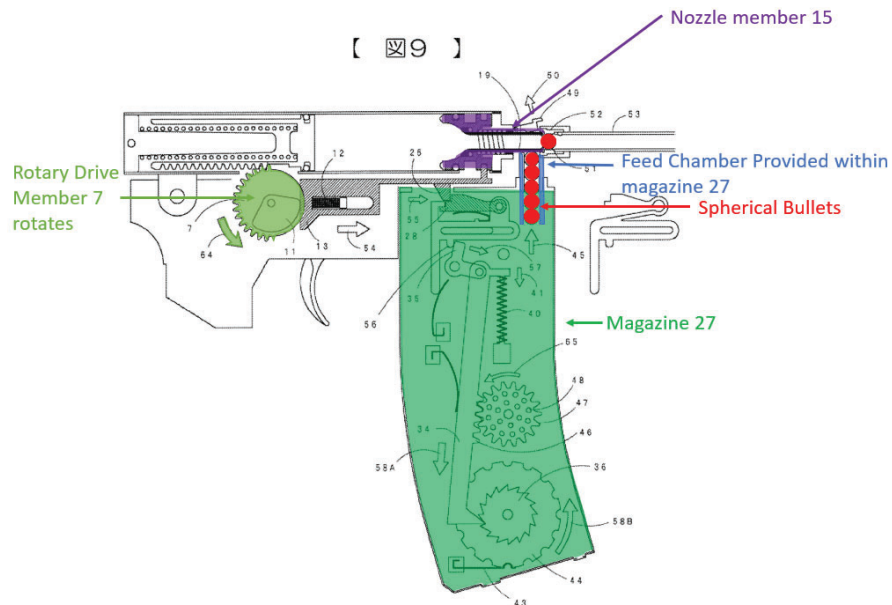
relates to a toy gun having ... a continuous bullet supply mechanism for *continuously feeding spherical bullets is provided inside the magazine*, and the continuous bullet supply mechanism is operated using a continuous shooting mechanism of the toy gun.” Ex. 1009 ¶ [0001]. Nagayoshi discloses “*a magazine having a continuous bullet feed mechanism* and a toy gun” such that “bullets can be reliably fed immediately following a shot even during high-speed continuous shooting”. Ex. 1009 ¶ [0027]. In Embodiment 1 of Nagayoshi, Nagayoshi discloses that “[w]hen the rotary drive member 7 further rotates in the direction of the arrow 68, a state such as shown in FIG. 9 results and the *bullet feed mechanism in the magazine* functions normally.” Ex. 1009 ¶ [0040]; *see also* Ex. 1009 ¶¶ [0029], [0032], [0034] (each describing the “magazine 27”). Each of these disclosures in Nagayoshi describe a bullet feed mechanism within a magazine. A POSITA would understand that the feed mechanism feeds the bullets through a feed chamber from the magazine into the gun.

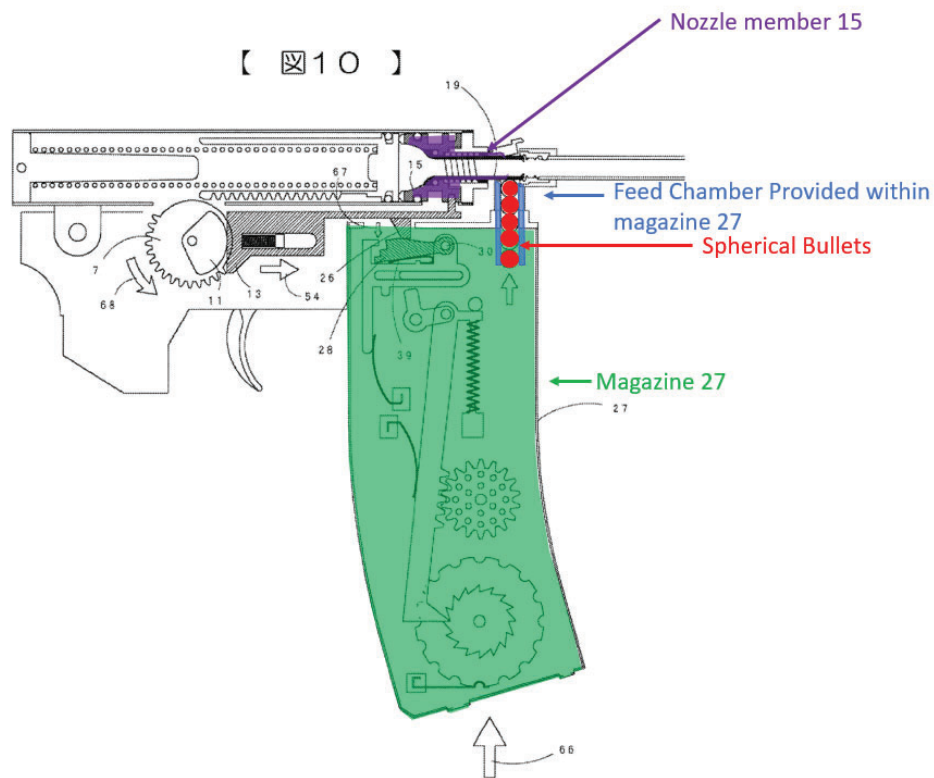
152. Figures 8-10 also clearly disclose a feed chamber provided within the magazine. I have annotated Figures 8-10 below, which each show spherical bullets 51 (annotated red) in a feed chamber (only a portion is shown, highlighted blue) that is provided within a magazine 27 (highlighted green):

【 図8 】



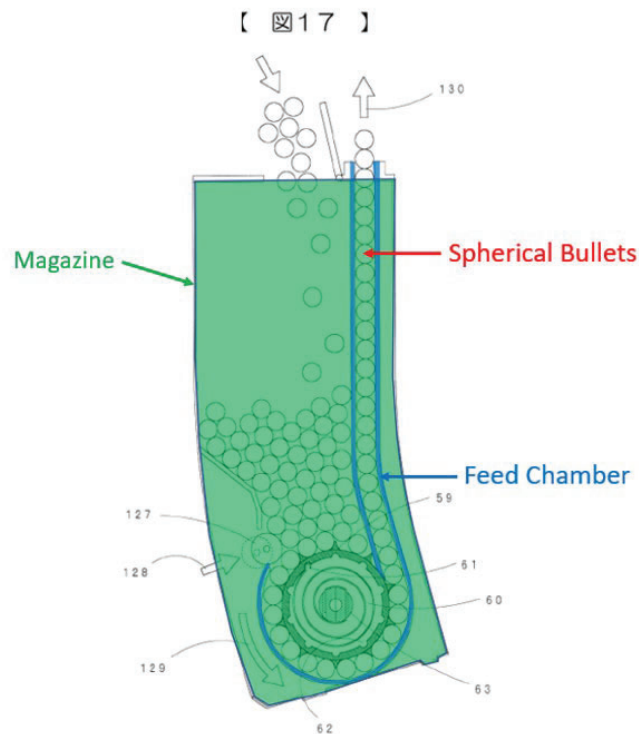
【 図9 】





Ex. 1009, Figs. 8-10.

153. Figure 17 likewise depicts the feed chamber provided within the magazine:



Ex. 1009 at Fig. 17.

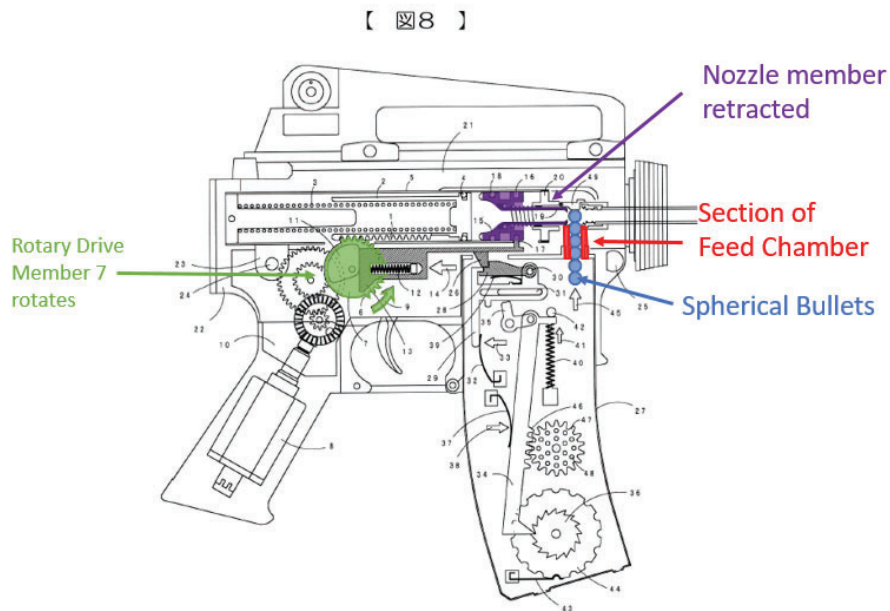
8. Claim 7 Mapping

a. “The system of claim 5, wherein the projectile launcher is adapted to load the soft-projectiles.”

154. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 5, wherein the projectile launcher is adapted to load the soft-projectiles. As discussed above, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 5. *See* Section IX.B.6.

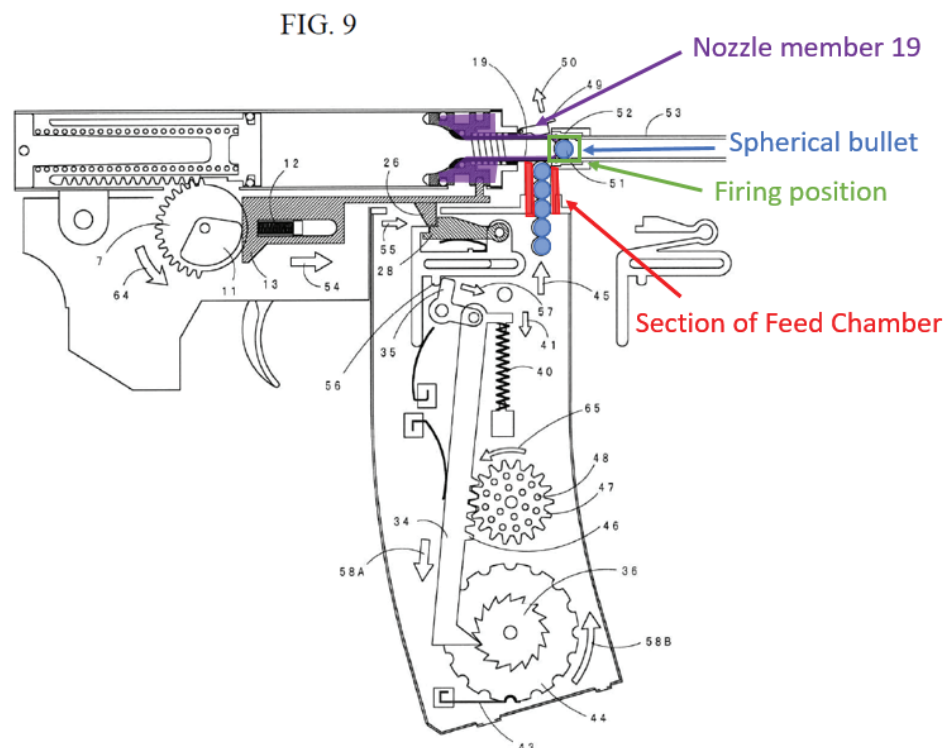
155. In my opinion, Nagayoshi discloses a projectile launcher adapted to load the soft-projectiles. A POSITA would understand that Nagayoshi discloses and

is directed to a projectile launcher (for example, Nagayoshi's "toy gun having a function for continuously shooting spherical bullets"). Ex. 1009, Nagayoshi ¶ [0001]; *see also* Ex. 1009 ¶ [0031] ("FIG. 8 is a drawing for explaining the structure of an electric toy gun...."). Figure 8 teaches "the backward-forward motion from the rotary motion of the rotary drive member arranged in the gun main body is extracted through the cam and transmitted in order to move the nozzle member (a member having the role of pushing spherical bullets to a packing at the rear end section of the gun body) backward and forward." Ex. 1009 ¶ [0035]. I have annotated Figure 8 below, which shows the nozzle retracted allowing a spherical bullet from the feed chamber to enter the barrel of the toy gun:



Ex. 1009 at Fig. 8 (annotated).

156. Figure 9 shows a later point in the firing cycle. Nagayoshi discloses that “FIG. 9 shows the state when the rotary drive member 7 rotates to an extent in the direction of an arrow 64 and the cam part 11 has pushed the cam receiving [sic: contact] bar 13 completely forward. A stopper 49, whose purpose is to prevent the spherical balls from going upward too far, is made to spring upward in the direction of an arrow 50 by the nozzle member 19. A spherical bullet 51 is pushed to the tip end section of the nozzle member 19 and ***pushed inside a barrel packing 52.***” Ex. 1009 ¶ [0036] (emphasis added).



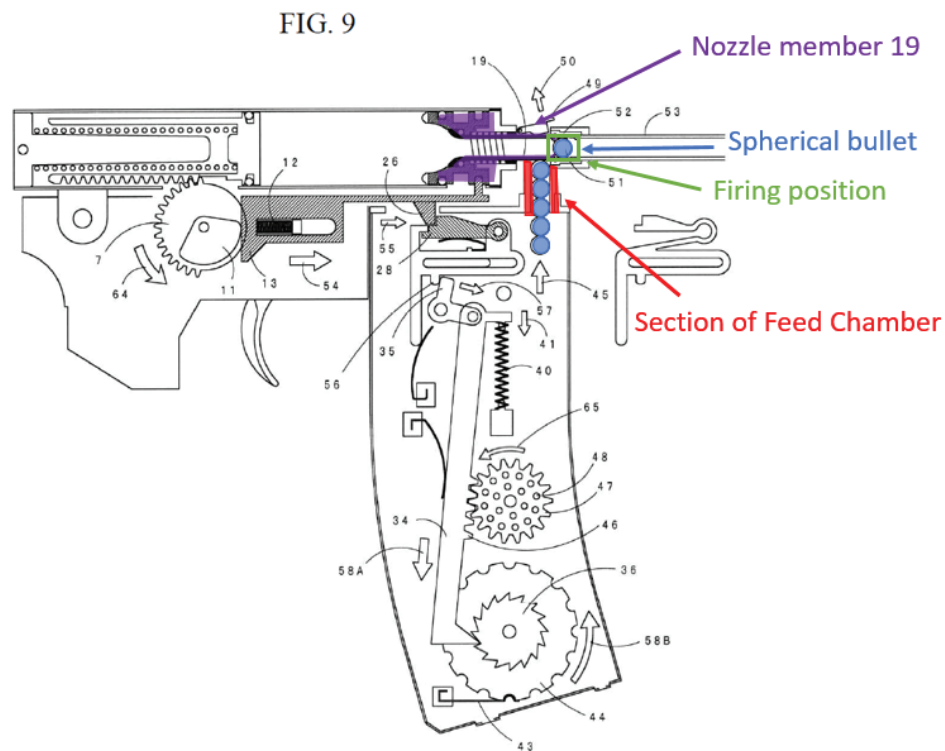
Ex. 1009 at Fig. 9 (annotated). A POSITA would understand that the projectile launching system depicted in Figure 9 has been adapted to load the

projectile. Thus, in my opinion, Nagayoshi discloses loading “bullet 51” within the projectile launching system.

157. I understand that Patent Owner contends this same configuration practices claim 5 in its infringement contentions in the ITC Action. For example, what Patent Owner points to as the “feed chamber for loading the soft-projectiles within the projectile launcher” is identical to what I have pointed to as the “feed chamber” that loads ammunition in Nagayoshi:



feed chamber for loading the soft-projectiles within the projectile launcher



Ex. 1070, '683 Infringement Contentions at 22; Ex. 1009, Nagayoshi Fig. 9.

158. In my opinion, Nagayoshi discloses a projectile launching system wherein the projectile launcher is adapted to load a projectile (the “spherical bullets”). Further, in my opinion, a POSITA would recognize that the same loading process employed by Nagayoshi could be used with hydrated SAP projectiles, such as taught by Spitballs. For example, Spitballs teaches that they can withstand compressive forces (for example, the Spitballs webpage discloses that they can “bounce” and depicts Spitballs being fired through a tube via air pressure):



Ex. 1007 at 5, 8. As such, a POSITA would understand that they can withstand the light compressive forces associated with loading them into the barrel and nudging them forward into a firing position.

159. Additionally, a POSITA would understand that, if needed, routine modifications could be made to either the toy gun of Nagayoshi or the hydrated SAPs to enable them to load as described in Nagayoshi. With respect to Nagayoshi, in the event that the force at which the projectiles (which in Nagayoshi would typically be plastic 6 mm airsoft rounds) are pressed upward into the barrel were too high for hydrated SAPs, a POSITA could adjust, for

example, the speed and force with which the projectiles are loaded into the gun, and/or the force supplied by the nozzle moving the round into position. And with respect to hydrated SAPs, from my discussion with Dr. Wanat I understand that a POSITA could have adjusted the strength of the hydrated SAP (e.g., by increasing the cross-linking), which would likewise make the hydrated SAP more resistant to breaking apart during a loading process.

160. Thus, in my opinion, if any modifications were necessary, they would have been well within the ordinary skill of a POSITA as of February 2010 and a POSITA would have a reasonable expectation of success in loading hydrated SAP ammunition using the feed chamber method taught by Nagayoshi.

9. Claim 8 Mapping

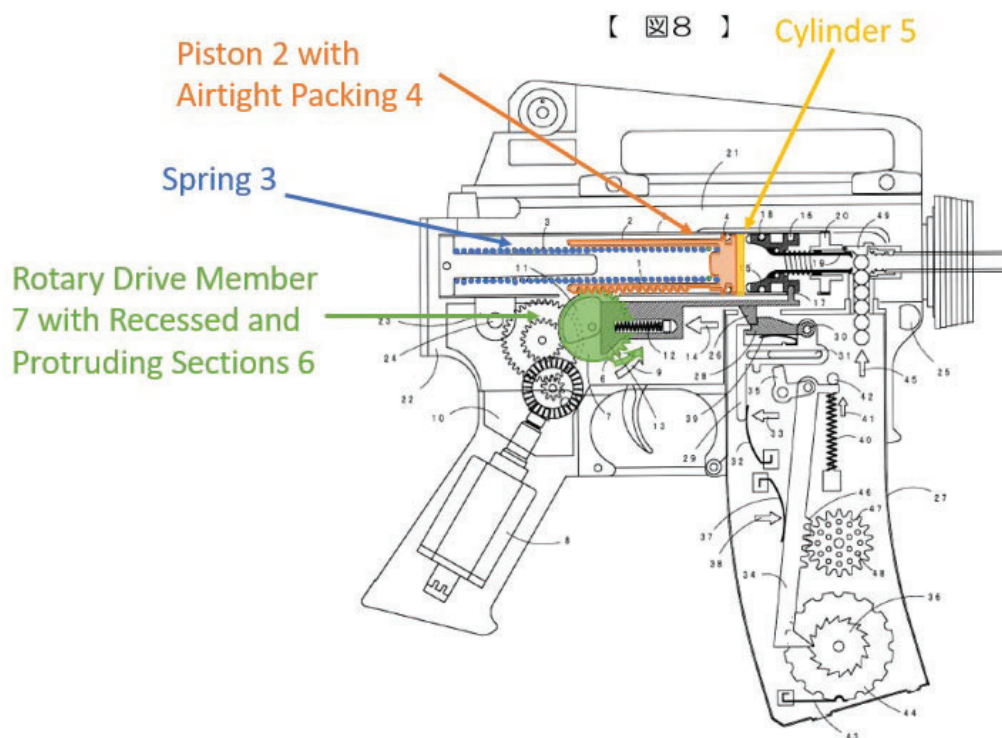
a. “The system of claim 7, wherein the projectile launcher further comprises:”

161. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 7. *See* Section IX.B.8.

b. “an air compression chamber;”

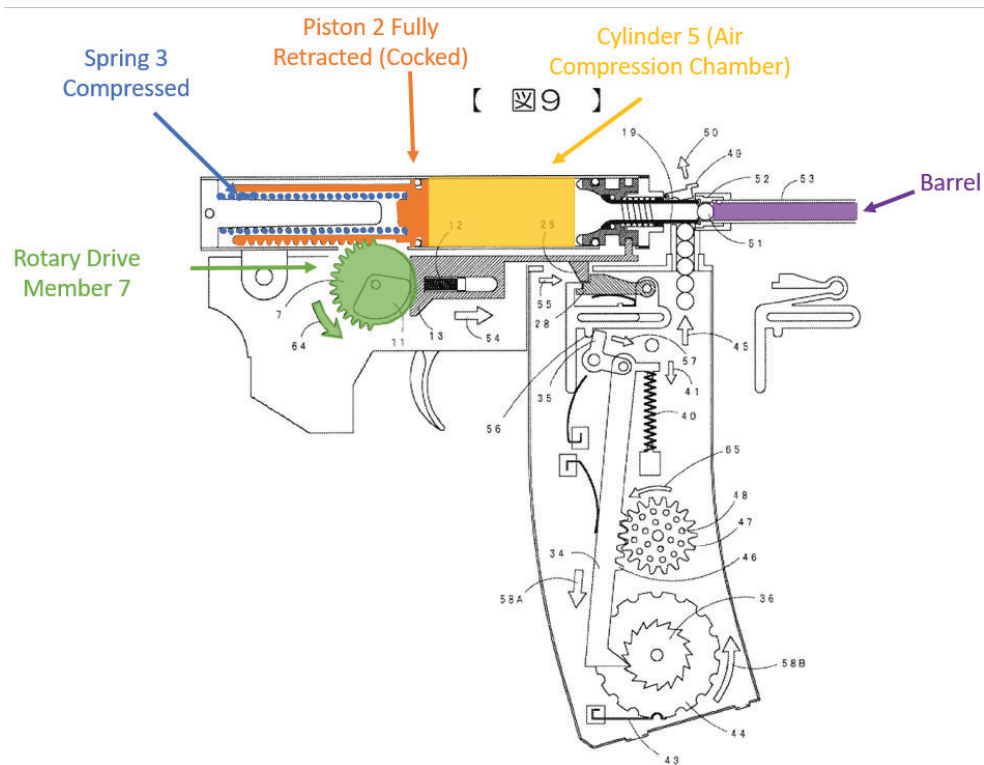
162. In my opinion, Nagayoshi discloses an air compression chamber. For example, Nagayoshi’s Embodiment 1 discloses an air compression chamber as “cylinder 5.” Ex. 1009 ¶¶ [0030]-[0031]. Regarding Embodiment 1, Nagayoshi discloses that “[a] spring 3 continuously presses a piston 2” and “a packing 18” provided on the front of the piston “*maintains airtightness in the*

interval with the cylinder 5.” Ex. 1009 ¶ [0030]. Piston 2 within cylinder 5 engages the rotary drive member 7 via concave and convex parts. Ex. 1009 ¶ [0030], Figs. 8-10. As rotary drive member 7 turns, piston 2 within cylinder 5 is pulled back by the gear. Ex. 1009 ¶ [0030]. Figure 8, which I have annotated below, depicts piston 2 (annotated in orange) partially retracted within cylinder 5 which is an air compression chamber (open space in front of the piston in cylinder 5 annotated in yellow), as rotary drive member 5 (annotated in green) begins to turn and draw the piston back:



Ex. 1009 at Fig. 8 (annotated).

163. Figure 9, which I annotated below, shows Nagayoshi's toy gun when rotary drive member 7 has continued turning and fully retracted piston 2 with the airtight packing 4. Ex. 1009 ¶¶ [0030], [0036]; Fig. 9. I have annotated Figure 9 below, which shows that the amount of air in cylinder 5 (annotated in yellow) in front of piston 2 (annotated in orange) has substantially increased from the amount of air in front of piston 2 in Figure 8:



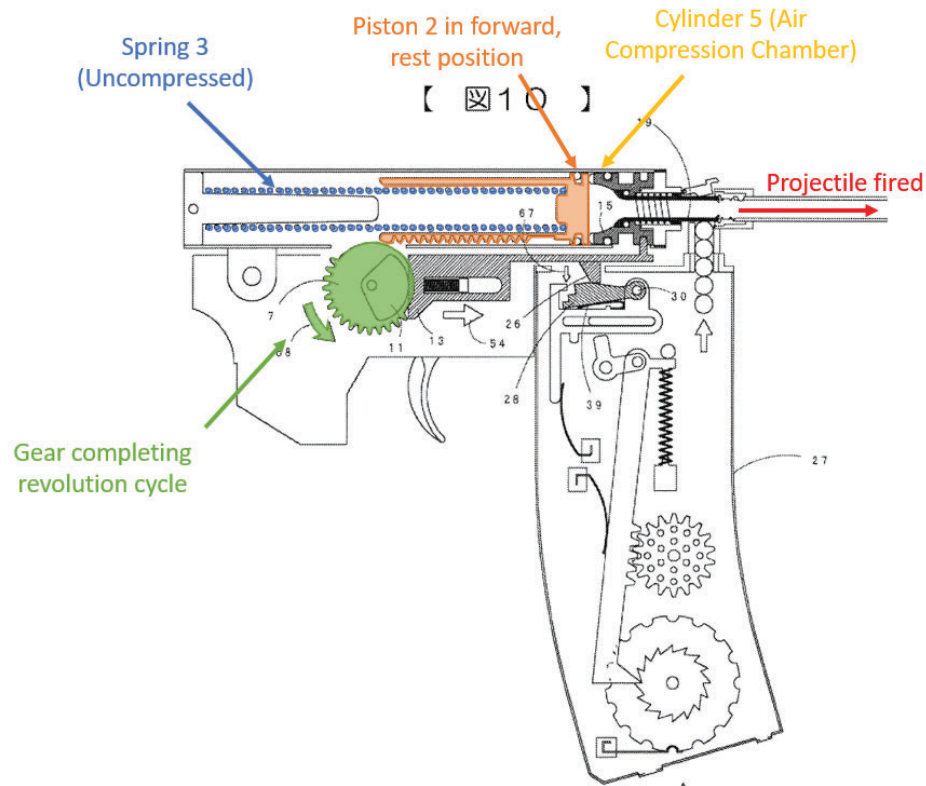
Ex. 1009 at Fig. 9 (annotated). Nagayoshi teaches that Piston 2 is released when rotary drive member 7 spins far enough that there are no longer recessed and protruding section 6 to engage with piston 2, which drives the piston forward under the pressure of the spring to fire a projectile and reach a

“shooting completion state.” Ex. 1009 ¶¶ [0030], [0036], [0039].

Specifically, piston 2 springs forward when the toothed portion of rotary drive member 7 no longer engages with piston 2. This displaces the air that has gathered in cylinder 5, pushing it into the barrel. Ex. 1009 ¶¶ [0030], [0036].

A POSITA would understand that the displacement of air in cylinder 5 into the barrel compresses the air because the barrel’s diameter is more narrow than the diameter of cylinder 5.

164. I have annotated Figure 10 below, which depicts the “shooting completion state” after the piston 2 is released. In Figure 10, the biasing force of the spring drives the piston forward in cylinder 5, which compresses the air into the smaller diameter barrel, and launches the spherical bullet into free flight.



Ex. 1009, Nagayoshi at Fig. 10 (annotated).

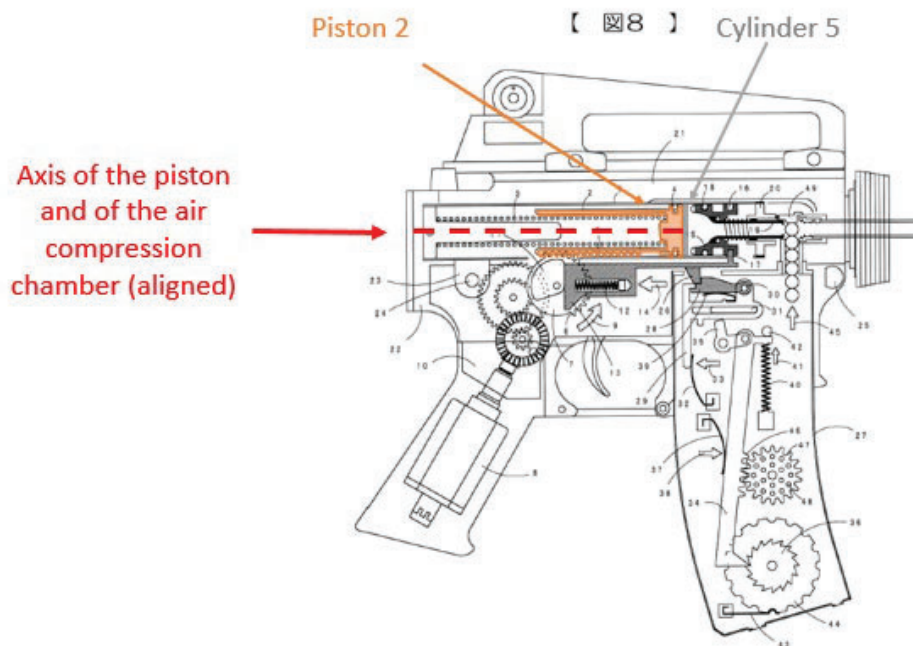
165. In my opinion, a POSITA would have understood that the cylinder annotated in yellow in Figures 8-10 is an air compression chamber because air gathers in the cylinder when piston 2 is retracted, and the piston driving forward and maintaining “airtightness” with cylinder 5 via the “packing 4” results in compression of air in the cylinder 5.

c. **“a piston disposed within and axially aligned with the air compression chamber; and”**

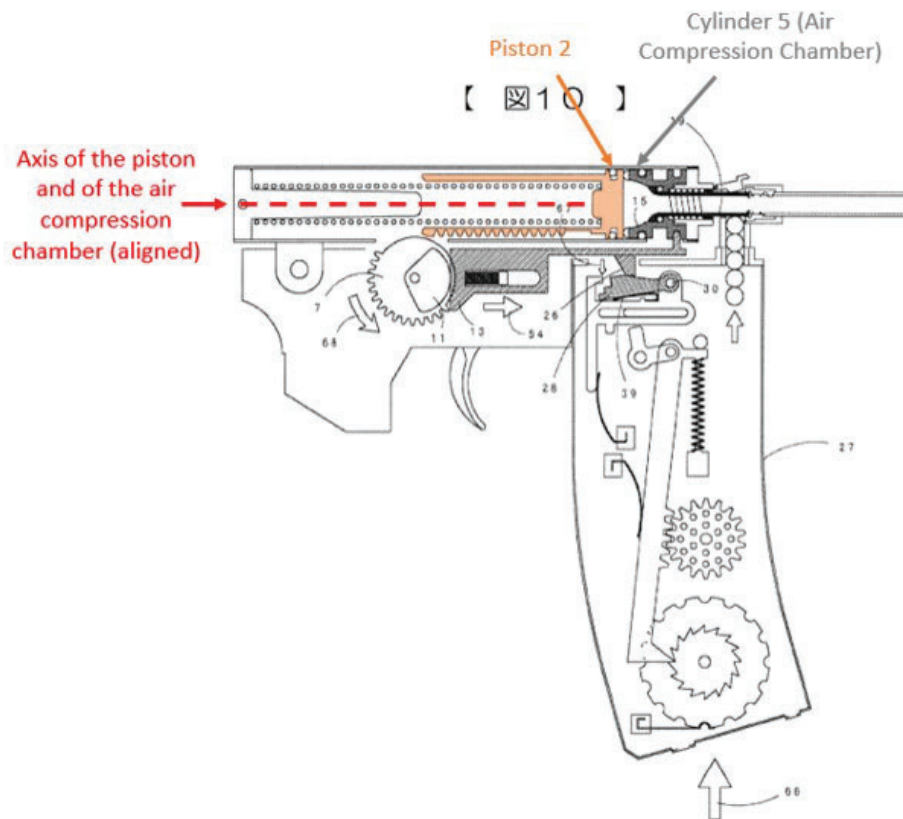
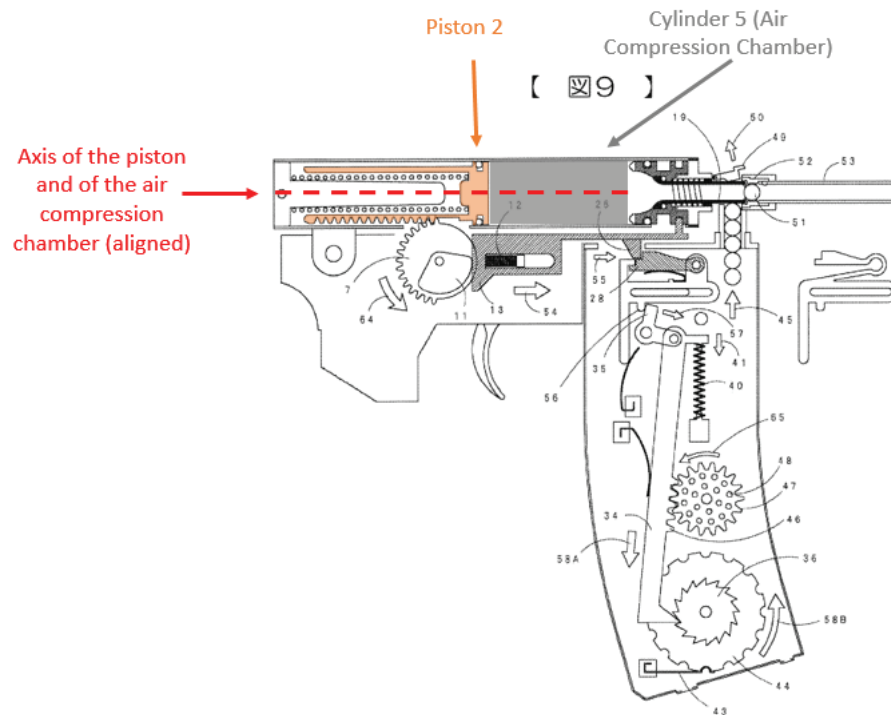
166. In my opinion, Nagayoshi in combination with Spitballs renders obvious “a piston disposed within and axially aligned with the air compression chamber.”

Nagayoshi discloses a piston disposed within and axially aligned with the air

compression chamber. Nagayoshi teaches “[a] spring 3 continuously presses a **piston 2**.... A packing 4 is provided at the front periphery of the **piston 2**, **maintaining airtightness in the interval with a cylinder 5**.” Ex. 1009, Nagayoshi ¶ [0030]. Thus, a POSITA would understand that the piston (piston 2) is provided within and axially aligned with the air compression chamber (cylinder 5). I have annotated Figures 8-10 below, which show the piston is disposed within the air compression chamber (Cylinder 5) and axially aligned with it, as both the piston and the air compression chamber share an axis traveling through the center of the air compression chamber (cylinder 5):



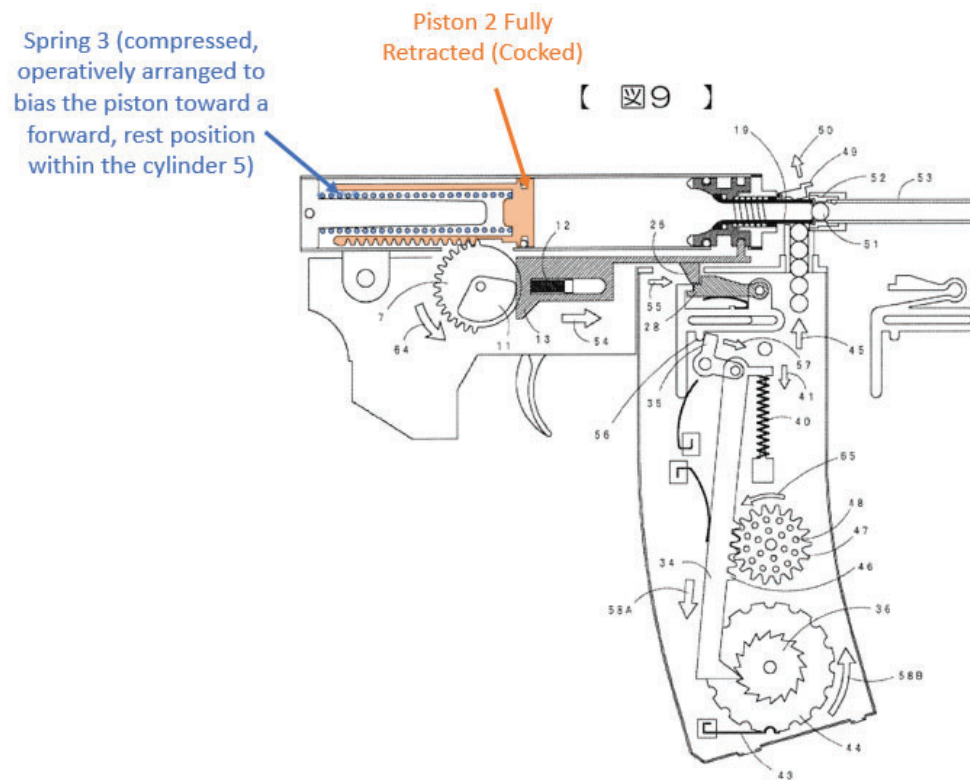
Declaration of Amanda Bligh Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 8,640,683



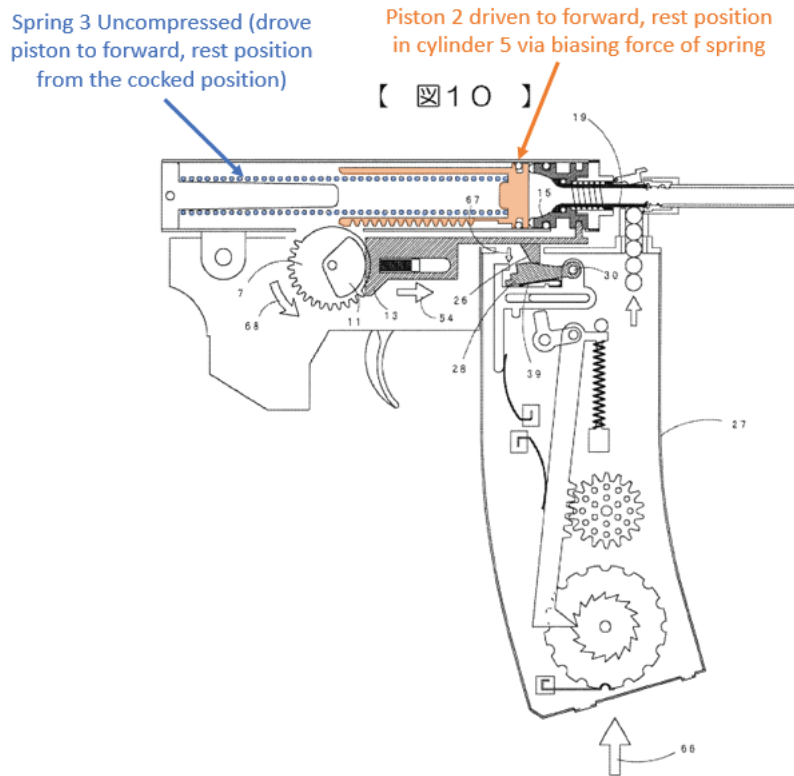
Ex. 1009, Nagayoshi Figs. 8-10 (annotated).

- d. **“a spring operatively arranged to bias the piston toward a rest position from a cocked position within the air compression chamber.”**

167. In my opinion, Nagayoshi discloses a spring operatively arranged to bias the piston toward a rest position from a cocked position within the air compression chamber. As discussed in greater detail in Section IX.B.9.b, Nagayoshi discloses that the *“spring 3 continuously presses a piston 2 provided with a recessed and protruding section 1 corresponding to a rack gear toward the muzzle.”* Ex. 1009 ¶ [0030]. When the gear 7 turns, it draws the piston backward and compresses the spring. Ex. 1009 ¶ [0030] (“A rotary drive member 7 having a recessed and protruding section 6 that meshes with the recessed and protruding section 1 is made to rotate in the direction of an arrow 9 by a motor 8 and a series of reduction gears. The recessed and protruding section 1 of the piston 2 and the concave-convex part 6 of the rotary drive member 7 begin to mesh in conjunction with rotation of the rotary drive member 7, pulling the piston 2 backward.”). Figure 9, annotated below shows the spring compressed, and the piston in a fully retracted, cocked position:



Ex. 1009, Nagayoshi Fig. 9. When the piston is released, the biasing force of the spring drives the piston forward from the cocked position to a rest position:



Ex. 1009, Fig. 10. Thus, Nagayoshi discloses that the spring is operatively arranged to bias the piston toward a rest position from a cocked position within the air compression chamber.

10. Claim 9 Mapping

a. “The projectile system of claim 8,”

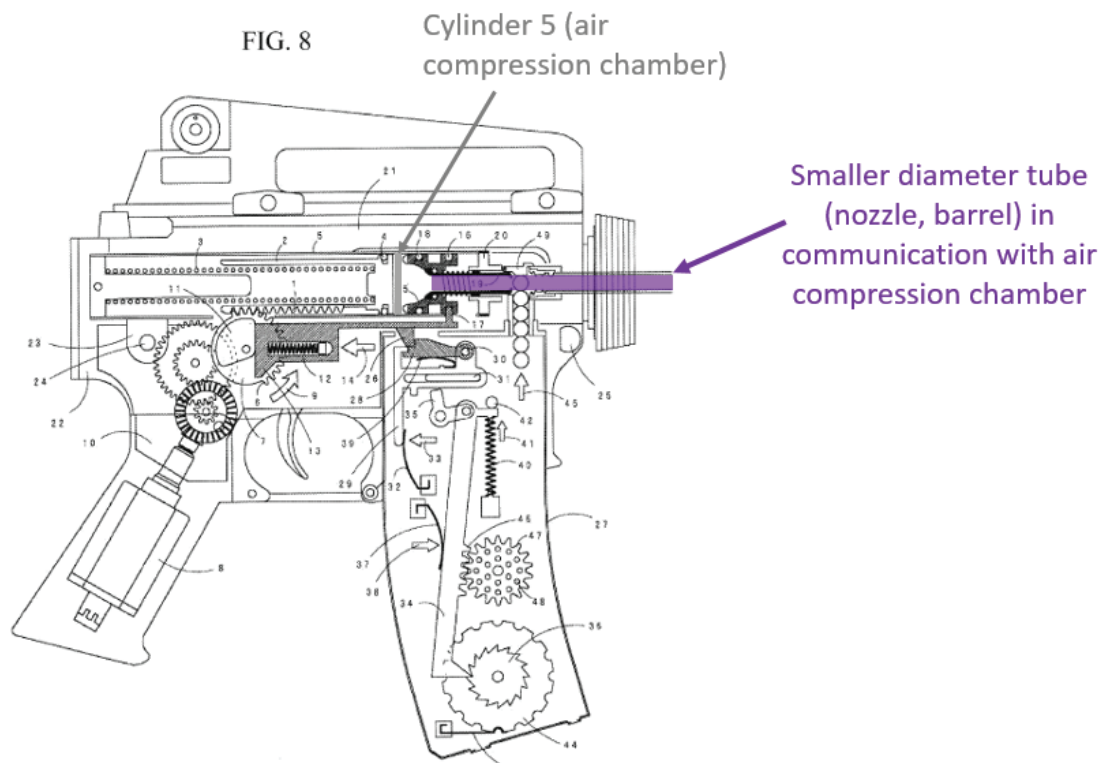
168. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 8. *See* Section IX.B.9.

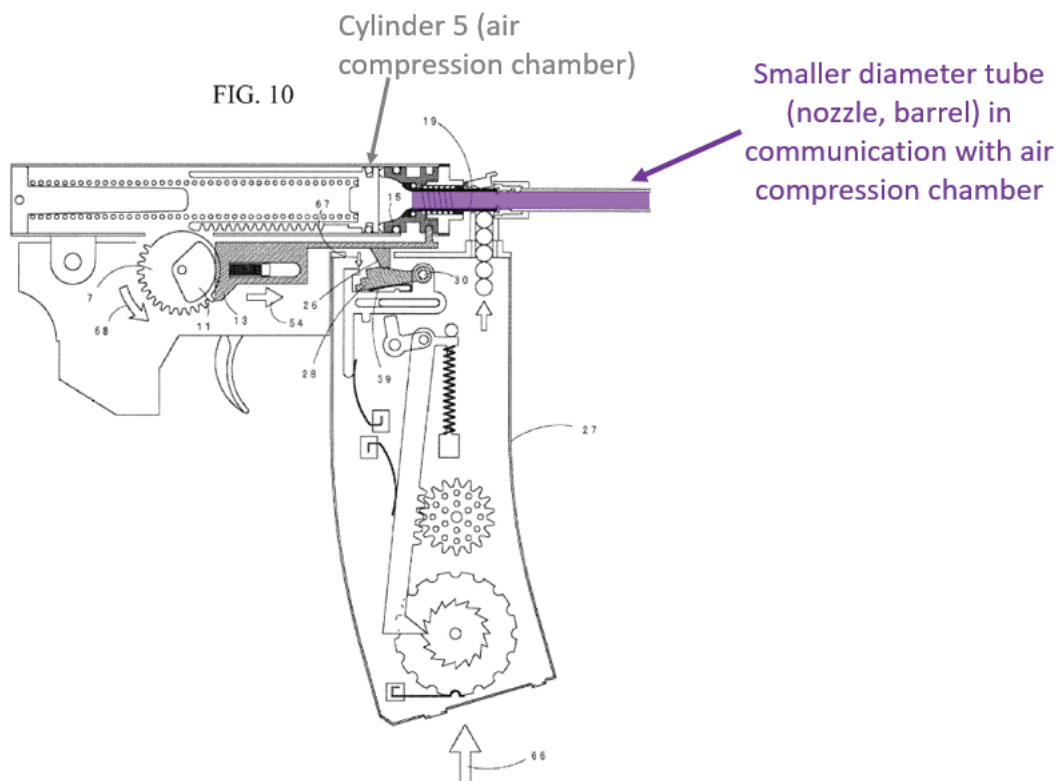
b. “wherein the projectile launcher further comprises a smaller diameter tube in communication with the air compression chamber, and”

169. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the projectile system of claim 8, wherein the projectile launcher

further comprises a smaller diameter tube in communication with the air compression chamber.

170. As discussed above, Nagayoshi in view of ThinkGeek Spitballs discloses “a small diameter tube in communication with the air compression chamber.” See Section IX.B.9.b. Specifically, the air compression chamber (cylinder 5) is in communication with a smaller diameter tube (e.g., the tube formed by nozzle member 19, and the tube formed by the barrel). Again as discussed above, the air is compressed from the air compression chamber into the smaller diameter tube as the piston drives forward from the position in Figure 9 to the position in Figure 10:



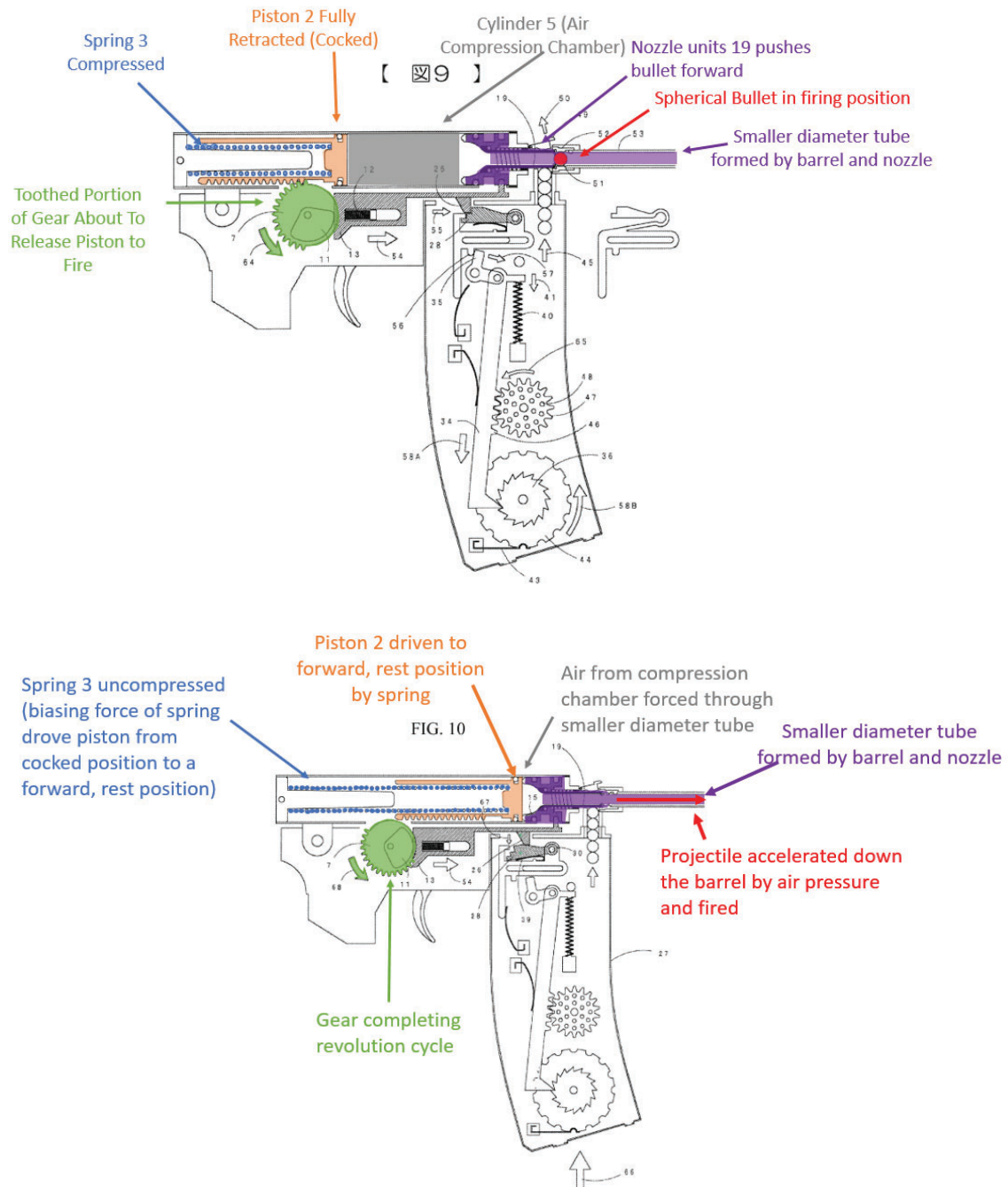


- c. **“wherein a biasing force of the spring is sufficient to cause the piston to move from the cocked position to the rest position to force air from the air compression chamber into the smaller diameter tube and cause a soft-projectile located at the firing position to accelerate and be launched from the projectile. from the feed chamber to a firing position of the projectile launcher.”**

171. I have reviewed the '683 Patent file history, and as issued, the '683 Patent claim 9 contains extraneous text: “from the feed chamber to a firing position of the projectile launcher.” The claims as the applicant submitted them during prosecution did not have this extraneous text. *See* Ex. 1002, '683 Patent File History at 35 (pending claim 19). There was an amendment made during prosecution, but it did not add this extraneous language. Ex. 1002, '683 Patent File History at 64. I therefore understand this extraneous language to be a typographical error.
172. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious a biasing force of the spring is sufficient to cause the piston to move from the cocked position to the rest position to force air from the air compression chamber into the smaller diameter tube and cause a soft-projectile located at the firing position to accelerate and be launched from the projectile launcher.

173. As I discussed above in Section IX.B.9.b, “[a] spring 3 *continuously presses a piston 2*,” such that the biasing force of the spring 3 drives the piston 2 from a cocked position (shown in Fig. 9) to a rest position (shown in Fig. 10). A POSITA would understand that because “[a] packing 4 is provided at the front periphery of the piston 2, maintaining airtightness in the interval with a cylinder 5” (Ex. 1009, Nagayoshi ¶ [0030]), as the biasing force of the spring causes the piston to move from the cocked position (shown in Figure 9, below) to the rest position (shown in Figure 10, below), air in the air compression chamber (cylinder 5) is compressed and forced from the air compression chamber through the smaller diameter nozzle member 19 and the smaller diameter barrel, which causes a projectile located at the firing position to accelerate down the smaller-diameter barrel and be launched from the Nagayoshi launcher:

Declaration of Amanda Bligh Under 37 C.F.R. § 1.68 in Support of
Petition for *Inter Partes* Review of U.S. Patent No. 8,640,683



Ex. 1009, Nagayoshi Figs. 9-10 (annotated).

174. Although Nagayoshi does not expressly describe launching a “soft-projectile,” a POSITA would recognize that using a hydrated SAP, such as described by Spitballs, in place of the “spherical bullets” taught by Nagayoshi,

discloses the projectile launcher of claim 19, further comprising a smaller diameter tube in communication with the air compression chamber, and wherein a biasing force of the spring is sufficient to cause the piston to move from the cocked position to the rest position to force air from the air compression chamber into the smaller diameter tube and cause a soft-projectile located at the firing position to accelerate and be launched from the projectile launcher.

11. Claim 10 Mapping

- a. **“The system of claim 1, wherein the super absorbent polymer has a cross linking density sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher.”**

175. Nagayoshi in combination with Spitballs renders obvious the system of claim 1. *See* Section IX.B.2.
176. I understand that Patent Owner has asserted in its infringement contentions in the ITC Action that “[t]he cross linking density is sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher, in that the plurality of soft-projectiles do not break apart when launched from the projectile launcher.” Ex. 1070, ’683 Patent Infringement Contentions at 26. In other words, Patent Owner applies this claim to mean that if the soft-projectile does not break apart when launched, that is sufficient

to show that the crosslinking density is sufficient to prevent the soft-projectiles from breaking apart when launched.

177. In my opinion, Spitballs discloses “the super absorbent polymer has a crosslinking density sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher.” See Section IX.A.4.a.
178. Further, in my opinion, Nagayoshi in view of Spitballs renders obvious “wherein the super absorbent polymer has a crosslinking density sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher.” Even if this limitation were not expressly taught by Spitballs, and in my opinion it is, a POSITA would find it obvious in view of Spitballs and the knowledge of a POSITA to design a hydrated SAP ammo that does not break apart when launched from a projectile launcher (like taught by Nagayoshi). Again, because Spitballs can “bounce” and survive launching (*i.e.*, they explode on “impact”) in my opinion a POSITA would have understood that they can withstand compressive forces (such as application of air pressure to launch the Spitball). Ex. 1007 at 5, 8. In my opinion, a POSITA would have understood that if they tried a hydrated SAP and it broke apart when launched from a launcher such as described in Nagayoshi, there are simple, well-known modifications that could be made to the hydrated SAP and/or the air gun to result in a successful combination. For example,

POSITAs would have known that the firing force of an air gun can be easily adjusted by, for example, (i) using a lighter spring and/or (ii) reducing the difference in diameter between the air compression chamber and the barrel, as I discussed further above in Paragraph 76. Both these modifications would have resulted in less firing force, thus applying less force to the soft-projectile and preventing them from breaking apart. And both of these are routine modifications that were well known to POSITAs in 2010. Additionally, from my discussion with Dr. Wanat I understand that a POSITA could have adjusted the strength of the hydrated SAP (*e.g.*, by increasing the cross-linking), which would likewise make the hydrated SAP more resistant to breaking apart. In view of these well known modifications, a POSITA would have a reasonable expectation of success in combining Spitballs and Nagayoshi even if one attempt at launching an SAP resulted in an SAP that broke up before it was launched from the launcher.

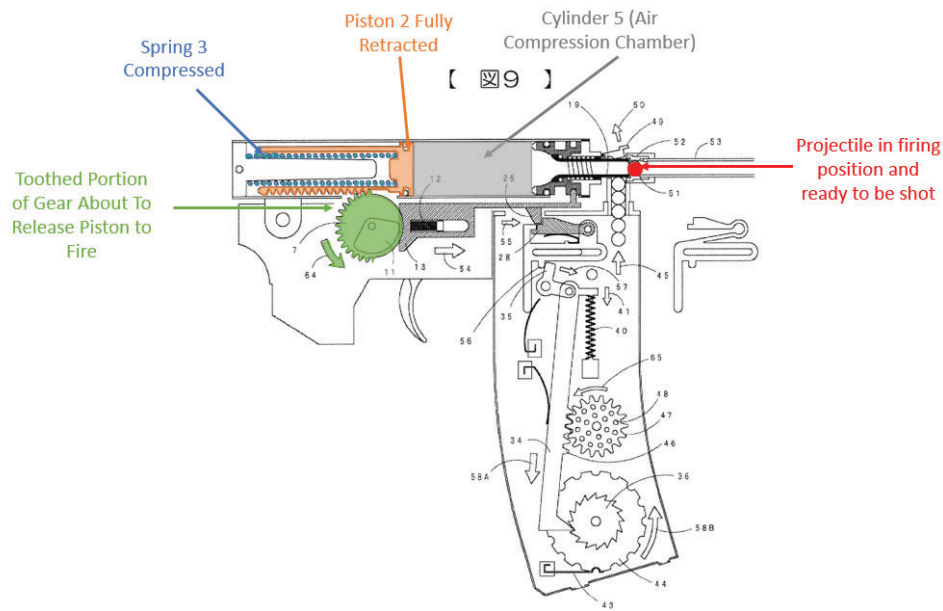
12. Claim 11 Mapping

- a. “The system of claim 1, wherein the projectile launcher is designed to use air pressure to launch the soft-projectiles.”**

179. In my opinion, Nagayoshi in view of ThinkGeek Spitballs renders obvious the system of claim 1, wherein the projectile launcher is designed to use air pressure to launch the soft-projectiles. As discussed above, Nagayoshi in

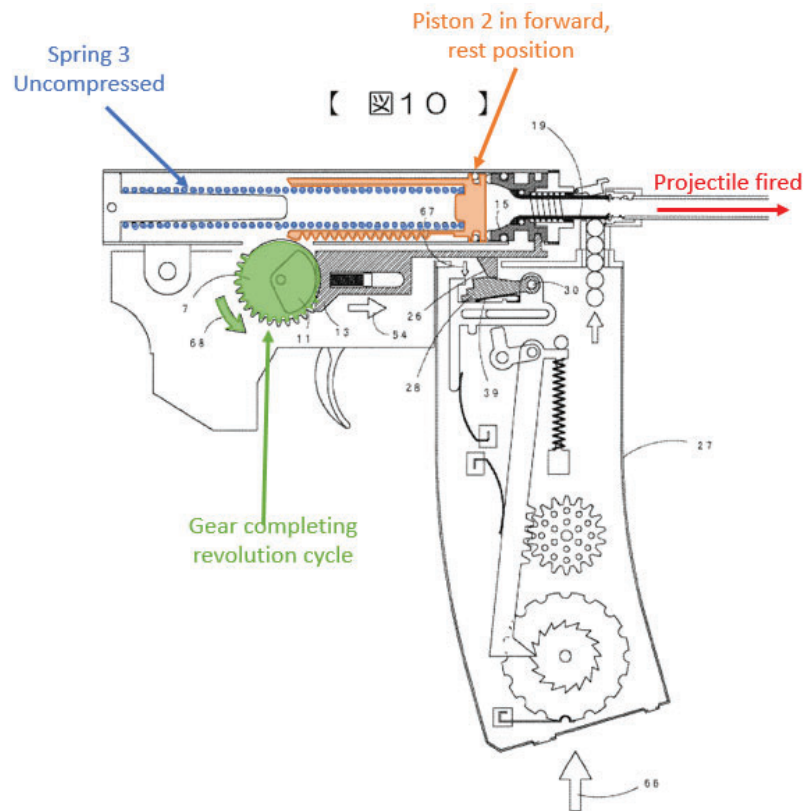
view of ThinkGeek Spitballs discloses the system of claim 1. *See* Section IX.B.2.

180. In my opinion, Nagayoshi in view of ThinkGeek Spitballs further discloses “wherein the projectile launcher is designed to use air pressure to launch the soft-projectiles.” For example, Nagayoshi claims an “electric air gun.” Ex. 1009, Nagayoshi Cls. 21-30. With respect to Embodiment 1, Nagayoshi discloses that “[a] spring 3 continuously presses ***a piston 2*** provided with a recessed and protruding section 1 corresponding to a rack gear toward the muzzle. ***A packing 4 is provided at the front periphery of the piston 2, maintaining airtightness in the interval with a cylinder 5.***” Ex. 1009, Nagayoshi ¶ [0030]. I have annotated Figure 9 below, which depicts Nagayoshi’s toy gun when rotary drive member 7 has continued turning and fully retracted piston 2 with airtight packing 4. Ex. 1009 ¶ [0036]:



Ex. 1009, Fig. 9. A POSITA would understand that when the piston is released by the partially-toothed gear, the spring will drive the piston forward, and the “airtightness” between the piston 2 and cylinder 5 will cause the air in the cylinder 5 to be compressed into the smaller diameter nozzle and barrel, launching the projectile.

181. Figure 10 (annotated below) shows this “shooting completion state” where the gear releases the piston and the piston is driven forward by the spring. The “airtightness” between the piston 2 and cylinder 5 causes the piston 2’s forward movement to compress air in the air compression chamber into the smaller diameter nozzle and barrel. That air pressure launches the projectile:



Ex. 1009 ¶ [0039], Fig. 10; *see* Section IX.B.10. A POSITA would understand that using hydrated SAP projectiles, as taught in Spitballs, with an air gun as disclosed by Nagayoshi, results in a projectile launcher that is designed to use air pressure to launch the soft-projectiles.

13. Claim 12 Mapping

- a. **“The system of claim 1, wherein the projectile launcher comprises a firing mechanism that stores energy independent of a user.”**

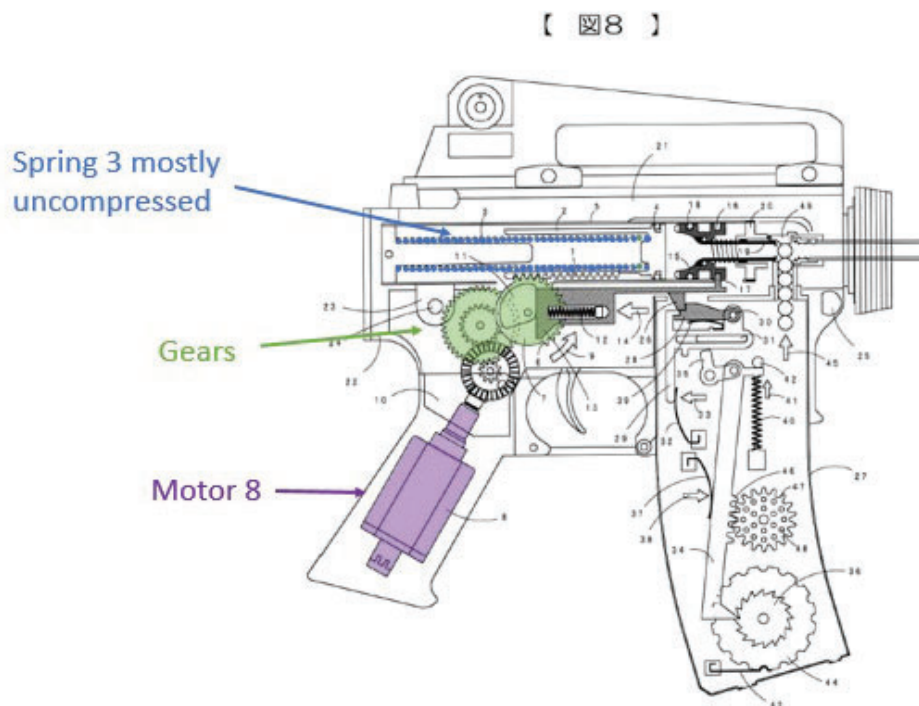
182. In my opinion, Nagayoshi in view of ThinkGeek Spitballs renders obvious the system of claim 1, wherein the projectile launcher comprises a firing mechanism that stores energy independent of a user. As discussed above,

Nagayoshi in view of ThinkGeek Spitballs discloses the system of claim 1.

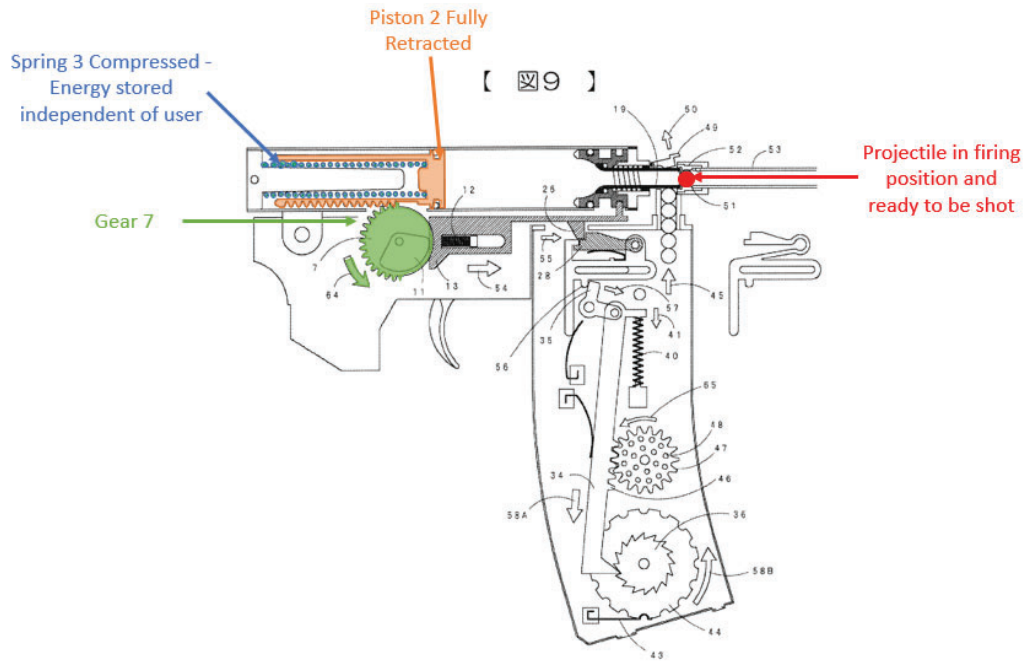
See Section IX.B.2.

183. In my opinion, Nagayoshi further discloses “a firing mechanism that stores energy independent of a user.” A POSITA would understand that Nagayoshi uses electromechanical components to compress the spring. For example, Nagayoshi discloses “[a] spring 3 continuously presses a piston 2 provided with a recessed and protruding section 1 corresponding to a rack gear toward the muzzle. A packing 4 is provided at the front periphery of the piston 2, maintaining airtightness in the interval with a cylinder 5. A rotary drive member 7 having a recessed and protruding section 6 that meshes with the recessed and protruding section 1 is made to rotate in the direction of an arrow 9 by a motor 8 and a series of reduction gears. The recessed and protruding section 1 of the piston 2 and the concave-convex part 6 of the rotary drive member 7 begin to mesh in conjunction with rotation of the rotary drive member 7, pulling the piston 2 backward.” Ex. 1009 ¶ [0030].
184. Nagayoshi discloses that Figure 8 is depicting an “electric toy gun” and “electric gun,” Ex. 1009, Nagayoshi ¶¶ [0031] and [0035], and that “[t]he first embodiment described in FIG. 8 to FIG. 11” has a “basic structure of an *electric gun* that converts rotational motion to linear motion,” Ex. 1009, Nagayoshi ¶ [0043]. A POSITA would understand from the teaching of a

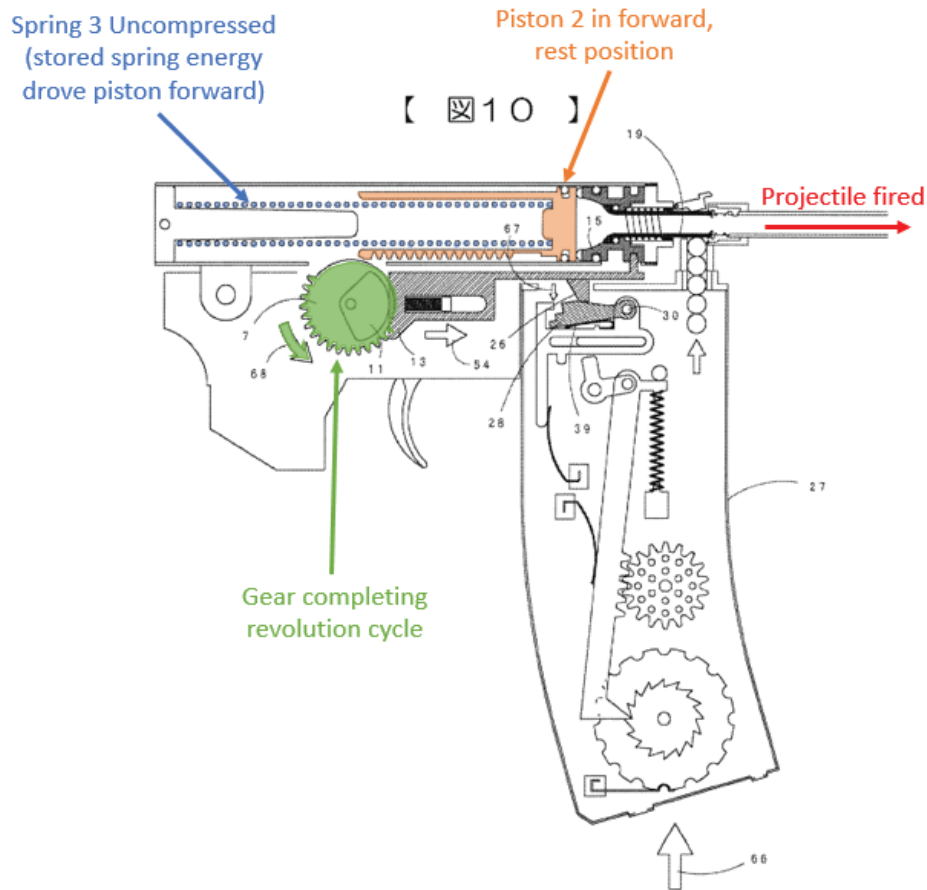
“motor 8” used in the “electric gun” that the “motor 8” is electrically powered (e.g., by a battery). When the trigger is pulled, the motor 8 is electrically activated and turns rotary drive member 7, which stores energy in the spring independent of the user, as shown in annotated Figures 8-9:



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Ex. 1009, Figs. 8-9. The spring is a component of the firing mechanism, and the energy stored in the spring is released as the gear 7 continues turning and releases the piston, driving the piston forward, which compresses air and fires the bullet, which I depict in annotated Figure 10, below:



Ex. 1009, Fig. 10.

185. Further, I understand that Patent Owner argued in the related ITC Action that the “Accused Products have firing mechanisms with springs that can be compressed and left in that state (i.e., storing energy independent of a user),” Ex. 1042, ’282 Patent Infringement Contentions at 32, and that Patent Owner argued that accused products that have the same type of firing mechanism as that disclosed by Nagayoshi comprise a firing mechanism that stores energy independent of a user, Ex. 1070, ’683 Patent Infringement Contentions at 30-33. In my opinion, Nagayoshi likewise discloses firing mechanisms with

springs that can be compressed and left in that state. Specifically, for example, Nagayoshi discloses: “FIG. 10 shows the state in a first embodiment in which the magazine is to be inserted when the shooting mechanism on the gun side has stopped in a non-initial state. A state is shown in which the cam part 11 has pushed the cam contact member 13 completely forward. *When the trigger is released on an electric gun during full-auto* (continuous) shooting, there are times when there is a stop as shown in FIG. 8 and times when there is a stop in the designed shooting completion state as shown in FIG. 10. Alternatively, *there may be a stop at an intermediate state.*” Ex. 1009, Nagayoshi ¶ [0039]. A POSITA would understand that, in a fully automatic firing mode, releasing the trigger will open the circuit and stop the firing process, thus stopping the firing mechanism in an “intermediate state,” such as the “state” shown in Figure 9. Ex. 1009, Nagayoshi ¶ [0036] (“FIG. 9 shows the state when the rotary drive member 7 rotates to an extent in the direction of an arrow 64 and the cam part 11 has pushed the cam receiving [sic: contact] bar 13 completely forward.”).

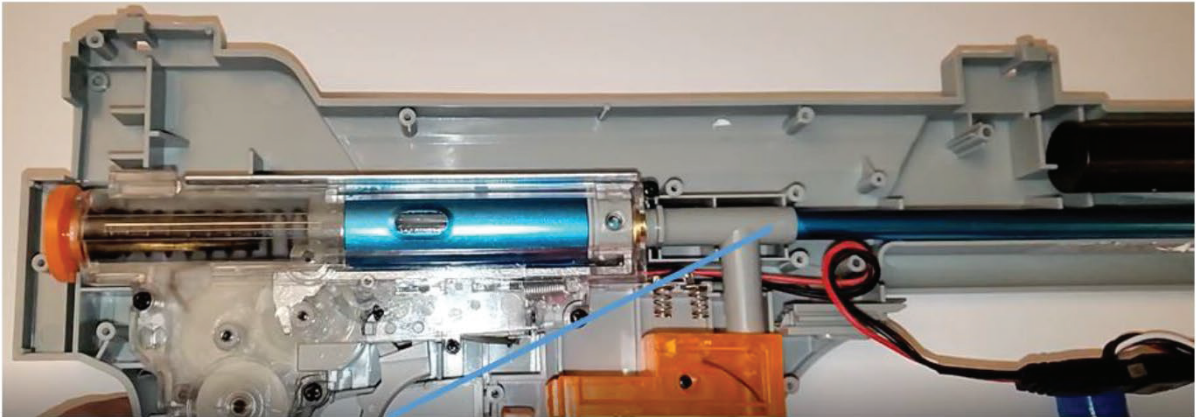
14. Claim 14 Mapping

- a. The system of claim 1, wherein the projectile launcher comprises a firing mechanism that directly applies a force to the ammunition.”**

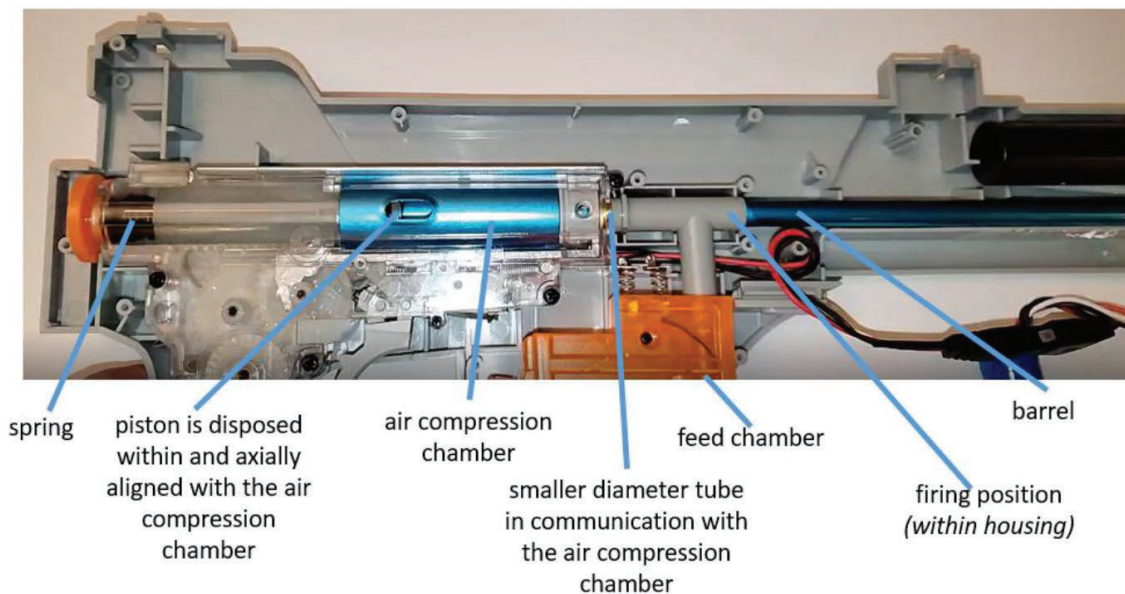
186. In my opinion, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 1, wherein the projectile launcher comprises a firing mechanism that directly applies a force to the ammunition. As discussed above, Nagayoshi in combination with ThinkGeek Spitballs renders obvious the system of claim 1. *See* Section IX.B.2.
187. I have reviewed Patent Owner’s infringement contentions in the ITC Action and understand that the Patent Owner alleges that launching ammunition using air pressure generated by a spring, piston, and air compression chamber after a nozzle has moved the ammunition into the barrel is a direct application of force by the firing mechanism to the ammunition. Ex. 1070 at 33-35. For example, Patent Owner contends that a firing mechanism with a spring, piston, and air compression chamber “directly applies a force to the soft-projectile.”

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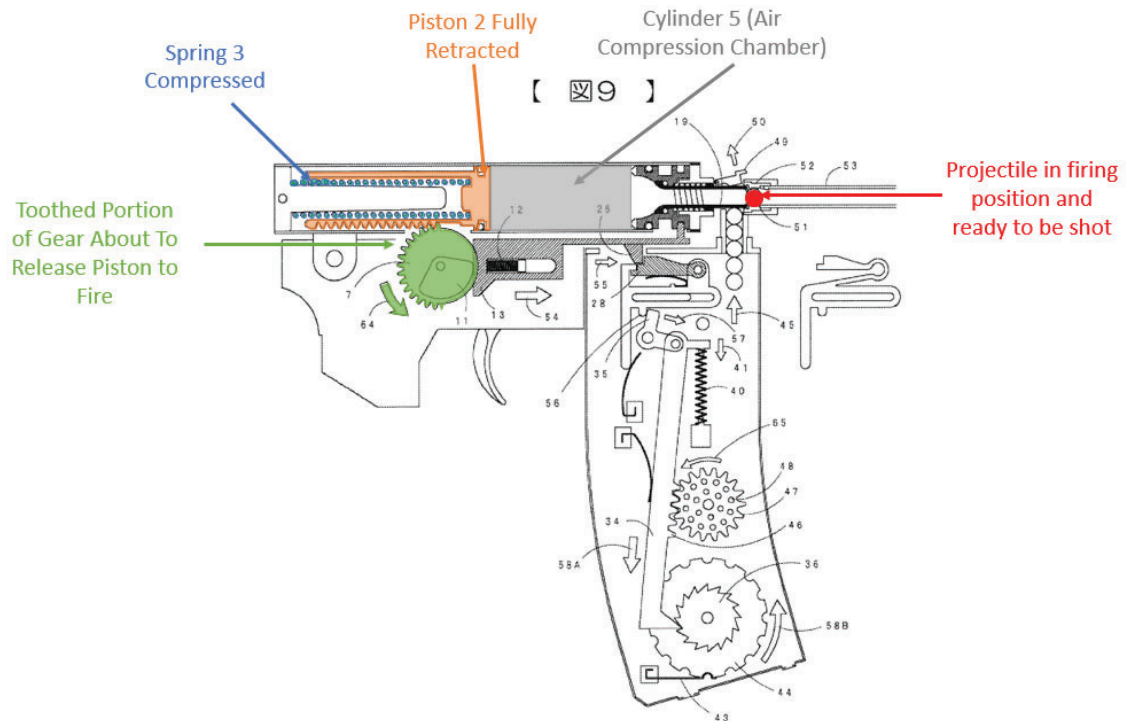
SRB400 (SRB-PHYS_000001):



firing mechanism directly applies a force to the ammunition (*in housing*)



Ex. 1070 at 28, 33. Nagayoshi uses the same configuration to launch a
projectile:



Ex. 1009, Nagayoshi Fig. 9. Consistent with Patent Owner's application of this claim, Nagayoshi in combination with Spitballs renders obvious a projectile launcher wherein the projectile launcher comprises a firing mechanism that directly applies a force to the ammunition.

X. OBVIOUSNESS – SECONDARY CONSIDERATIONS

188. Before reaching a final conclusion on obviousness for any claim, I considered secondary considerations evidence as part of my analysis. In my opinion, secondary considerations further support my findings of obviousness.

189. I have been instructed by counsel that independently made, simultaneous inventions, made within a comparatively short space of time, are persuasive evidence that the claimed invention was the product only of ordinary

mechanical or engineering skill. In my opinion, there are several examples of simultaneous, independent invention, which further supports my conclusion that the Challenged Claims are obvious.

190. For example, KR2010-0004855 (“Kim”), filed on November 1, 2008, more than a year before the May 10, 2010 ’683 Patent filing date, and published May 11, 2010, discloses “Toy bullets formed of gel or gel material.” Ex. 1016, Title. I understand from my discussion with Dr. Wanat that hydrated SAP beads form a gel material. While Kim teaches that the gel material bullet can be “a cleaning material,” it does not limit the gel bullet to cleaning material.
191. As of November 1, 2008, Kim recognized the need for toy bullets that are softer than traditional toy bullets and, thus, safer for use:

The present invention is to *improve the bullet of a toy gun to prevent injury to the human body*; it is configured so that when a barrel is formed upwards in front of a muzzle, the lid of the barrel is opened, a *toy bullet formed of gel or gel material* is placed inside the barrel, the toy bullet formed of gel or gel material is injected into the firing pin hole through the hole in the bore of the barrel, the *piston* is pulled backwards, and a trigger is pulled by *charging air pressure inside the bullet cylinder*, the air pressure inside the bullet cylinder is caused *to push and fire the gel*

or gel bullet in the firing pin hole by a spring and fires it; therefore it is a *very safe and useful toy bullet that is safer to use than a bullet of a conventional rigid material structure and does not cause injury to the human body*.

Ex. 1016, Kim at Abstract. Similarly, Kim teaches that a soft, gel bullet is safer than a “conventional” bullet made of “hard materials”:

Conventional bullets are made of hard materials, and some people become disabled therewith, so *it is necessary to develop safe gels or gel bullets to improve dangerous bullets* and supply bullets that are safe to use.

The object of the present device is to prevent injury to the human body by using bullets formed of gel or gel material when firing toy bullets; by applying a method wherein when a barrel is formed upwards in front of a muzzle, the lid of the barrel is opened, a toy bullet formed of gel or gel material is placed inside the barrel, a piston is pulled to fill the inside of the bullet cylinder with air pressure, a trigger is pulled so that a firing pin connector works and moves a firing pin and the gel or gel material bullet in the firing pin hole *generates air pressure inside the bullet cylinder, pushing the gel or gel material bullet so that it is released and fired, it ensures the safety of toy bullets by preventing human injury*.

...

Further, gel or gel material bullets *prevent injuries by mitigating shock* when the hit the human body....

Ex. 1016, Kim ¶¶ [0002]-[0003], [0034]. Kim likewise recognizes that air pressure generated by a spring, piston, and air compression chamber is a viable way to shoot softer, gel ammunition:

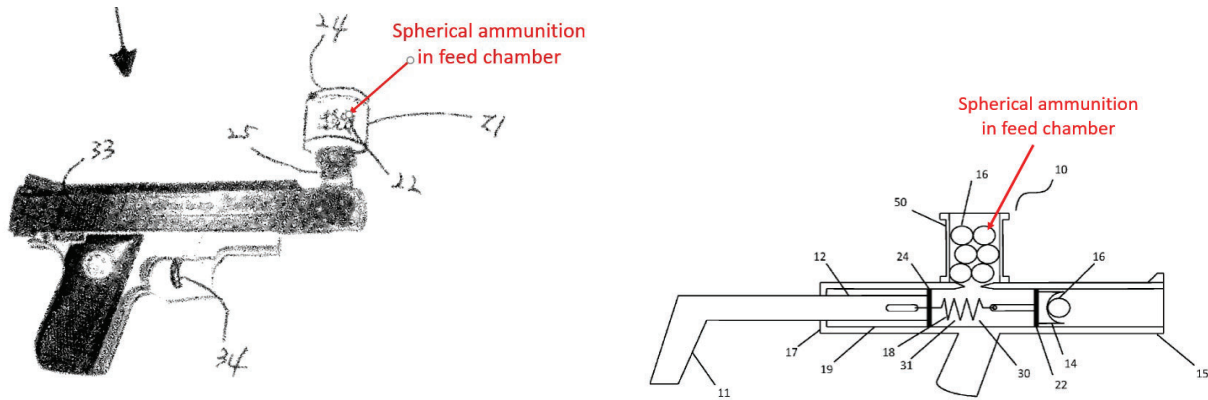
In order to achieve the above object, the present device is equipped so that, by a means wherein a sight and a barrel are placed through a hole in the front of the bullet cylinder and the lid is opened to insert the gel or gel material bullet into the barrel, a firing pin hole in the firing pin is loaded with a gel or gel material bullet through the hole in the barrel towards the hole in the sight, and *the piston and spring attached to the cover are operated so that air pressure is charged inside the bullet cylinder and the gel or gel material bullet is fired.*

...

[W]hen the trigger is pulled, through the spring, the air pressure stored inside the bullet cylinder pushes the piston forward, and as the air pressure inside the bullet cylinder is applied by the advance of the spring and piston, the gel or gel material bullet in the firing pin is released and fired forward.

Ex. 1016 ¶¶ [0004], [0033]

192. In my opinion, Kim describes the same motivation as the asserted patents (to make a softer, safer bullet), and solves them in the same way (with a softer, gel bullet fired by air pressure generated with a spring, piston, and air compression chamber, as discussed above): “Conventional bullets are made of hard materials, and some people become disabled therewith, so it is necessary to develop safe gels or gel bullets to improve dangerous bullets and supply bullets that are safe to use.” Ex. 1016 ¶¶ [0003]-[0004], *see also* Abstract; *compare with* Ex. 1001, ’683 Patent at 3:54-4:3 (“The present patent document discloses and teaches projectile launching devices, such as toys, amateur guns and weaponry that use projectiles formed from a Super absorbent polymer (SAP). As a result, the projectiles launched by the devices of the present patent document are soft-projectiles. Further, once hydrated, the unique properties that SAP’s exhibit give the soft-projectiles several advantages over current projectile materials such as paint balls, plastics, and foams.... Because SAP projectiles break down under excessive pressure, the force at impact is spread over a much wider Surface area, thus reducing the likelihood of injury.”).
193. In my opinion, Kim likewise discloses a feed chamber to drop the spherical gel ammunition into the launcher (below, left), just like the ’683 patent (right):



Ex. 1016, Fig. 1; Ex. 1001, Fig. 1.

194. As another example, Steve Spangler invented and publicly disclosed and publicly used an air-powered launcher for hydrated super absorbent polymers on or before July 10, 2008, as I described above in Paragraphs 57-58.
195. Further, I reviewed U.S. Patent No. 8,584,589 (“Carlson”), which was filed on October 6, 2010, about five months after the claimed May 10, 2010 filing date of the ’683 patent. Ex. 1039. I understand from counsel that inventions occurring shortly after the alleged invention can be relevant, for example by showing that the claimed invention was the product of only ordinary mechanical engineering or skill.
196. Carlson’s “invention relates to [] toy projectiles” (Ex. 1039, 1:13) with a “projectile 100” that can be made of “dehydrated gels, *a hydro-polymer (similar to the absorbent polymer material used in a diaper)*, and a sponge material that is compressed and dehydrated.” Ex. 1039 at 3:53-56. Based on my conversation with Dr. Wanat, I understand that a POSITA would know

that the “hydro-polymer” using the absorbent material from a diaper, as taught in Carlson, is an SAP. *See also* Ex. 1001, 3:46-51 (’683 Patent acknowledging SAPs “are commonly used in personal disposable hygiene products such as diapers”). Carlson describes the same motivation for developing a hydrated SAP bullet as the ’683 Patent, specifically, a desire for a safer bullet that is less influenced by air currents than foam bullets (such as sold by Nerf):

[Carlson:] *An advantage of plastic bullets* is that they are solid and typically smaller than foam bullets and, as such, *are less influenced by wind resistance* than foam bullets. In other words, after being fired by a toy gun, a solid and plastic projectile is more likely than a porous projectile (i.e., the foam bullet) to shoot straight. A disadvantage to such plastic bullets is that they are solid and, although softer than metal, can still cause injury. Additionally, because they are typically solid, such plastic bullets do not stick to their target and readily “bounce off” of the target. Alternatively, *a foam bullet is much softer than a plastic bullet which reduces the risk of injury from such a projectile. However, as noted above, the foam bullet is subject to being influenced by air currents and, as such, does not shoot straight (or as far) as the plastic bullet.*

[’683 Patent:] *Although NERF(R) and other foam like materials can be used to make toy weaponry projectiles that are relatively safe* to project or launch, the properties

of NERF® and other foam like materials have some significant drawbacks when used as projectiles for projectile launching toys. Because foam based materials such as *NERF® foam are light, they are highly susceptible to air forces* when trying to project them through the air in free flight as occurs when fired from toy weaponry. The soft, light properties of foam and NERF® type products are due to their low density. The low density of foam based projectiles decreases the momentum of the projectiles, which in turn increases the effect of air resistance, drag, and other motion retarding forces. *This causes foam based projectiles to rapidly slow after initial firing and easily curve offline.*

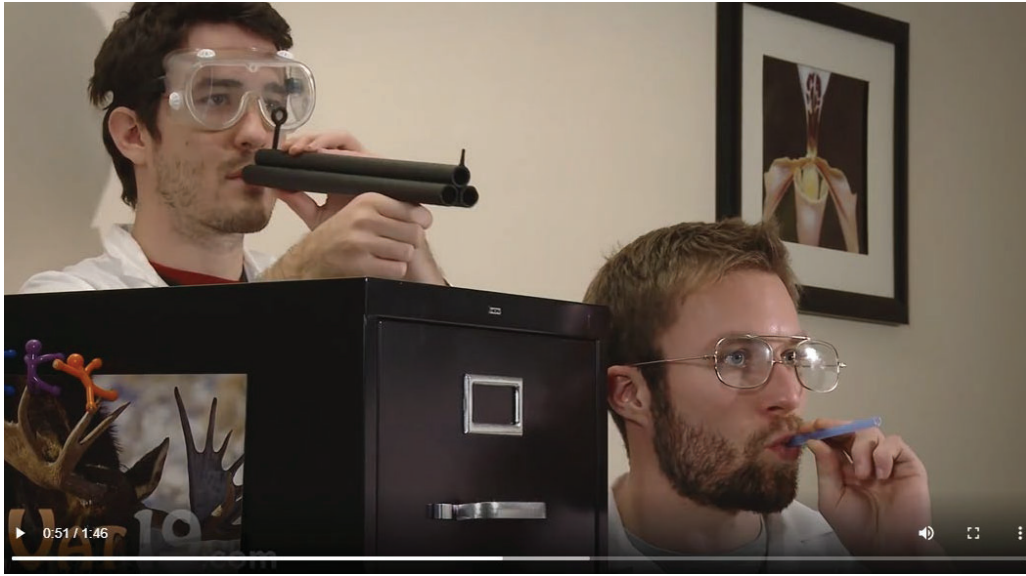
Ex. 1039, Carlson at 1:17-28; Ex. 1001, '683 Patent at 1:49-62. Carlson concludes that “a continuing need exists for a soft projectile that is safer than a plastic bullet, that is less influenced by air current than a foam bullet or tipped projectile.” Ex. 1039, Carlson at 1:51-54. Similarly, the '683 Patent suggests “The super absorbent polymer projectile launching toys and/or weaponry described herein may increase the user experience as compared to foam-based projectile toys, yet they remain safe for children to use.” Ex. 1001, '683 Patent at 3:11-14. In my opinion, the near-simultaneous nature of Carlson and the '683 applicants identifying the same purported problem and

the same solution demonstrates that the alleged invention in the '683 Patent is the product of only ordinary skill, well within the abilities of a POSITA.

197. Similarly, I reviewed a December 20, 2010 YouTube video posted by Vat19 that featured DuneCraft Spitballs—the same product described in the ThinkGeek listing (Ex. 1029; 1068)—and depicting two men launching hydrated SAP Spitballs at each other using air pressure. Ex. 1029. The video explains that “Spitballs are fascinating little projectiles perfect for launching at just about anything.” Ex. 1029. At the same time, one of the men on the screen puts a Spit Ball into a straw and launches it at his coworker. Ex. 1029. The video states that “[p]rior to activation, they could be mistaken for a handful of salt. But add a little water, and like magic, they grow, up to 200 times their original size.” Ex. 1029. The video explains that how long you leave them in is up to you, and that adjusts the size:



Ex. 1029. “Bigger Spit Balls will explode easily,” “while smaller Spit Balls are durable and bouncy.” Ex. 1029. The video confirms that Spitballs “[a]re also perfect for shooting from a straw or tube.” Ex. 1029.



198. Regular people on the internet also suggested launching hydrated SAPs using well known launchers after they were shown a hydrated SAP. For example, on a video showing hydrated “Liquid Marbles” in a jar, a user commented on February 19, 2021 “oh I am so getting these for my slingshot :))” as I describe in more detail above in Paragraph 56. Exs. 1030, 1031.

199. I also reviewed a YouTube video titled “What do you do with Orbeez?” and posted to YouTube on September 10, 2010, in which children with no apparent skill in the art also conceived of the idea of launching hydrated SAPs, for example using guns. Ex. 1033; 1069. After being shown the Orbeez, one boy in the video suggests to use them with “a gun.” Ex. 1033 at 0:20-0:22.

The boy who previously suggested launching hydrated SAPs with a “slingshot” then says “Bazooka!” Ex. 1033 at 0:24-0:26. In my opinion, this video shows that even children recognized that combining hydrated SAPs with previously-known launchers, including slingshots and guns, would be fun. This is supported by an interview with one of the named inventors, Ronald Brawer. He is quoted in the article and acknowledges that children “nearly universal[ly]” proposed shooting hydrated SAPs: “For the boys, the response was nearly universal: “These are paintballs,” they would say. “We want to shoot them,” Brawer said.” Ex. 1034 at 6. In my opinion, given that individuals with no skill in the relevant art (like school-aged children) thought to combine hydrated SAPs with launchers, including guns, that idea, including as expressed in the claims of the Challenged Claims, would unquestionably have been obvious to a POSITA.

200. I understand that there was a product called “Xploderz” released by the Maya Group, the original assignee of the ’683 Patent. For example, this commercial depicts the product: <https://www.youtube.com/watch?v=yD2gII94TUw&t=1s>. To the extent Patent Owner alleges this product was “praised” and/or “commercially successful” because of (1) use of SAPs as ammunition, (2) shooting “up to” 85 feet (which suggests it often will not reach that distance), and (3) the ability

to hold more ammo (“70 rounds”), in my opinion, there is no nexus between these features and the claims because these features are not claimed, are driven by prior art features, or both.

201. In my opinion, use of SAPs as ammunition cannot supply a nexus because SAP ammunition was in the prior art. *See* Section VIII.B and IX.A (discussing ThinkGeek Spitballs) and Paragraphs 57-58 (discussing Steve Spangler’s launching of hydrated SAPs).
202. Second, in my opinion the distance shot is not claimed—an allegedly covered product could shoot varying distances, depending on the air pressure applied. Further, in my opinion, the distance fired is driven by the amount of force supplied to the ammo, which is controlled by the century-old prior art components, including a spring, piston, and air compression chamber mechanisms. *See* Sections VIII.C (Nagayoshi), VIII.E (Peev), VIII.F (Bennett), VIII.G (Hamilton); Ex. 1051 at 11-12 (teaching “Electric air” airsoft guns with springs, pistons, and air compression chambers that shoot “99 yards”). Even if there were success/praise, and even if it were driven by the distance fired, in my opinion there is no nexus between distance and any of the Challenged Claims.
203. Third, the ability to hold allegedly “more ammo” (upwards of 70 rounds) is not claimed in any of the Challenged Claims. In fact, all that is required in

any Challenged Claim is a “plurality” (i.e., 2 or more) soft projectiles. Ex. 1001, Cls. 1-15. Further, launchers that had magazines with large ammo capacity were well known in the prior art. For example, Nagayoshi depicts magazines with substantial ammo capacity that feed spherical projectiles into a launcher. Ex. 1009 Figs. 12-14, 17, 19-21. Similarly, Daisy’s 2006 catalog for the Airstrike airsoft gun describes an “Ammo Capacity” of “100.” Ex. 1051 at 11-12. In my opinion, the ability of a toy launcher to hold 2 or more rounds (or even 70 or more rounds) is a prior art feature that does not support a finding of nonobviousness.

204. I am aware Hasbro took a license to the ’683 Patent. I have not seen any evidence indicating Hasbro did so out of a belief in the patent’s merits, as opposed to for business reasons and/or to avoid litigation expense.
205. I have not reviewed an Xploderz product, but understand Petitioner contends it does not practice the claims. If Patent Owner relies on an Xploderz product and contends it does practice the claims, or relies on confidential information produced in the ITC proceeding, I reserve the right to review it.
206. If Patent Owner presents evidence of alleged secondary considerations, I reserve the right to submit a reply declaration to address it.

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I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1001.

Date:

23 MAR 2023

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Amanda Bligh', written over a horizontal line.