

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GEL BLASTER INC.

Petitioner,

v.

SPIN MASTER

Patent Owner

Patent No. 8,371,282

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Inventors: Keith G. Meggs, Ronald Brawer, Michael G. Hoeting, and Neil
Hamilton

Title: SOFT-PROJECTILE LAUNCHING DEVICE

Inter Partes Review No. IPR2023-00301

**DECLARATION OF GUERRY GRUNE PH.D.
REGARDING U.S. PATENT NO. 8,371,282**

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I. INTRODUCTION

A. Engagement

1. My name is Dr. Guerry Grune, and I have been retained by counsel for Petitioner Gel Blaster Inc. as an expert witness in the above-captioned proceeding.

2. My opinions are based on my years of education, research and experience, as well as my investigation and study of relevant materials. The materials that I studied for this declaration include all exhibits of the petition.

3. I may rely upon these materials, my knowledge and experience, and/or additional materials to rebut arguments raised by the patent owner. Further, I may also consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me.

4. My analysis of the materials produced in this investigation is ongoing and I will continue to review any new material as it is provided. This declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

B. Compensation

5. I am being compensated at a base rate of \$525 per hour for my study and work on this declaration and \$625 per hour for testimony in this matter. I am

also being reimbursed for reasonable and customary expenses associated with my work and testimony in this investigation. My compensation is not contingent on the outcome of this matter or the specifics of my testimony.

C. Background and Qualifications

6. I am an expert in the field of polymer science and technology that I developed both through my industrial and academic experience. Specifically, I received both an AB degree in Chemistry and a BSME (Mechanical Engineering) degree from Duke University, an MSChE (Chemical Engineering) at the University of Massachusetts – Amherst, and a PhD in Chemical Engineering at NC State University. My industrial experience began with the research and development involved in producing liquid crystal polyester polymers and fibers at Fiber Industries Inc., a joint venture of ICI and Celanese (later Hoechst-Celanese) and then went to work for IBM-RTP, NC, where I was involved in all aspects of both polymer testing extrusion and molding. Later I was employed with ABB Corporation where I continued working with and developing new polymer systems while also staying involved in extrusion and molding applications. As an employee of Mitsubishi Chemical America, I was a development manager in for the field of electrophotography and used my expertise for polymer coatings, molding and adhesion for laser printers and copy machines. Later as a Praxair (now Linde) employee I was involved in all aspects of new polymer technology for

application in the cryogenic gas and liquid space including using specifically treated polymers for tertiary oil and gas recovery. My expertise includes synthesis of new and existing polymers (including SAPs) as well as the molding and extrusion of polymers and commercially available plastics for multiple products including parts for sporting and other recreational goods.

7. In completing my doctorate in Chemical Engineering under the direction of Professor Vivian T. Stannett at NC State University, my work included both e-beam and Co-60 sourced radiation to induce grafting of polymers to increase their hydrophobicity (i.e. to produce super-absorbency) with polyethylene and acrylic acid. This effort along with Dr. Stannett's long standing consultancy with Kimberly-Clark (manufacturer of Huggies® disposable diapers – the first commercial use and success for SAPs) allowed me to more fully comprehend how SAPs function, their commercial importance, and also how they are actually produced. Modification of existing polymers to become SAPs was a portion of my PhD research efforts. I later went to work for ABB Corporation's newly built Transmission Technology Institute and as an ABB Fellow Engineer, I used my expertise to develop process economic downsizing for drying distribution transformer production lines including the use of super absorbent polymers (SAPs).

8. My mechanical engineering degree and expertise has been used over the course of my career to include many different aspects of making new and existing polymer base products. This includes the molding of many thermoplastic parts including; connectors, mouthguards and mouthpieces in addition to other sporting good products, packaging materials, larger scale reaction injection molded parts for automobiles including bumpers and taillights, and even manufacture, filling, and labeling of personal care products. In addition, I have experience with extrusion of wire and cable, and coatings, including optical fibers. My experience also extends to the use of loading and discharge of ballistic cartridges using automated magazines and magazine cartridges.

9. A true and accurate copy of my curriculum vitae is attached as Exhibit 1004.

10. A complete list of cases in which I have testified at trial, hearing, or by deposition within the preceding four years is provided in my curriculum vitae.

D. Scope of Opinion

11. I have been asked to provide my opinions regarding whether claims 1, 4-6 are anticipated by DuneCraft, Exs. 1007 and 1009, whether claims 2-3, 7-14, 16-21 are rendered obvious over U.S. Patent 5,241,944 ("Rappaport") (Ex. 1006) in view of DuneCraft, and whether claims 8 and 15 are rendered obvious over U.S. Patent Application 2006/0180134A1 ("Illuzzi") (Ex. 1011) in view of DuneCraft.

12. This declaration, including the exhibits hereto, sets forth my opinion on this topic.

E. Information Considered

13. My opinions are based on my years of education, research and experience, as well as my investigation and study of relevant materials. In forming my opinions, I have considered the materials I identify in this report and those listed in Attachment B to the Petition.

14. I may rely upon these materials and/or additional materials to respond to arguments raised by the Patent Owner. I may also consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me.

15. My analysis of the materials produced in this investigation is ongoing and I will continue to review any new material as it is provided. This report represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided.

II. LEGAL STANDARDS FOR PATENTABILITY

16. In expressing my opinions and considering the subject matter of the claims of the 282 Patent, I am relying upon certain basic legal principles that have been explained to me.

17. First, I understand that for an invention claimed in a patent to be found patentable, it must be, among other things, new and not obvious from what was known before the invention was made.

18. I understand the information that is used to evaluate whether an invention is new and not obvious is generally referred to as “prior art” and generally includes patents and printed publications (e.g., books, journal publications, articles on websites, product manuals, etc.).

19. I understand that in this proceeding the Petitioner has the burden of proving that the claims of the 282 Patent are anticipated by or obvious from the prior art by a preponderance of the evidence. I understand that “a preponderance of the evidence” is evidence sufficient to show that a fact is more likely true than it is not.

20. I understand that generally the claim terms should be evaluated using the ordinary meaning of the words being used in those claims from the perspective of a person of ordinary skill in the art in light of the specification and file history (i.e., the “intrinsic record”). The claims after being construed in this manner are then to be compared to the information in the prior art.

21. I understand that in this proceeding, the information that may be evaluated is limited to patents and printed publications. My analysis below

compares the claims to patents and printed publications that are prior art to the claims.

22. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can be shown to “anticipate” the claim. Second, the prior art can be shown to have made the claim “obvious” to a person of ordinary skill in the art. My understanding of the two legal standards is set forth below.

A. Anticipation

23. I understand that the following standards govern the determination of whether a patent claim is “anticipated” by the prior art.

24. I have applied these standards in my evaluation of whether the claims of the 282 Patent would have been anticipated by the prior art.

25. I understand that the “prior art” includes patents and printed publications that existed before the earliest filing date (the “effective filing date”) of the claim in the patent. I also understand that a patent will be prior art if it was filed before the effective filing date of the claimed invention, while a printed publication will be prior art if it was publicly available before that date.

26. I understand that, for a patent claim to be “anticipated” by the prior art, each and every requirement of the claim must be found, expressly or inherently, in a single prior art reference as recited in the claim. I understand that

claim limitations that are not expressly described in a prior art reference may still be there if they are “inherent” to the thing or process being described in the prior art. For example, an indication in a prior art reference that a particular process complies with a published standard would indicate that the process must inherently perform certain steps or use certain data structures that are necessary to comply with the published standard.

27. I understand that if a reference incorporates other documents by reference, the incorporating reference and the incorporated reference(s) should be treated as a single prior art reference for purposes of analyzing anticipation.

28. I understand that it is acceptable to consider evidence other than the information in a particular prior art document to determine if a feature is necessarily present in or inherently described by that reference.

B. Obviousness

29. I understand that a claimed invention is not patentable if it would have been obvious to a person of ordinary skill in the field of the invention at the time the invention was made.

30. I understand that the obviousness standard is defined in the patent statute (35 U.S.C. § 103(a)) as follows:

31. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences

between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be denied by the manner in which the invention was made.

32. I understand that the following standards govern the determination of whether a claim in a patent is obvious. I have applied these standards in my evaluation of whether the asserted claims of the 282 Patent would have been considered obvious as of the priority date of the patent.

33. I understand that to find a claim in a patent obvious, one must make certain findings regarding the claimed invention and the prior art. Specifically, I understand that the obviousness question requires consideration of four factors (although not necessarily in the following order):

- The scope and content of the prior art;
- The differences between the prior art and the claims at issue;
- The knowledge of a person of ordinary skill in the pertinent art; and
- Whatever objective factors indicating obviousness or non-obviousness may be present in any particular case.

34. In addition, I understand that the obviousness inquiry should not be done in hindsight, but must be done using the perspective of a person of ordinary skill in the relevant art as of the effective filing date of the patent claim.

35. I understand the objective factors indicating obviousness or non-obviousness may include: commercial success of products covered by the patent claims; a long-felt need for the invention; failed attempts by others to make the invention; copying of the invention by others in the field; unexpected results achieved by the invention; praise of the invention by those in the field; the taking of licenses under the patent by others; expressions of surprise by experts and those skilled in the art at the making of the invention; and the patentee proceeded contrary to the accepted wisdom of the prior art. I also understand that any of this evidence must be specifically connected to the invention rather than being associated with the prior art or with marketing or other efforts to promote an invention. I am not presently aware of any evidence of “objective factors” suggesting the claimed methods are not obvious, and reserve my right to address any such evidence if it is identified in the future.

36. I understand the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. I also understand that an example of a solution in one field of endeavor may make that solution obvious in another related field. I also understand that market

demands or design considerations may prompt variations of a prior art system or process, either in the same field or a different one, and that these variations will ordinarily be considered obvious variations of what has been described in the prior art.

37. I also understand that if a person of ordinary skill can implement a predictable variation, that variation would have been considered obvious. I understand that for similar reasons, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using that technique to improve the other device would have been obvious unless its actual application yields unexpected results or challenges in implementation.

38. I understand that the obviousness analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, but instead can take account of the “ordinary innovation” and experimentation that does no more than yield predictable results, which are inferences and creative steps that a person of ordinary skill in the art would employ.

39. I understand that sometimes it will be necessary to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art. I understand that all these

issues may be considered to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

40. I understand that the obviousness analysis cannot be confined by a formalistic conception of the words “teaching, suggestion, and motivation.” I understand that in 2007, the Supreme Court issued its decision in *KSR Int’l Co. v. Teleflex, Inc.* where the Court rejected the previous requirement of a “teaching, suggestion, or motivation to combine” known elements of prior art for purposes of an obviousness analysis as a precondition for finding obviousness. It is my understanding that *KSR* confirms that any motivation that would have been known to a person of skill in the art, including common sense, or derived from the nature of the problem to be solved, is sufficient to explain why references would have been combined.

41. I understand that a person of ordinary skill attempting to solve a problem will not be led only to those elements of prior art designed to solve the same problem. I understand that under the *KSR* standard, steps suggested by common sense are important and should be considered. Common sense teaches that familiar items may have obvious uses beyond the particular application being described in a reference, that if something can be done once it is obvious to do it multiple times, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. As such, the prior art

considered can be directed to any need or problem known in the field of endeavor at or before the priority date of the patent and can provide a reason for combining the elements of the prior art in the manner claimed. In other words, the prior art does not need to be directed towards solving the same problem that is addressed in the patent. Further, the individual prior art references themselves need not all be directed towards solving the same problem.

42. I understand that an invention that might be considered an obvious variation or modification of the prior art may be considered non-obvious if one or more prior art references discourages or lead away from the line of inquiry disclosed in the reference(s). A reference does not “teach away” from an invention simply because the reference suggests that another embodiment of the invention is better or preferred. My understanding of the doctrine of teaching away requires a clear indication that the combination should not be attempted (e.g., because it would not work or explicit statements saying the combination should not be made).

43. I understand that a person of ordinary skill is also a person of ordinary creativity.

44. I further understand that in many fields, it may be that there is little discussion of obvious techniques or combination, and it often may be the case that market demand, rather than scientific literature or knowledge, will drive design trends. When there is such a design need or market pressure to solve a problem and

there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within their technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious. The fact that a particular combination of prior art elements was “obvious to try” may indicate that the combination was obvious even if no one attempted the combination. If the combination was obvious to try (regardless of whether it was actually tried) or leads to anticipated success, then it is likely the result of ordinary skill and common sense rather than innovation.

III. THE 282 PATENT

A. Effective Filing Date

45. The application that resulted in the 282 Patent is U.S. Patent Application Serial No. 12/777,134, filed May 10, 2010. Ex. 1001 at Face.

46. My understanding is that Patent Owner has asserted an earlier invention date for some claims in the ITC action. Ex. 1019. Patent Owner asserted that “The ’282 patent is entitled to a priority date of May 10, 2010, the filing date of U.S. Patent Application No. 12/777,134. Further, the following asserted patent claims in the ’282 patent are entitled to an earlier priority date, as follows: ’282 claims 1 and 4 were conceived no later than February 21, 2010 and reduced to

practice no later than April 8, 2010. '282 claims 2 and 3 were conceived no later than February 21, 2010 and reduced to practice no later than May 10, 2010." Ex. 1019 at 1. Because all the prior art at issue in this Petition predates February 21, 2010, I will assume that the claims of the 282 patent are entitled to a February 21, 2010 priority date.

B. A Person of Ordinary Skill in the Art

47. In rendering the opinions set forth in this declaration, I was asked to consider the patent claims and the prior art through the eyes of a person of ordinary skill in the art. I considered factors such as the educational level and years of experience of those working in the pertinent art; the types of problems encountered in the art; the teachings of the prior art; patents and publications of other persons or companies; and the sophistication of the technology. I understand that a person of ordinary skill in the art is not a specific real individual, but rather a hypothetical individual having the qualities reflected by the factors discussed above.

48. Taking these factors into consideration, it is my opinion that a person of ordinary skill in the art as of the effective filing date of the 282 Patent ("POSITA") would have been (i) an individual with 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) either understanding the chemistry involved regarding super absorbent polymers or

having access to a chemist knowledgeable regarding super absorbent polymers.

Individuals with additional education or additional industrial experience could still be of ordinary skill in the art if that additional aspect compensates for a deficit in one of the other aspects of the requirements stated above.

C. Overview of The 282 Patent

49. The 282 patent describes “soft-projectile launching devices, such as projectile toys. More particularly, the present patent document relates to soft-projectile launching devices that launch super absorbent polymer projectiles and related devices and methods.” Ex. 1001, 1:5-9. The 282 patent acknowledges that “Super absorbent polymers (SAPs) were first invented by the United States Department of Agriculture (USDA) in the 1960s.” *Id.*, 3:37-39. The 282 patent states: “SAPs are polymers that can absorb an extremely large amount of liquid relative to their own mass” (*id.*, 3:41-42) but does not define “extremely large” beyond one example “where they may absorb 500 times their weight, and from 30-60 times their dehydrated volume.” *Id.*, 4:58-59. The 282 patent identifies no specific SAPs compositions that might be useable as a projectile.

50. The 282 patent discloses a structure of a toy gun to launch these projectiles at a high-level of abstraction. “FIG. 1 illustrates a cross section of one embodiment of a projection device 10, which in the present embodiment is a

projectile launching toy, designed for use with soft-projectile 16. ... As shown in FIG. 1, projection device 10 is in the general form of a gun.” *Id.*, 4:60-65.

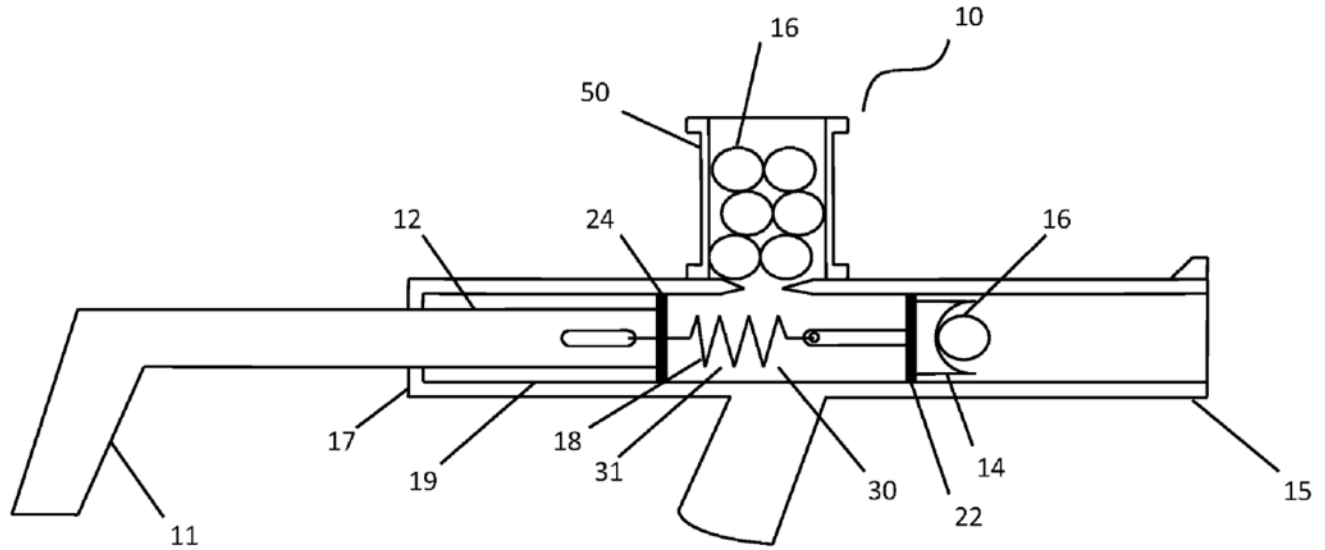


FIG. 1

51. The 282 patent also describes using a “magazine or feed hopper 50,” shown in the figure above. “Magazine 50 can be of any shape or size and is intended to contain the soft-projectiles 16 made from a SAP.” *Id.*, 7:56-60. When using a magazine, “soft-projectiles 16 may only be loaded into the projection device 10 from the magazine 50.” *Id.*, 8:19-20.

52. “The firing mechanism of the embodiment shown in FIG. 1 is based on air pressure, which is created in air compression chamber 31.” *Id.*, 5:10-12. To fire the gun, “a user pulls back on the handle 11 which retracts the plunger 12 out of the aft end 17 of a plunger cylinder 19. The plunger 12 is attached to spring 18. As the spring 18 is stretched, air is sucked into an air compression chamber 31

located between plunger seal 24 and air seal 22. ... When the user releases the handle 12, the spring 18 quickly pulls the plunger 12 back inside the plunger cylinder 19. This creates a rapid increase in air pressure in the air compression chamber 31 between plunger seal 24 and air seal 22. Consequently, air seal 22 is propelled rapidly through barrel 15 towards the distal end of barrel 15 and simultaneously accelerates the holder for a soft-projectile 14 and the soft-projectile 16. The soft-projectile 16 is launched from the projection device 10.” *Id.*, 5:36-53.

D. Challenged Claims

53. This declaration relates to claims 1-21 of the 282 patent. Those claims read as follows:

1. Ammunition configured for use with a projectile launcher comprising: a plurality of soft-projectiles having the same shape, each soft projectile being formed from hydrated super absorbent polymer.
2. The ammunition of claim 1, wherein the ammunition is disposed within a feed chamber of the projectile launcher.
3. The ammunition of claim 2, wherein the feed chamber is in selective communication with a barrel of the projectile launcher.
4. The ammunition of claim 1, wherein the soft-projectiles are substantially spherical.
5. The ammunition of claim 4, wherein the soft-projectiles have a diameter of less than about 10 millimeters.
6. The ammunition of claim 4, wherein the soft-projectiles have a diameter greater than about 4 mm and less than about 9 mm.
7. The ammunition of claim 2, 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.

8. A projectile launcher including the ammunition of claim 1 disposed within a feed chamber of the projectile launcher, and wherein the projectile launcher is adapted to load a soft-projectile from the feed chamber to a firing position.

9. The projectile launcher of claim 8, wherein the projectile launcher is a toy.

10. The projectile launcher of claim 8, wherein the projectile launcher is in the shape of a gun.

11. The projectile launcher of claim 8, wherein the feed chamber is provided within a magazine.

12. The projectile launcher of claim 8, wherein the soft-projectiles are substantially spherical.

13. The projectile launcher of claim 8, 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.

14. The projectile launcher of claim 8, wherein the projectile launcher is designed to use air pressure to launch the soft-projectiles.

15. The projectile launcher of claim 8, further comprising a firing mechanism that stores energy independent of a user.

16. The projectile launcher of claim 8, further comprising a firing mechanism that is incapable of storing energy independent of a user.

17. The projectile launcher of claim 8, further comprising a firing mechanism that directly applies a force to a soft-projectile located in the firing position to launch the soft-projectile from the projectile launcher in free flight.

18. The projectile launcher of claim 8, further comprising a firing mechanism that indirectly applies a force to a soft-projectile located in the firing position to launch the soft-projectile from the projectile launcher in free flight.

19. The projectile launcher of claim 8, further comprising:

an air compression chamber;

a piston disposed within and axially aligned with the air compression chamber;
and

a spring operatively arranged to bias the piston toward a rest position from a cocked position within the air compression chamber.

20. 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.

21. The projectile launcher of claim 8, wherein the absorbency of the super absorbent polymer is sufficiently limited to allow the soft-projectiles to be launched from the projectile launcher without breaking apart.

E. Construction of Terms Used in the Claims

54. I understand that generally the claim terms should be evaluated using the ordinary meaning of the words being used in those claims from the perspective of a person of ordinary skill in the art in light of the specification and file history (i.e., the “intrinsic record”).

55. I also understand that where a patent applicant provides a definition of a claim term in the specification, that definition may control the interpretation of that term in the claim. I also understand that if no definition is given to a term in the patent specification, the claim terms must be evaluated using the ordinary meaning of the words being used in those claims, evaluated from the perspective of

a person of ordinary skill in the art. I have applied this understanding in my analyses set forth below.

56. I understand that in the pending ITC Investigation, Petitioner and Patent Owner, as well as several co-Respondents, filed a Joint Claim Construction Chart, Ex. 1020, containing claim construction disputes relating to the 282 patent. The parties asserted that various terms should be given their plain and ordinary meaning or are indefinite, which I understand is beyond the scope of this Petition. The following terms had a construction proposed by any party:

1. “super absorbent polymer”

Term	Claim(s)	Proposed By	Complainant’ Construction	Respondents’ Construction	Staff’s Construction
“super absorbent polymer”	1	Gel Blaster	Plain and ordinary meaning, i.e., “polymer that can absorb an extremely large amount of liquid relative to its own mass”	<u>PTT and Splat-R-Ball</u> : No construction necessary; term of art known to those skilled in the art at the time of the alleged invention <u>Gel Blaster</u> : Indefinite	No construction necessary; term of art known to those skilled in the art at the time of the alleged invention

57. I understand that Petitioner believes that this term is indefinite and is arguing such in the ITC action but that indefiniteness cannot be at issue in an IPR. In my analysis, I will use both constructions given in the Joint Chart: Patent Owner’s—“polymer that can absorb an extremely large amount of liquid relative to

its own mass”—and plain and ordinary meaning—i.e., “no construction necessary.”

2. Preamble

Term	Claim(s)	Proposed By	Complainant' Construction	Respondents' Construction	Staff's Construction
'282 patent claim 1 preamble “ammunition configured for use with a projectile launcher”	1 (and any asserted dependent claims)	Staff	Limiting	Preamble of claim 1 is not limiting as to claims 6, 8, 13, 14, 15, 17, 19, 20, and 21 Preamble of claim 1 is limiting for dependent claim 3	Limiting

58. For purposes of this Petition, I will assume that the preamble is limiting.

3. “a firing mechanism directly applies force to a soft-projectile”

Term	Claim(s)	Proposed By	Complainant' Construction	Respondents' Construction	Staff's Construction
“a firing mechanism that directly applies a force to a soft-projectile”	17	Respondents	Plain and ordinary meaning, i.e. “a firing mechanism that directly applies a force to a soft-projectile”	“a firing mechanism that directly applies a force to a soft-projectile (not via an intermediary)”	Plain and ordinary meaning

59. I understand that the dispute about this term relates to whether applying a force to an intermediary falls within this term. The prior art cited against this claim, Rappaport, applies force using a bolt that hits the soft-projectile, which constitutes “directly applies force” under either construction.

IV. OVERVIEW OF THE PRIOR ART

A. DuneCraft Spit Balls

60. DuneCraft's Spit Balls appear on websites at least as early as November 27, 2009. Ex. 1007. Ex. 1007 shows an archived version of the webpage at <http://www.thinkgeek.com/geektoys/science/cd32/> as of November 27, 2009 and can be found at <https://web.archive.org/web/20091127080602/http://www.thinkgeek.com/geektoys/science/cd32/>. Ex. 1007. The declaration in Ex. 1007 shows that this archived webpage reflects the state of this webpage on November 27, 2009.

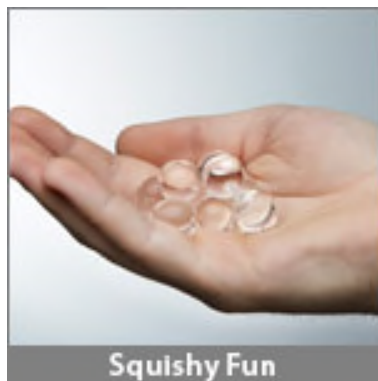
61. As reproduced by archive.org, the webpage shown in Ex. 1007 has a blank spot that, if one hovers one's mouse over it, indicates it contained a zoomable picture at <http://www.thinkgeek.com/geektoys/science/cd32/zoom/>. Clicking on that blank space results in the webpage at <http://www.thinkgeek.com/geektoys/science/cd32/zoom/> that as of November 28, 2009 can be found at <https://web.archive.org/web/20091128071922/http://www.thinkgeek.com/geektoys/science/cd32/zoom/>. Ex. 1009. The declaration in Ex. 1009 shows that this archived webpage reflects the state of this webpage on November 28, 2009.

62. My understanding is that because both webpages were accessible at the same time, were linked together, and were put forth by the same party,

thinkgeek.com, they can be treated as one publication. Accordingly, these two webpages, Exs. 1007, 1009, are together (collectively “DuneCraft”) prior art to the 282 patent under 35 U.S.C. §102(a).

63. DuneCraft explains that “Spitballs start out as tiny balls and expand 200 times when stuck in water.” Ex. 1007. After hydration, “[t]hey are slimy and squishy.” *Id.* DuneCraft also says that the spit balls “[w]ill bounce and/or explode into mushy parts on impact (depending on the force you throw them).” *Id.* And DuneCraft states that the balls are “spherical polymers.” *Id.* “Spitballs grow to about 0.6" in diameter (the longer they absorb water, the bigger they grow).” *Id.*

64. DuneCraft also shows multiple spit balls in a person’s hand and a bowl of spit balls, Ex. 1007, as reproduced below:



65. The picture of the Spit Balls product packaging shows both un-hydrated balls (in plastic, lower middle), the hydrated balls (picture on packaging, bottom left, and in front of the packaging, bottom right) (Ex. 1009):



66. The Spit Balls product packaging also says that the balls “grow[] [to] 200x their size,” that they “slip, slide, bounce, and explode,” and that they are “fun to throw.” The package also shows a background cartoon with a child using a cylindrical tube to launch a Spit Ball. Ex. 1009. DuneCraft also shows a projectile

launcher in the form of a cylindrical tube, shown on the packaging in background cartoon with a child using it to launch a Spit Ball. Ex. 1009. The child's blue eyes are at the top of the image with her or his nose between them and a hand in front of the nose. The hand is holding a white Spit Ball projectile launching tube to the child's mouth. And shown immediately behind the plastic containing the Spit Balls, the tube launches a cartoon spit ball.

B. U.S. Patent No. 5,241,944 (“Rappaport”) (Ex.1006)

67. U.S. Patent No. 5,241,944 to Rappaport (“Rappaport”) was filed on August 24, 1992, and issued on September 7, 1993. Ex. 1006 at Face. Accordingly, Rappaport is prior art to the 282 Patent pursuant to 35 U.S.C. § 102(b).

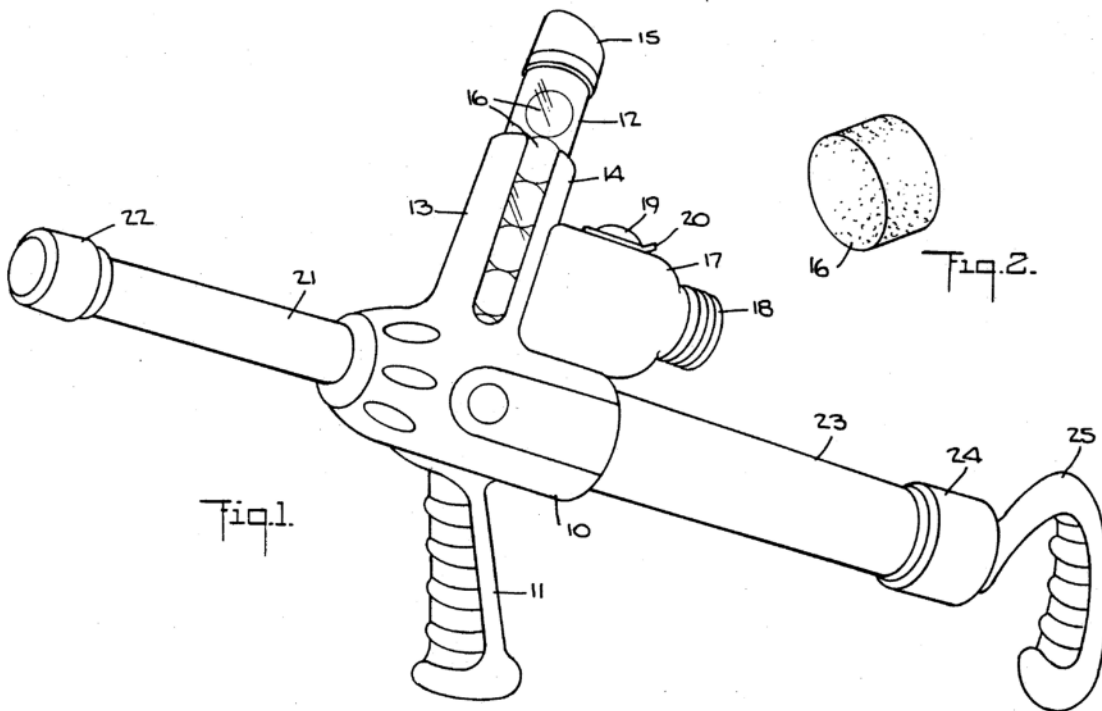
68. Rappaport describes “a toy gun adapted to shoot out innocuous soft pellets formed of flexible foam plastic material impregnated with water, so that an individual struck by the pellet is made wet thereby.” Ex. 1006, 1:9-12. This is intended to “combin[e] the advantages of those toy weapons which fire dry missiles and those which only shoot out water.” Ex. 1006, 2: 6-9.

69. Rappaport's toy gun fires missiles or pellets where “each pellet is constituted by a small, drum-shaped body of sponge like material. The pellets may be formed of flexible foam plastic material, such as polyurethane of the open cell type or cellulosic or other material having sponge like properties capable of absorbing water or other liquids.” Ex. 1006, 3:28-34. In addition, “[t]he pellets

may be in any usable form and need not be drum-shaped as shown.” *Id.*, 5:6-7.

Rappaport also discusses a prior art patent that shoots “soft balls of flexible, foam plastic material.” *Id.*, 1:42-54.

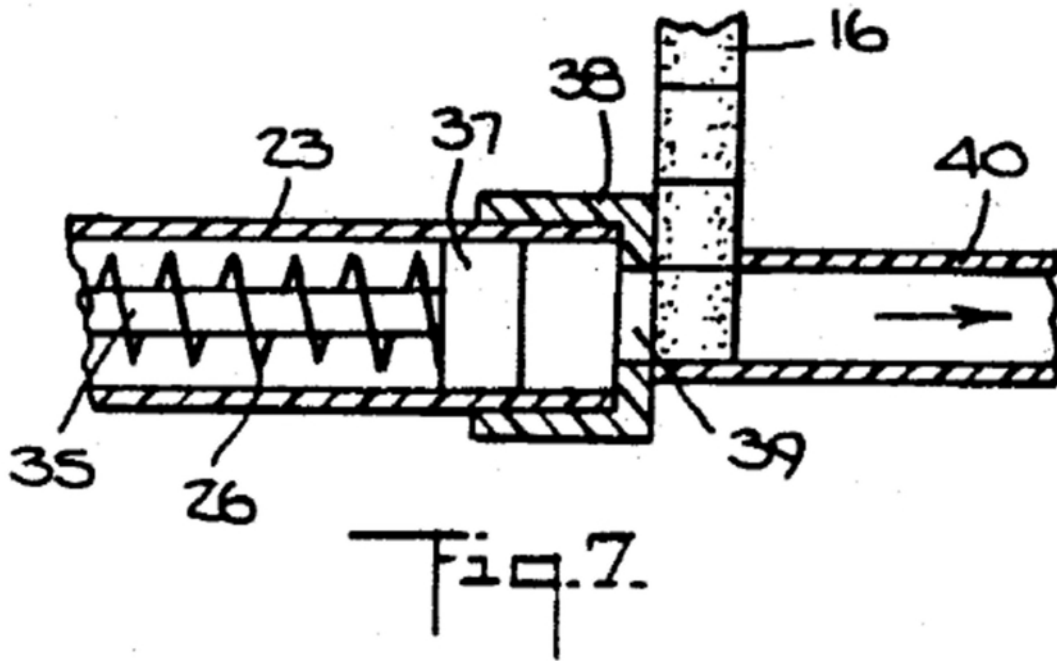
70. Rappaport describes using a cartridge to avoid having to reload the toy gun “each time a missile is fired, for the gun includes a cartridge loaded with a stack of soft, wet missiles; and when a missile is fired from a launching chamber, another missile drops into the chamber in readiness to be fired.” *Id.*, 2:14-19. “The gun includes a launching chamber 10 having attached to its underside a hand grip 11. Mounted vertically above chamber 10 is a gravity-feed cartridge 12 formed of transparent plastic material to expose the pellets loaded therein.” *Id.*, 3:16-20. The cartridge is shown as element 12 on Figure 1:



71. Rappaport's first embodiment uses a "launching bolt" to directly push the projectiles to launch them: "[w]hen, however, a player pulls out handle 25 so that spring 36 is then compressed as the piston assembly is shifted to a retracted position adjacent the rear end of cylinder 23, then launching bolt 31 is retracted, as shown in FIG. 3, to clear the launching chamber to allow the lowermost wet pellet in the cartridge stack to drop into the chamber. ... When the player then releases handle 25, the piston assembly is urged by the expanding spring toward the front end of cylinder 23, and the launching bolt at high velocity drives the wet pellet then in the launching chamber through barrel 21." Ex. 1006, 4:12-26.

72. Rappaport's second embodiment uses air pressure to launch missiles: "as the piston advances, it compresses the air between the piston and a cap 38 attached to the front end of cylinder 23. Cap 38 is provided with a central air port 39 which is blocked by the lowermost wet pellet 16 dropped from the cartridge into the launching chamber. A barrel 40 is coupled to the output of this chamber. When, therefore, the handle of the weapon is pulled back by the player to retract piston 37 and in doing so compresses spring 36, and the handle is then released, the piston is advanced at a high velocity by the expanding spray toward front end collar 38. The advancing piston abruptly compresses the air between the piston and the wet pellet blocking air port 39 in collar 38. The resultant pulse of compressed air acts to propel pellet 16 through barrel 40 from which it is discharged. When a

pulse of air fires the lowermost pellet, the next pellet in the stack drops into place in the launching chamber.” *Id.*, 5:30-47. Figure 7 shows this embodiment:



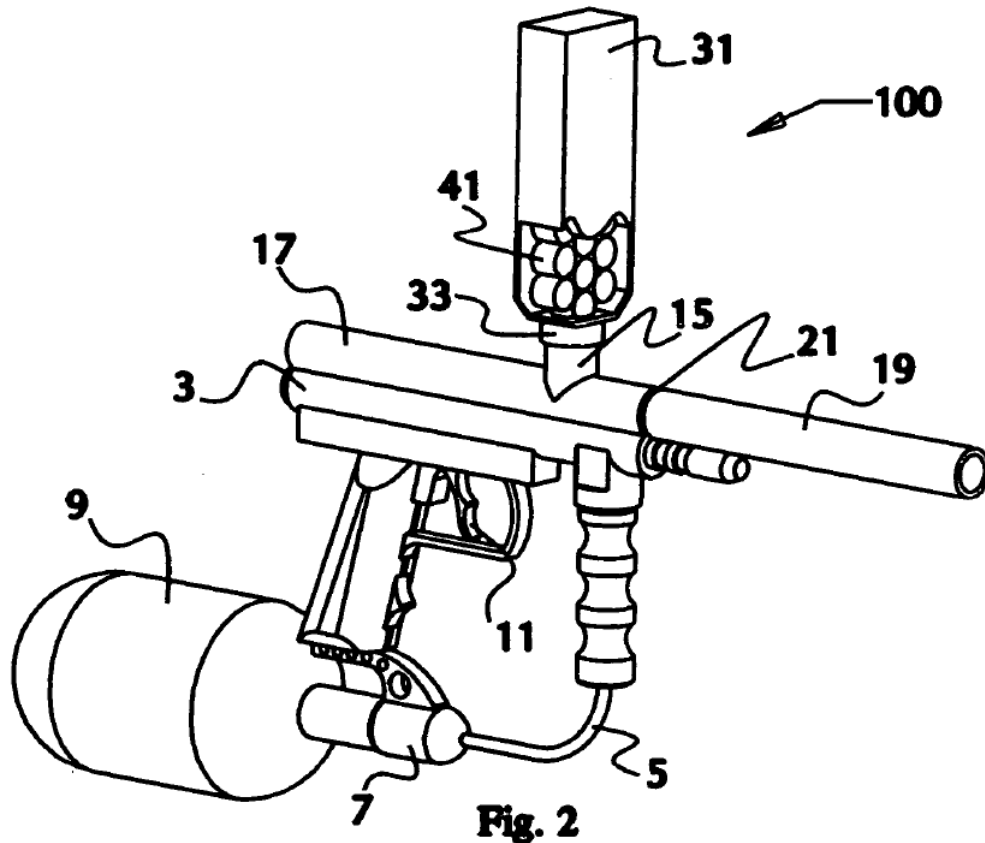
C. U.S. Patent Application 2006/0180134A1 to Illuzzi (“Illuzzi”) (Ex. 1011)

73. U.S. Patent Application 2006/0180134A1 to Illuzzi (“Illuzzi”) published on August 17, 2006 from an application filed on February 11, 2005. Ex. 1011, Face. Illuzzi is prior art to the 282 Patent under 35 U.S.C. §102(b).

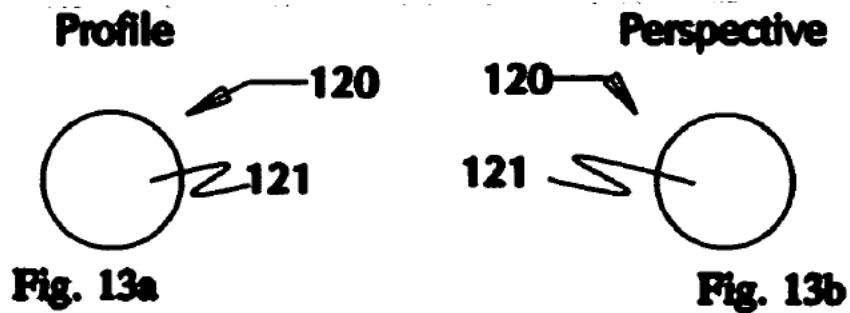
74. Illuzzi describes “a combination solid projectile and paintball gun. It includes a main housing, a trigger, a barrel, a first projectile port, a second projectile port, means for opening and closing the ports, and an adapter for attachment to the gun for feeding and firing solid projectiles. By ‘solid’ is meant having no liquid, and includes dense, hard materials as well as soft porous

materials. These solid projectiles could be foam, plastic, cork, wood, or other material or combinations thereof.” Ex. 1011, ¶0017. Illuzzi also discloses “soft” projectiles: “The combination soft projectile and paintball gun of the present invention includes...” Ex. 1011, ¶0023.

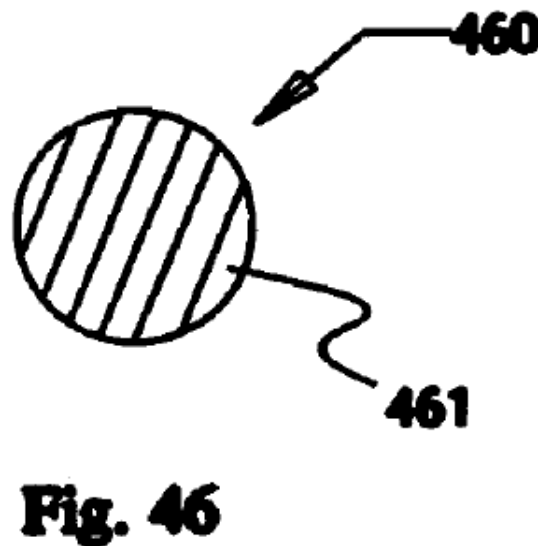
75. Illuzzi’s paintball gun is shown in Figure 2 (reproduced below), where the “combination solid projectile and paintball projectile gun 100 includes most of the functional features at the prior art gun 1 of FIG. 1, except that hopper 13 has been removed and adapter housing 31 with attachment means 33 has been attached in its place. Adapter housing 31 contains a plurality of solid projectiles 41 that are fed by gravity individually into paintball feeder port 15 and are subsequently fired with trigger 11 using the force of a compressed gas source 9.” Ex. 1011, ¶0053.



76. Illuzzi discloses several shapes for its “liquid-free projectile 120,” including spherical. Ex. 1011, ¶0024 (“The magazine may contain a plurality of liquid-free projectiles having a shape selected from the group consisting of bullet-shaped, spherical, elliptical, disc-shaped and cylindrical.”). “FIG. 13a shows a side (profile) view of a present invention liquid-free projectile 120, and FIG. 13b shows a perspective view thereof. It has a spherical front view and a spherical side view surface 121, and is indeed a sphere.” Ex. 1011, ¶0067. These figures are reproduced below:



77. Illuzzi also discloses single material projectiles: "FIG. 46 illustrates a cut view of a projectile 460 having a construction of a single material 461." Ex. 1011, ¶0091.



78. And Illuzzi discloses that the single material in Figure 46 can be a polymer. Ex. 1011, ¶0095, Table:

FIGURE	ITEM	MATERIAL
34	341	Polymer
35	351	Rubber
35	353	Metal
36	361	Foam
36	363	Wood
37	371	Polymer
37	375	Ceramic
38	381	Cork
38	385	Metal
39	391	Wood
39	397	Polymer
40	401	Foam
40	403	Metal
40	407	Ceramic
41	411	Wood
41	413	Ceramic
41	415	Rubber
42	421	Metal
42	423	Polymer
43	431	Rubber
43	433	Cork
43	437	Ceramic
44	441	Metal
44	443	Polymer
44	445	Rubber
45	451	Foam
45	455	Ceramic
45	457	Polymer
45	459	Metal
46	461	Polymer
47	471	Foam
47	473	Metal
48	481	Ceramic
48	483	Cork
48	485	Metal
49	491	Rubber
49	493	Cork
49	495	Polymer
49	497	Metal

V. COMPARISON OF THE PRIOR ART TO THE CLAIMS OF THE 282 PATENT

A. Summary of Analysis

79. Provided below is a summary of my analysis of claims 1-21 of the 282 Patent:

Claims	Conclusion
Claims 1, 4-6	Anticipated by DuneCraft, Exs. 1007 and 1009.
Claims 2-3, 7-14, 16-21	Obvious to one of skill in the art over U.S. Patent 5,241,944 (“Rappaport”) (Ex. 1006) in view of DuneCraft.
Claims 8 and 15	Obvious to one of skill in the art over U.S. Patent Application 2006/0180134A1 (“Illuzzi”) (Ex. 1011) in view of DuneCraft.

B. Ground 1: Claims 1, 4-6 Are Anticipated by DuneCraft

80. As explained below, DuneCraft discloses every element of claims 1 and 4-6 of the 282 patent. Consequently, DuneCraft anticipates these claims.

1. Claim 1

a) [1A] Preamble

81. Assuming for purposes of this Petition that the preamble is limiting, claim 1 recites “Ammunition configured for use with a projectile launcher comprising.” DuneCraft discloses “ammunition” configured for use with a projectile launcher.

82. The specification describes a projectile launcher broadly, noting that a “projection device 10 can be a bow, crossbow, sling shot, handgun, machine gun, futuristic weapon, catapult, or shaped as any other type of weaponry.” Ex. 1001, 4:67-5:3. The 282 patent also explains that a “projection device” is the same as a “projectile launcher”: “projection device 10, which in the present embodiment is a projectile launching toy.” Ex. 1001, 4:61-62; also 6:28-29, 7:57-58.

83. DuneCraft discloses a “projectile launcher.” DuneCraft describes using the disclosed balls as “Spitballs,” and says that “you flung awesome spherical polymers at your friends and/or coworkers.” Ex. 1007. DuneCraft also discloses that one can “throw-em.” *Id.* And DuneCraft says on its packaging that the Spit Balls are “fun to throw.” Ex. 1009. Spit Balls are thus “projectiles.” One of skill in the art would understand that throwing a Spit Ball requires a “projectile launcher” in the form of a hand and arm, especially in view of the specification’s broad definition of “projectile launcher.”

84. The DuneCraft Spit Balls’ packaging shows a cartoon child using a cylindrical tube to shoot spitballs, reproduced below. Ex. 1009. The child’s blue eyes are at the top of the image with her or his nose between them and a hand in front of the nose. The hand is holding a white tube to the child’s mouth. And shown immediately behind the plastic containing the Spit Balls, the tube has a cartoon spit ball being launched.



Spit Balls are thus “projectiles,” and this tube is a “projectile launcher,” especially in view of the specification’s broad definition of “projectile launcher,” where the projectiles are the Spit Balls.

85. DuneCraft discloses “ammunition configured for use” with this “projectile launcher.” DuneCraft discloses “Spitballs.” Ex. 1007. DuneCraft discloses throwing and flinging the Spitballs, which are according configured for use with a human hand and arm as a launcher. Moreover, DuneCraft discloses a cartoon spit ball tube on its packaging. One of skill in the art, and even a primary school student, would know that “spit balls” are intended and configured to be

used with such a spitball tube and are therefore configured for use with a “projectile launcher.”

86. Accordingly, DuneCraft discloses the preamble.

b) [1B] - “a plurality of soft-projectiles having the same shape, each soft projectile being formed from hydrated super absorbent polymer.”

87. Claim 1 recites: “a plurality of soft-projectiles having the same shape, each soft projectile being formed from hydrated super absorbent polymer.”

DuneCraft discloses this element.

88. First, DuneCraft discloses a “plurality” of projectiles “having the same shape.” DuneCraft discloses using more than one—i.e., a plurality of projectiles—including a picture of multiple, same shape Spit Balls at the bottom left and right corners of the picture of the packaging. Ex. 1009. DuneCraft also shows a bowl of same shape spit balls and multiple same shape spit balls in a hand. Ex. 1007. DuneCraft also discusses Spit Balls in the plural. Ex. 1007 (“Spitballs start off as small hard little spheres”). Therefore, one of skill in the art would understand that this reference discloses “a plurality of” soft-projectiles “having the same shape.”

89. Second, DuneCraft discloses “soft-projectiles.” DuneCraft discloses that the Spit Balls are made from “polymers” and “expand 200 times when stuck in water.” Ex. 1007. The reference also discloses that the spit balls “are slimy and

squishy.” Ex. 1007. “Squishy” tells one of skill in the art that the spit balls are soft. DuneCraft also shows the original, unexpanded size of the Spit Balls. Ex. 1009. One of skill in the art would know that adding water and expanding a polymer to 200x its original size will result in a “soft” projectile. And DuneCraft discloses that these balls are “projectiles” for the reasons discussed for Element 1A. Accordingly, DuneCraft discloses “soft-projectiles.”

90. Third, DuneCraft discloses that each of the “soft-projectiles” is “formed from hydrated super absorbent polymer.” DuneCraft discloses that the spit balls are made from “spherical polymers” that “start out as tiny balls and expand 200 times when stuck in water.” Ex. 1007. The package also says that each spit ball “grows 200x their size.” Ex. 1009. Expanding in “water” shows that the spit balls are “hydrated.” The disclosure of “polymers” discloses that the spit balls are made of polymer. And one of skill in the art would understand that only a “super absorbent polymer” would “expand 200 times when stuck in water,” which is an “extremely large amount of liquid relative to its own mass” and which is consistent with the ordinary meaning of “super absorbent polymer.” Accordingly, DuneCraft discloses “each soft projectile being formed from hydrated super absorbent polymer.”

* * *

91. As described above, DuneCraft discloses every limitation of claim 1 and therefore anticipates it.

2. Claim 4 – “wherein the soft-projectiles are substantially spherical”

92. Claim 4 adds to claim 1 “wherein the soft-projectiles are substantially spherical.” In addition to the limitations of claim 1 as described above, DuneCraft discloses the limitation added by this dependent claim.

93. DuneCraft shows “substantially spherical” soft-projectiles, as shown on the figure to the right from Ex. 1007. Ex. 1009 also shows spherical Spit Balls, one relevant portion reproduced below. Ex. 1009. DuneCraft also says that the Spit Balls are “spherical polymers.” Ex. 1007. DuneCraft therefore discloses “substantially spherical” soft-projectiles.



(from Ex. 1009)

94. DuneCraft therefore anticipates claim 4.

3. Claim 5 – “wherein the soft-projectiles have a diameter of less than about 10 millimeters”

95. Claim 5 adds to claim 4 “wherein the soft-projectiles have a diameter of less than about 10 millimeters.” In addition to the limitations of claim 4 as described above, DuneCraft discloses the limitation added by this dependent claim.

96. DuneCraft discloses that “Spitballs start out as tiny balls” and “Spitballs grow to about 0.6” in diameter (the longer they absorb water, the bigger they grow).” Ex. 1007. 0.6 inches is about 15 mm. Although 0.6”/15 mm is greater than 10 mm, DuneCraft explains that 0.6” is the maximum diameter (“grow to about 0.6”), and if left in water for a shorter time, the Spit Balls will be smaller—“the longer they absorb water, the bigger they grow.” Given that the spit balls start “tiny” and can be as big as 15 mm, they necessarily go through a stage where their diameter is “less than about 10 millimeters.” And if removed from water at that time, they would stay at that size unless put back in water or allowed to dehydrate.

97. DuneCraft therefore anticipates claim 5.

4. Claim 6 – “wherein the soft-projectiles have a diameter greater than about 4 mm and less than about 9 mm”

98. Claim 5 adds to claim 4 “wherein the soft-projectiles have a diameter greater than about 4 mm and less than about 9 mm.” In addition to the limitations of claim 4 as described above, DuneCraft discloses the limitation added by this dependent claim.

99. As explained above for claim 5, given that the DuneCraft spit balls start “tiny” and can grow as big as 15 mm, they necessarily go through a stage where their diameter is “greater than about 4 mm and less than about 9 mm.” And if removed from water at that time, they would stay at that size unless put back in water or allowed to dehydrate.

100. DuneCraft therefore anticipates claim 6.

C. Ground 2: Claims 2-3, 7-14, 16-21 Are Unpatentable as Obvious Over Rappaport in View of DuneCraft

101. The combination of Rappaport and DuneCraft discloses all of the elements of claims 2-3, 7-14, 16-21. Rappaport discloses all of the elements of these claims except those relating to a projectile made of “super absorbent polymer.” DuneCraft discloses that element via its Spit Balls. As explained below, one of skill in the art at the time of the alleged invention would know to use DuneCraft’s Spit Balls in Rappaport’s gun. For these reasons, claims 2-3, 7-14, 16-21 are obvious over Rappaport in view of DuneCraft.

1. One of Skill in The Art Would Combine Rappaport with DuneCraft

102. One of skill in the art would combine the toy gun in Rappaport with the super absorbent polymer balls disclosed in DuneCraft by substituting the “flexible foam plastic material, such as polyurethane of the open cell type or cellulosic or other material having sponge like properties capable of absorbing

water or other liquids” used for Rappaport’s projectiles with the super absorbent polymer balls disclosed in DuneCraft. The state of the art at the time of the invention shows that one of skill in the art would have known to modify Rappaport by combining it with the DuneCraft Spit Balls to arrive at the claimed invention.

a) The State of the Art and the Knowledge of One of Skill in the Art at the Time of the Invention

103. Contemporaneous evidence shows that one of skill in the art would have been motivated to use DuneCraft’s super absorbent balls in Rappaport’s gun. Safety issues would motivate one of skill in the art to replace DuneCraft’s spit ball launching tube with a toy gun. At about the same time as the alleged invention in the 282 patent, other inventors also used gels and super absorbents as projectiles, including in toy guns.

104. One of skill in the art would be motivated to replace the launchers disclosed in DuneCraft with toy guns such as those disclosed in Rappaport and Illuzzi to solve a serious safety problem present in the launchers disclosed in DuneCraft. DuneCraft discloses projectile launchers that rely on the user’s breath to project the super absorbent polymer projectile. In particular, DuneCraft shows a tube used in a common way to shoot spit balls. As is well known in the art, spit balls are put into a tube and the user inhales and blows hard on the end of the tube to project the spit ball towards its intended target. The packaging of the DuneCraft

Spit Balls shows a cartoon version of such a tube and a child blowing on the end of it to project a DuneCraft Spit Ball:



105. The risk with the DuneCraft projectile launcher tube is that the user, who is usually a child, inhales with their mouth on the blow tube rather than inhaling before placing their mouth on the end of the tube. Inhaling while one's mouth is on the tube risks inhaling the super absorbent polymer projectile, which was previously loaded into the end of the tube. Inhaling these projectiles could

damage a child's (or adult's) airway and lungs. In particular, unless fully hydrated (i.e., so it will accept no more water), the super absorbent projectile may absorb additional water from the child's body and increase in size. This can cause serious medical issues. Even if it does not increase in size, having an object the size of one of the DuneCraft Spit Balls in a child's lung could cause medical problems and may need medical intervention.

106. In addition, even if the super absorbent projectile only goes as far as the child's mouth, a child may either accidentally or on purpose swallow the super absorbent projectile rather than removing it from her or his mouth. Moreover, DuneCraft's super absorbent polymer spit balls are not sterile and having them in a child's mouth allows germs to enter that child's body. And ingesting a super absorbent projectile like these can lead to serious medical issues. As described above, these projectiles can increase in size in the child's digestive system and become lodged in place or block that system. Here too, medical intervention might be needed. Indeed, children who had serious medical issues from ingesting super absorbent polymer toys caused a recall of a super absorbent toy. *See e.g.*, Ex. 1022.

107. One of skill in the art would understand these safety problems with the breath-based launchers in super absorbent prior art and seek to improve on their projectile systems. Such a person of skill in the art would be aware of guns, and in particular, toy guns, that could replace the breath-based launchers and that

could shoot the super absorbent balls from DuneCraft via a toy gun rather than using a child's breath. Using a toy gun with a projection mechanism such as a spring eliminates the need for a child to blow into a tube to shoot the super absorbent polymer projectile, thereby increasing the safety of the DuneCraft super absorbent polymer projectiles.

108. Indeed, one of skill in the art would recognize safety as a major issue for toys, particular projectile toys, and seek to improve the safety of the launchers of the super absorbent polymer Spit Balls. Rappaport stresses safety. See e.g., Rappaport, 1:19-20 ("for in toys, safety is a primary consideration"); also 2:20-21. Thus, the need to protect children by improving the safety of the super absorbent polymer projectile launchers in DuneCraft would motivate one of skill in the art to use the projectile launchers in Rappaport and Illuzzi with the super absorbent polymer projectiles disclosed in DuneCraft.

109. One of skill in the art would know to use the super absorbent polymers disclosed in DuneCraft as ammunition for guns and in particular for toy guns. Several contemporaneous references show others using such ammunition in guns before or slightly after the alleged conception date and the filing date.

110. KR20100004855U (the "Kim application"), published May 11, 2010 but with a Korean filing date of November 1, 2008, discloses, as its title says, Toy bullets formed of gel or gel material. Ex. 1013. Element 22 is identified as "gel or

gel bullet.” Ex. 1013, [0038]. One of skill in the art would know that a “gel or gel bullet” would be soft, a conclusion consistent with the Kim application’s explanation that “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.” *Id.* at [0003]. Indeed, these safety concerns are the same rationale given in Rappaport and in the 282 patent’s specification. Ex. 1006, 1:13-20 (“Toy weapons which simulate actual weapons have always been popular with children, for children seek to emulate the activity of adults. However, those weapons which act to shoot out a missile capable of inflicting even slight injury on an individual struck by the missile are not acceptable; for in toys, safety is a primary consideration.”); *also* 2:20-21 (“an object of this invention is to provide a toy gun of the above type which is safe to use”); Ex. 1001, 3:3-6 (“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.”).

111. Although the Kim application is not pre-AIA prior art, it nonetheless demonstrates the state of the art at the time of the 282 patent’s alleged invention. The Kim application was filed in 2008, long before the 2010 invention date of the 282 patent and is thus evidence that those of skill in the art at the time of the alleged invention of the 282 patent had already thought of using soft, gel pellets

like DuneCraft's in a toy gun and for the same reasons given in Rappaport and in the 282 patent.

112. Other contemporaneous references also show that people of skill in the art were thinking of the same combination that this ground asserts, *i.e.*, putting super absorbent polymer balls into a gun. A website at <https://www.aaroncake.net/spuds/things.asp> ("Cake") (Ex. 1014) also shows that people of skill in the art knew to use super absorbent polymer in projectile launchers before the priority date of the 282 patent. Cake is prior art under 35 U.S.C. §102(b), having published on the internet on or before February 6, 2009, proof of which can be found at <https://web.archive.org/web/20090206231446/https://www.aaroncake.net/spuds/things.asp> with a copy of that webpage and a declaration from archive.org in Ex. 1014.

113. Cake states that "There are a lot of things you can shoot in your spudgun besides potatoes. Here are a few you might want to try:" and lists "Wet Diaper": "First find an un-used diaper and cut a hole in the middle of it. Shake out all of that fluffy stuff into a bowl, add a lot of water and the stuff soaks it up. Put this gel-like stuff in a small cup and drop it in your gun. Good to have fights with." Ex. 1014 at 3. The "fluffy stuff" in a diaper at that time would be a super absorbent polymer. Cake shows that people of skill in the art knew to use super absorbent

polymer as ammunition in a gun before the alleged invention underlying the 282 patent.

114. In addition to the Kim application and Cake, which evidence the state of the art before the filing date of the 282 patent, I understand that evidence from slightly after the filing date is also relevant to the state of the art and whether one of skill in the art would know to combine Rappaport and DuneCraft by using the DuneCraft balls as projectiles in the Rappaport gun.

115. Although Carlson, U.S. Patent No. 8,584,589 (“Carlson”) (Ex. 1016) was filed on October 6, 2010, about five months after the 282 patent, it discloses such a simultaneous invention and is therefore evidence of the contemporaneous knowledge of one of skill in the art. Carlson’s “invention relates to [] toy projectiles” (1:13) with a “projectile 100.” Carlson describes this projectile as “molded and dehydrated into a projectile shape to form the dehydrated, pulp-based projectile. In operation, the pulp-based projectile can be positioned within the bullet chamber (e.g., gun clip) of a toy gun and then rehydrated. For example, the toy gun or bullet chamber can be dipped in water, which would cause the projectile to absorb the water, soften, and expand. An advantage to being pulp based is that the projectile is more solid and smaller than foam and, as such, generally shoots straighter and further than foam.” Ex. 1016, 1:66-2:9. Carlson also discloses that “projectile 100” can be “formed in a variety of shapes, non-limiting examples of

which include being round” and made of “a rice-based material, 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. 1016, 3:53-56. One of skill in the art would know that “a hydro-polymer (similar to the absorbent polymer material used in a diaper)” refers to a hydrated super absorbent polymer because in 2010, diapers used super absorbents and because a “hydrated super absorbent polymer” is a “hydro-polymer.” Carlson also discusses safety concerns and the intention for its projectile to “increase safety.” Ex. 1016, 1:61.

116. Carlson shows the general level of knowledge in the art at the time of the invention and that one of skill in the art would have known to use a round super absorbent polymer projectile in a toy gun. Carlson also shows that the state of the art at the time of the invention included a “projectile [that] is more solid and smaller than foam and, as such, generally shoots straighter and further than foam” that would tell one of skill in the art that a super absorbent polymer projectile like DuneCraft would work in a toy gun. Ex. 1016, 2:7-9. Carlson is therefore further evidence that a knowledgeable person would know and be motivated to use DuneCraft’s super absorbent polymer balls in Rappaport’s toy gun.

117. Carlson, Cake, and the Kim application individually and collectively demonstrate that one of skill in the art at the time of the alleged invention would have had the knowledge of using gel and super absorbent balls as projectiles for

guns and thus been motivated to combine Rappaport and DuneCraft to use DuneCraft's super absorbent polymer balls as projectiles in Rappaport's gun. Indeed, DuneCraft's Spit Balls solve the same safety problem that Rappaport was trying solve. Others such as Carlson and the Kim application also explain that they used gel and super absorbent balls to solve this same safety problem and in guns. And importantly, Carlson and Cake show that one of skill in the art would already be aware of the claimed combination—using a super absorbent polymer projectile in a toy gun.

b) Combining Rappaport's Toy Gun with DuneCraft's Spit Balls Combines Prior Art Elements in a Known Manner to Yield Predictable Results

118. As the above evidence shows, combining Rappaport's toy gun with DuneCraft's Spit Balls combines prior art elements in a known manner to yield predictable results. Indeed, other inventors (Carlson and Cake) had done exactly that.

119. In the Rappaport/DuneCraft combination, each element performs the same function that it does separately. DuneCraft discloses Spit Balls that act as projectiles when launched through a tube, and those Spit Balls would act as projectiles when used in Rappaport's toy gun. The function of the DuneCraft Spit Balls does not change. The Rappaport gun also would work exactly the same if its pellets "formed of flexible foam plastic material, such as polyurethane of the open

cell type or cellulosic or other material having sponge like properties capable of absorbing water or other liquids” (Ex. 1006, 3:28-34) were substituted with DuneCraft’s super absorbent polymer Spit Balls. Carlson shows that one of skill in the art knew to make that swap: “An advantage to being pulp based is that the projectile 100 is more solid than foam and, as such, generally shoots straighter and further than foam.” Ex. 1016, 4:1-4; 3:53-56 (pulp can be “a hydro-polymer (similar to the absorbent polymer material used in a diaper)”).

120. And one of ordinary skill in the art would have recognized that the results of the Rappaport/DuneCraft combination were predictable. The evidence discussed above, Carlson, Cake, and the Kim application, shows that at the time of the alleged invention, those of skill in the art were using guns with polymer gel as projectiles and even were using super absorbent polymer projectiles. It was therefore predictable that putting DuneCraft’s super absorbent polymer Spit Balls in Rappaport’s gun would yield a working gun.

c) Substituting DuneCraft’s Spit Balls for the Pellets in Rappaport’s Gun Yields Predictable Results

121. Combining Rappaport’s toy gun with DuneCraft’s Spit Balls requires only a simple substitution of one known element for another to obtain predictable results.

122. Rappaport’s hydrated, soft pellets “may be formed of flexible foam plastic material, such as polyurethane of the open cell type or cellulosic or other

material having sponge like properties capable of absorbing water or other liquids.” Ex. 1006, 3:28-34. DuneCraft describes Spit Balls that have absorbed water sufficient to increase their size up to 200 times and that are “squishy.” Ex. 1007, 1009. These balls “grow to about 0.6” in diameter” (Ex. 1007) and thus the size of toy ammunition. Carlson shows that one of skill in the art knew to make that swap and that the results were predictable: “An advantage to being pulp based is that the projectile 100 is more solid than foam and, as such, generally shoots straighter and further than foam.” Ex. 1016, 4:1-4; 3:53-56 (pulp can be “a hydro-polymer (similar to the absorbent polymer material used in a diaper)”). Carlson, Cake, and the Kim Application show that one of skill in the art would have known to use gel polymer balls in guns, including super absorbent polymers, making those known materials for projectiles. *See* Ex. 1013, 1014, 1016.

123. Rappaport differs from the claims in this ground only in that it does not use a projectile made of “super” absorbent polymer (although its projectile is “soft,” “absorbent,” “polymer,” and “hydrated”). The combination sought is simply to substitute DuneCraft’s super absorbent polymer balls for Rappaport’s “sponge like” polymer pellets.

124. Both types of ammunition and using them in projectile launchers were known in the art as shown by Rappaport and DuneCraft, as well as Carlson, Cake, and the Kim application. One of skill in the art would have known to substitute one

known element—DuneCraft’s super absorbent polymer balls—for another known element—Rappaport’s “sponge like” pellets—and the results of the substitution would have been predictable, as demonstrated by Carlson, Cake, and the Kim application.

**d) Using DuneCraft’s Spit Balls in Rappaport’s Gun
Applies a Known Technique to a Known Device
Ready for Improvement to Yield Predictable Results**

125. Using DuneCraft’s Spit Balls in Rappaport’s gun applies a known technique to a known device ready for improvement to yield predictable results. Rappaport describes projectiles made of non-environmentally friendly materials that would either have to be collected after being shot from the toy gun or left at risk to the environment. One of ordinary skill in the art could have applied the known technique of using super absorbent projectiles to a known device, Rappaport’s gun, to improve that gun and make it shoot environmentally friendly ammunition. And the results of making this improvement would have been predictable to one of ordinary skill in the art.

126. Using polymer and super absorbent polymer ammunition in the form of the DuneCraft super absorbent polymer balls was a known technique that would apply to and improve the Rappaport gun, as shown by Carlson, Cake, and the Kim application. Accordingly, the technique of using such materials in guns was recognized as part of the ordinary capabilities of one skilled in the art.

127. Using DuneCraft's ammunition in Rappaport's gun would have resulted in an improved gun with disposable pellets that did not need to be collected and that were biodegradable. One of skill in the art would realize that the child playing with Rappaport's "pellets formed of flexible, foam plastic or other sponge-like material impregnated with water" and pellets "formed of flexible foam plastic material, such as polyurethane of the open cell type or cellulosic or other material having sponge like properties capable of absorbing water or other liquids" would need to collect those pellets after shooting them or risk polluting the environment. Foam plastic and sponge-like material particularly in the form of "polyurethane" do not readily biodegrade. Even if the ammunition was inexpensive enough to replace, non-biodegradable plastics can harm the environment and animals that might eat the pellets. In the environmentally conscience world at the time of the invention of the 282 patent, one of skill in the art would recognize this as a problem with the toy gun described in Rappaport.

128. DuneCraft offers a solution to this problem. The super absorbent polymer projectiles used in DuneCraft are biodegradable. Combining the Rappaport gun with the DuneCraft ammunition leads to a gun that shoots biodegradable pellets. Children playing with the Rappaport gun would no longer need to collect their shot pellets, a likely impossible task, or worry about (and actually harm) the environment. Hence, one of skill in the art would apply the

known improvement of using super absorbent ammunition in Rappaport's gun to improve that gun and make using the gun more fun—by not having to collect the pellets—and better for the environment—because most people would not and could not collect all the pellets.

129. One of ordinary skill in the art would have recognized that applying the known technique of using super absorbent polymer projectiles in a projectile launcher like Rappaport's toy gun would have yielded predictable results and resulted in an improved system. One of skill in the art would know to improve Rappaport's gun by using the super absorbent polymer projectiles in DuneCraft. As explained above, the state of the art at the time of the alleged invention included using gel polymers and super absorbents for projectiles in guns like Rappaport's, making the results of the combination predictable to one of skill in the art. In particular, Carlson shows the predictability of the results of this substitution: "An advantage to being pulp based is that the projectile 100 is more solid than foam and, as such, generally shoots straighter and further than foam." Ex. 1016, 4:1-4; 3:53-56 (pulp can be "a hydro-polymer (similar to the absorbent polymer material used in a diaper)"). In other words, the known technique of using gel or super absorbent projectiles would have predictably led to the use of those projectiles in Rappaport to improve its environmental friendliness. And doing so was accordingly within the skill of one of skill in the art.

* * *

130. For all these reasons, one of skill in the art would know to and be motivated to combine Rappaport with DuneCraft by using the DuneCraft Spit Balls as ammunition in Rappaport's gun. The sections below demonstrate how this combination discloses each element of the claims in this ground.

2. Claim 2 - "wherein the ammunition is disposed within a feed chamber of the projectile launcher."

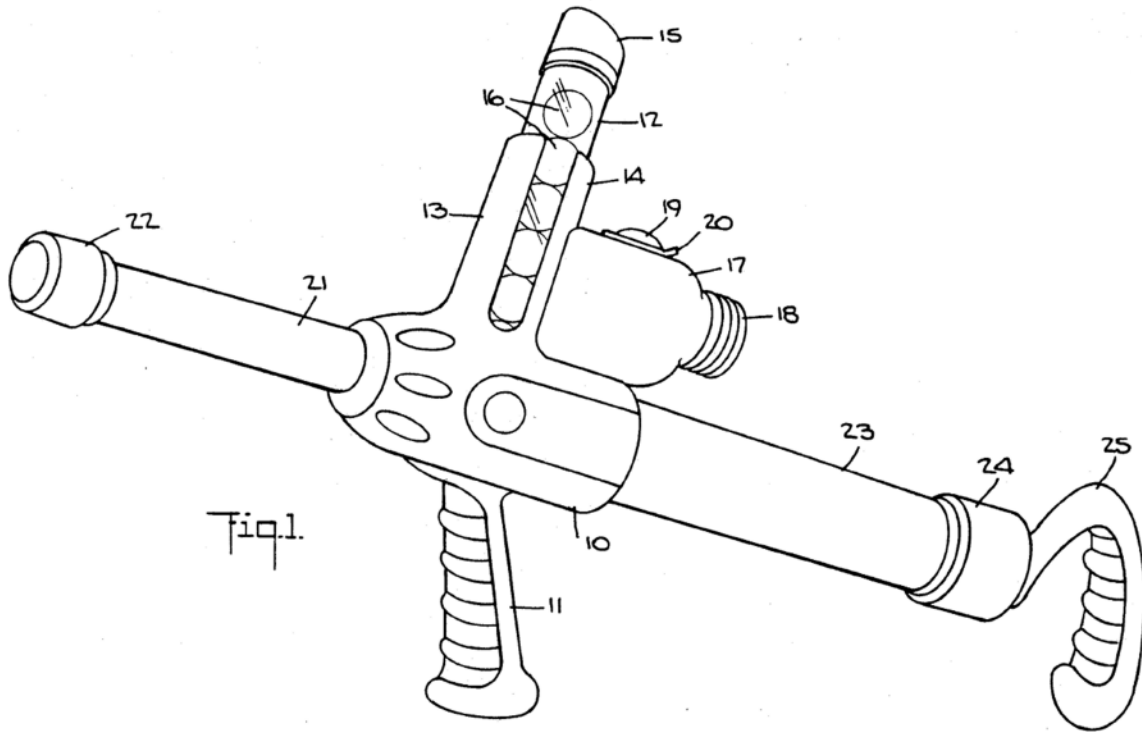
131. Claim 2 adds to claim 1 "wherein the ammunition is disposed within a feed chamber of the projectile launcher." In addition to DuneCraft's disclosure of the limitations of claim 1 as described above, Rappaport discloses this claim's added limitation.

132. Rappaport discloses a "projectile launcher": "an object of this invention is to provide a toy gun which is loaded with a stack of pellets formed of flexible, foam plastic or other sponge-like material impregnated with water, the pellets being successfully fired from the gun." Ex. 1006, 2:9-13. Rappaport's gun is thus a "projectile launcher."

133. The 282 patent defines a "magazine" as "used herein to refer any container that holds super absorbent polymer projectiles for a projectile toy gun or other projectile weaponry." Ex. 1006, 3:30-32. The 282 patent uses the term "feed hopper" interchangeably with "magazine." Ex. 1001, 6:6-11. In making patent infringement allegations against Petitioner, Patent Owner's exclusive licensee has

alleged that a container holding pellets is a “feed chamber.” Ex. 1021 at 22-23, 25-26. Consequently, the “feed chamber” is the “magazine” and its interior, which comprises a chamber.

134. First, Rappaport discloses a “feed chamber” of the “projectile launcher.” Rappaport explains that “[a] significant advantage of the invention is that the toy gun need not be reloaded with a soft missile each time a missile is fired, for the gun includes a cartridge loaded with a stack of soft, wet missiles; and when a missile is fired from a launching chamber, another missile drops into the chamber in readiness to be fired.” Ex. 1006, 2:14-19. Rappaport also explains that “Mounted vertically above chamber 10 is a gravity-feed cartridge 12 formed of transparent plastic material to expose the pellets loaded therein.” Ex. 1006, 3:17-20. Figure 1 shows the cartridge 12 as part of the launcher with the ammunition 16 in the cartridge:



This disclosure shows that the interior of the “cartridge 12,” which is the “feed chamber” of the launcher, holds the ammunition (“missiles”), meaning the ammunition is disposed within that feed chamber.

135. Second, Rappaport discloses that “the ammunition is disposed within a feed chamber.” Rappaport discloses that “the gun includes a cartridge loaded with a stack of soft, wet missiles.” Ex. 1006, 2:16-17. In other words, the interior of the cartridge, the “feed chamber,” has ammunition disposed within it. Rappaport’s ammunition is thus “disposed within a feed chamber of the projectile launcher.”

136. The combination of Rappaport and DuneCraft therefore discloses all the elements of claim 2 and renders it obvious.

3. Claim 3 – “wherein the feed chamber is in selective communication with a barrel of the projectile launcher”

137. Claim 3 adds to claim 2 “wherein the feed chamber is in selective communication with a barrel of the projectile launcher.” The limitations of claim 2 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitation.

138. Rappaport discloses that “the feed chamber is in selective communication with a barrel of the projectile launcher.” According to Rappaport, “[w]hen, however, a player pulls out handle 25 so that spring 36 is then compressed as the piston assembly is shifted to a retracted position adjacent the rear end of cylinder 23, then launching bolt 31 is retracted, as shown in FIG. 3, to clear the launching chamber to allow the lowermost wet pellet in the cartridge stack to drop into the chamber. ... When the player then releases handle 25, the piston assembly is urged by the expanding spring toward the front end of cylinder 23, and the launching bolt at high velocity drives the wet pellet then in the launching chamber through barrel 21.” Ex. 1006, 4:12-26. This disclosure shows that the “feed chamber” is in “selective communication with a barrel of the projectile launcher” because (1) Rappaport’s pellet drops from the cartridge (which has a “feed chamber” as discussed above) into the launching chamber from which the pellet travels to the “barrel,” so the cartridge and its internal “feed chamber” are in communication with the barrel of the gun (the “projectile launcher”); and (2)

the communication is selective because, as shown on Fig. 3, the pellets block the entry to the barrel from the cartridge and the pellets only drop in after the launching chamber is cleared.

139. The combination of Rappaport and DuneCraft therefore discloses all the elements of claim 3 and renders it obvious.

4. Claim 7 – “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”

140. Claim 7 adds to claim 2 “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.” The limitations of claim 2 are disclosed by the combination of Rappaport and DuneCraft as described above, and DuneCraft discloses this claim’s added limitation.

141. DuneCraft discloses that its Spit Balls “Will bounce and/or explode into mushy parts on impact (depending on the force you throw them)” and that “when the war is over, collect all the whole ones and let them dry out.” Ex. 1007. Given that the Spit Balls can be reusable and are intended to explode on impact, if at all, one of skill in the art would know that the Spit Balls do not break apart when launched from the projectile launcher, which can be the spitball tube or the arm/hand using to throw them. Consequently, this disclosure teaches that if one put the DuneCraft Spit Balls in Rappaport’s gun, one would similarly not want

them to explode when launched. One of skill in the art would also know that in designing a toy gun, the projectiles should not break apart when launched from the gun.

142. Claim 7 utilizes functional claiming in that it requires only that the super absorbent in the projectile have “a cross linking density sufficient to prevent the soft-projectiles from breaking apart when launched from the projectile launcher.” In other words, the claim requires only that the super absorbent projectile perform the function of not breaking up and recites no specific levels of cross linking to make that happen. The DuneCraft super absorbent satisfies this limitation because the cross linking density of the DuneCraft polymer is sufficient to prevent the projectile from breaking apart when launched. And one of skill in the art would know from such teaching to use a cross linking density in Rappaport’s gun such that the projectile did not break apart on launch.

143. The combination of Rappaport and DuneCraft therefore disclose all the elements of claim 7 and render it obvious.

5. Claim 8

144. Claim 8 includes the limitations of claim 1 and adds: “A projectile launcher including the ammunition of claim 1 disposed within a feed chamber of the projectile launcher, and wherein the projectile launcher is adapted to load a soft-projectile from the feed chamber to a firing position.” In addition to

DuneCraft's disclosure of the limitations of claim 1 as described above, Rappaport discloses this claim's added limitations.

145. Rappaport discloses a "projectile launcher": "provide a toy gun which is loaded with a stack of pellets formed of flexible, foam plastic or other sponge-like material impregnated with water, the pellets being successfully fired from the gun." Ex. 1006, 2:9-13. Rappaport's gun is a "projectile launcher."

146. DuneCraft discloses the "ammunition of claim 1" in the form of the soft-projectile made from super absorbent polymer disclosed therein, as described above for claim 1. The combination therefore "include[es] the ammunition of claim 1."

147. The ammunition in Rappaport is "disposed within a feed chamber of the projectile launcher": "A significant advantage of the invention is that the toy gun need not be reloaded with a soft missile each time a missile is fired, for the gun includes a cartridge loaded with a stack of soft, wet missiles; and when a missile is fired from a launching chamber, another missile drops into the chamber in readiness to be fired." Ex. 1006, 2:14-19; also 3:17-20. Rappaport's cartridge is the "feed chamber" and as this quote says, the "missile," which is the ammunition, is "disposed" in the "feed chamber"/cartridge of the projectile launcher, which is Rappaport's gun.

148. Rappaport also discloses “wherein the projectile launcher is adapted to load a soft-projectile from the feed chamber to a firing position” by explaining that “another missile drops into the chamber in readiness to be fired” from the cartridge. Ex. 1006, 2:14-19. Thus, Rappaport’s gun is “adapted to load a soft-projectile from the feed chamber to a firing position” by being built to drop the missile from the cartridge into the chamber where it is in position to be fired. *Id.*

149. Accordingly, the combination of Rappaport and DuneCraft discloses all the elements of this claim and therefore renders it obvious.

6. Claim 9 – “wherein the projectile launcher is a toy”

150. Claim 9 adds to claim 8 “wherein the projectile launcher is a toy.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitation.

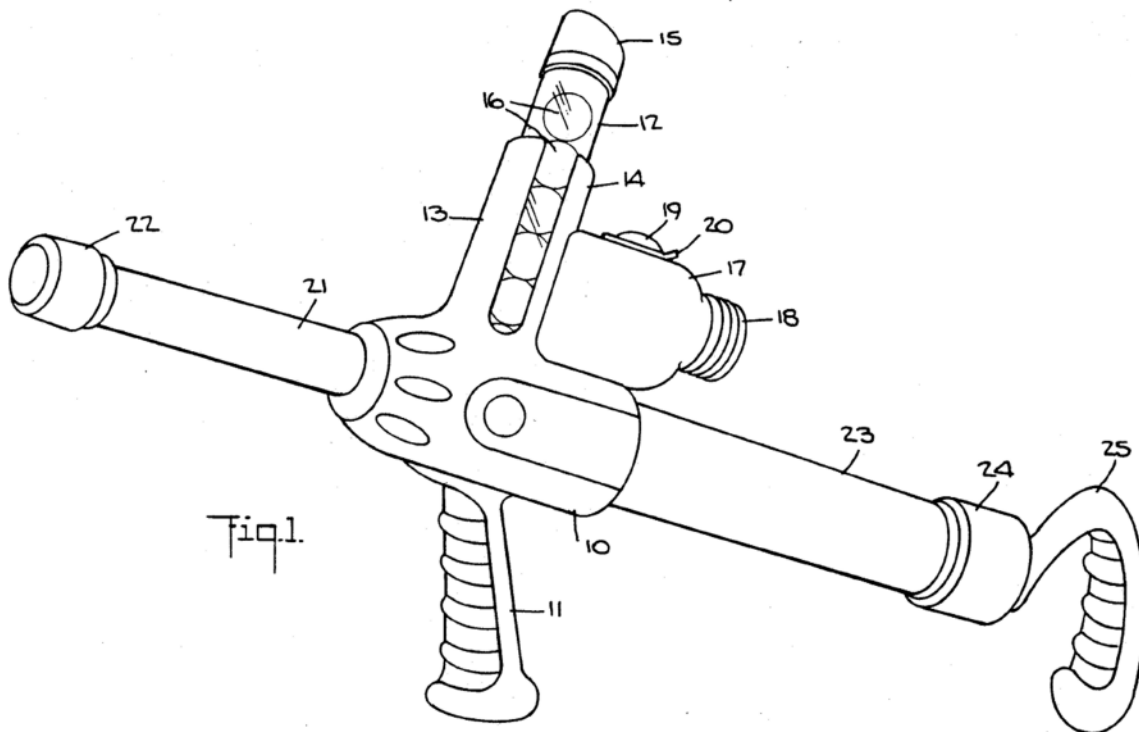
151. Rappaport discloses a toy gun. Rappaport discloses that its “invention relates generally to toy weapons, and more particularly to a toy gun adapted to shoot out innocuous soft pellets...” Ex. 1006, 1:7-9; *see also* 2:3-13, 2:20-22, 3:11-15.

152. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

7. Claim 10 – “wherein the projectile launcher is in the shape of a gun”

153. Claim 10 adds to claim 8 “wherein the projectile launcher is in the shape of a gun.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitation.

154. Rappaport discloses a toy projectile launcher in the shape of a gun. Rappaport discloses that its “invention relates generally to toy weapons, and more particularly to a toy gun adapted to shoot out innocuous soft pellets...” Ex. 1006, 1:7-9; see also 2:3-13, 2:20-22, 3:11-15. In addition, Rappaport’s figures, such as Fig. 1 reproduced below, show that the launcher is in the “shape of a gun.”



155. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

8. Claim 11 – “wherein the feed chamber is provided within a magazine”

156. Claim 11 adds to claim 8 “wherein the feed chamber is provided within a magazine.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitation.

157. The 282 patent defines a “magazine” as “used herein to refer any container that holds super absorbent polymer projectiles for a projectile toy gun or other projectile weaponry.” Ex. 1001, 3:30-32. The 282 patent uses the term “feed hopper” interchangeably with “magazine.” Ex. 1001, 6:6-11. In making patent infringement allegations against Petitioner, Patent Owner’s exclusive licensee has alleged that a container holding pellets is a “feed chamber.” Ex. 1021 at 22-23, 25-26. Consequently, the “feed chamber” “provided within a magazine” is the interior of the magazine.

158. Rappaport discloses “the feed chamber is provided within a magazine.” Rappaport discloses the claimed feed chamber within a magazine that contains the ammunition. “A significant advantage of the invention is that the toy gun need not be reloaded with a soft missile each time a missile is fired, for the gun includes a cartridge loaded with a stack of soft, wet missiles; and when a

missile is fired from a launching chamber, another missile drops into the chamber in readiness to be fired.” Ex. 1006, 2:14-19; *also* 3:17-20. Rappaport’s “cartridge” is the claimed “magazine” in that it is a container that holds the projectiles (i.e., the “missiles”). The interior of that cartridge contains the “missiles” and thus is the feed chamber. Rappaport thus discloses “the feed chamber is provided within a magazine.”

159. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

9. Claim 12 – “wherein the soft-projectiles are substantially spherical”

160. Claim 12 adds to claim 8 “wherein the soft-projectiles are substantially spherical.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and DuneCraft discloses this claim’s added limitation for the same reasons given above for claim 4 of Ground 1.

161. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

10. Claim 13 – “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”

162. Claim 13 adds to claim 8 “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.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and DuneCraft discloses this claim’s added limitation for the same reasons given for claim 7.

163. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

11. Claim 14 – “wherein the projectile launcher is designed to use air pressure to launch the soft-projectiles”

164. Claim 14 adds to claim 8 “wherein the projectile launcher is designed to use air pressure to launch the soft-projectiles.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitations.

165. Rappaport discloses: “[w]hen, therefore, the handle of the weapon is pulled back by the player to retract piston 37 and in doing so compresses spring 36, and the handle is then released, the piston is advanced at a high velocity by the expanding spray toward front end collar 38. The advancing piston abruptly

compresses the air between the piston and the wet pellet blocking air port 39 in collar 38. The resultant pulse of compressed air acts to propel pellet 16 through barrel 40 from which it is discharged. When a pulse of air fires the lowermost pellet, the next pellet in the stack drops into place in the launching chamber.” Ex. 1006, 5:36-47. This quotation describes the toy gun being designed to use air pressure (“a pulse of air”) to launch (“fires”) the soft-projectiles in the form of “pellet 16.” Thus, Rappaport’s gun “is designed to use air pressure to launch the soft-projectiles.”

166. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

12. Claim 16 – “further comprising a firing mechanism that is incapable of storing energy independent of a user”

167. Claim 16 adds to claim 8 “further comprising a firing mechanism that is incapable of storing energy independent of a user.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitation.

168. Rappaport discloses: “to fire this pellet, the player must pull out handle 25 as far as it will go. This action causes launching bolt 31 to clear the launching chamber to permit the lowermost wet pellet in the stack loaded in the gravity feed cartridge to drop into chamber 10, this pellet being then adjacent the tip of the launching bolt. ... The player then releases the handle, causing the

advancing bolt to drive the first pellet through the barrel from which it is discharged. Before releasing the handle, the player aims the barrel at a selected target, so that when the handle is released and the pellet is fired, it is directed toward this target.” Ex. 1006, 4:39-51; *also* 5:37-45 (“When, therefore, the handle of the weapon is pulled back by the player to retract piston 37 and in doing so compresses spring 36, and the handle is then released, the piston is advanced at a high velocity by the expanding spray toward front end collar 38. The advancing piston abruptly compresses the air between the piston and the wet pellet blocking air port 39 in collar 38. The resultant pulse of compressed air acts to propel pellet 16 through barrel 40 from which it is discharged.”). This “firing mechanism” describes a gun that is incapable of storing energy independent of the user because the user must hold the spring loaded handle 25 for the energy to stay stored (see Ex. 1006, 4:12-20), and when that user releases the handle, the energy is released and the gun fired. The Rappaport gun has no way to store the energy that the user has input to the system by pulling back the handle, as demonstrated by Rappaport’s description of what happens when the user releases the handle, and thus is incapable of storing energy independent of a user.

169. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

13. Claim 17- “further comprising a firing mechanism that directly applies a force to a soft-projectile located in the firing position to launch the soft-projectile from the projectile launcher in free flight”

170. Claim 17 adds to claim 8 “further comprising a firing mechanism that directly applies a force to a soft-projectile located in the firing position to launch the soft-projectile from the projectile launcher in free flight.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitations.

171. Rappaport discloses: “When a player pulls out the handle, the piston is then at its retracted position and the spring is compressed; and when the handle is released, the expanding spring then advances the piston toward the front end of the cylinder. Projecting from the piston through the chamber and into the barrel is a launching bolt which in the retracted position of the piston cleans the chamber to permit the lowermost wet pellet in the stack to drop therein. When the handle is released, the bolt then drives this pellet through the barrel from which it is discharged toward a target in line with the barrel.” Ex. 1006, 2:39-49; *also* 4:21-27 (“When the player then releases handle 25, the piston assembly is urged by the expanding spring toward the front end of cylinder 23, and the launching bolt at high velocity drives the wet pellet then in the launching chamber through barrel 21 from which it is discharged toward a target in line with the barrel, as shown in FIG.

6.”); 4:46-48 (“The player then releases the handle, causing the advancing bolt to drive the first pellet through the barrel from which it is discharged.”).

172. Rappaport’s “launching bolt” is part of a “firing mechanism” that “directly applies a force to a soft-projectile” via a “launching bolt” (“bolt then drives this pellet through the barrel”), which directly pushes the pellet out of the gun to launch it. And the pellet is “located in the firing position” (the bottom pellet 16 in Fig. 3) before being launched “from the projectile launcher in free flight” (“drives the wet pellet then in the launching chamber through barrel 21 from which it is discharged toward a target in line with the barrel”).

173. In addition to the soft-projectiles in DuneCraft, Rappaport discloses that the “wet pellet” described in the quote above is a “soft-projectile.” Ex. 1006, 1:9-11 (“a toy gun adapted to shoot out innocuous soft pellets formed of flexible foam plastic material impregnated with water”); 2:14-19 (“a toy gun which is loaded with a stack of pellets formed of flexible, foam plastic or other sponge-like material impregnated with water, the pellets being successively fired from the gun”).

174. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

14. Claim 18 – “further comprising a firing mechanism that indirectly applies a force to a soft-projectile located in the firing position to launch the soft-projectile from the projectile launcher in free flight”

175. Claim 18 adds to claim 8 “further comprising a firing mechanism that indirectly applies a force to a soft-projectile located in the firing position to launch the soft-projectile from the projectile launcher in free flight.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitations.

176. Rappaport discloses: “the arrangement is such as to pneumatically drive the pellet by a blast of air produced by the advancing piston, thereby obviating the need for a launching bolt to mechanically drive the wet pellet.” Ex. 1006, 2:50-54; also 5:37-45 (“When, therefore, the handle of the weapon is pulled back by the player to retract piston 37 and in doing so compresses spring 36, and the handle is then released, the piston is advanced at a high velocity by the expanding spray toward front end collar 38. The advancing piston abruptly compresses the air between the piston and the wet pellet blocking air port 39 in collar 38. The resultant pulse of compressed air acts to propel pellet 16 through barrel 40 from which it is discharged.”).

177. Rappaport’s “firing mechanism” acts to “pneumatically drive the pellet by a blast of air,” which “indirectly applies a force to a soft-projectile” (the pellet) using compressed air. Rappaport also discloses that using this “firing

mechanism,” a “resultant pulse of compressed air acts to propel pellet 16,” which also “indirectly applies a force” to fire the pellet. And the pellet is “located in the firing position,” in front of the “air port 39 in collar 38” as shown in Fig. 7 and described as “the wet pellet blocking air port 39 in collar 38.” Per Rappaport, this indirect force “propel[s] pellet 16 through barrel 40 from which it is discharged,” which means the pellet is launched “from the projectile launcher in free flight.”

178. Rappaport also discloses that the “wet pellet” described in the quote above is a “soft-projectile.” Ex. 1006, 1:9-11 (“a toy gun adapted to shoot out innocuous soft pellets formed of flexible foam plastic material impregnated with water”); 2:14-19 (“a toy gun which is loaded with a stack of pellets formed of flexible, foam plastic or other sponge-like material impregnated with water, the pellets being successively fired from the gun”).

179. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

15. Claim 19

180. Claim 19 adds the following to the limitations in claim 8:

19. The projectile launcher of claim 8, further comprising:

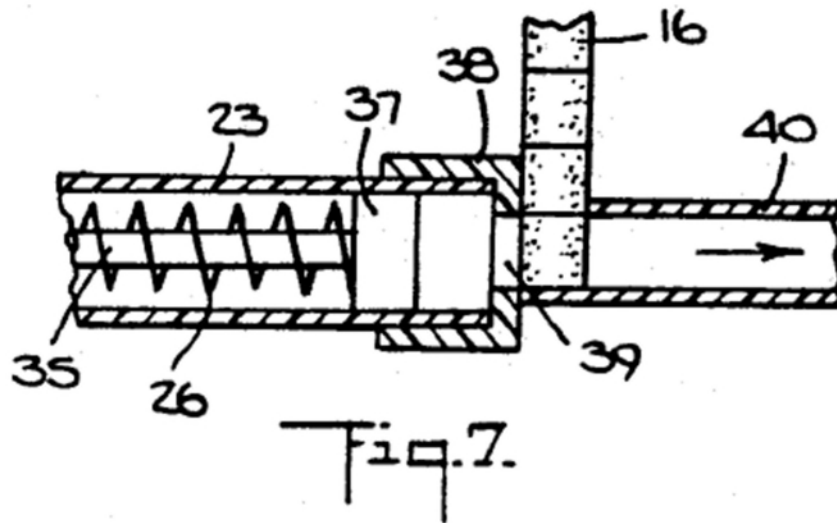
an air compression chamber;

a piston disposed within and axially aligned with the air compression chamber, and

a spring operatively arranged to bias the piston toward a rest position
from a cocked position within the air compression chamber.

The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim's added limitations.

181. First, Rappaport discloses "an air compression chamber." Rappaport discloses: "[w]hen, therefore, the handle of the weapon is pulled back by the player to retract piston 37 and in doing so compresses spring 36, and the handle is then released, the piston is advanced at a high velocity by the expanding spray toward front end collar 38. The advancing piston abruptly compresses the air between the piston and the wet pellet blocking air port 39 in collar 38. The resultant pulse of compressed air acts to propel pellet 16 through barrel 40 from which it is discharged." Ex. 1006, 5:37-45. The chamber between the retracted piston 37 and its end position at front end collar 38 is the "air compression chamber," labeled as "cylinder 23." This is shown on Fig. 7, which shows the post-release, relaxed position:



182. Second, Rappaport discloses “a piston disposed within and axially aligned with the air compression chamber.” Rappaport discloses, also with reference to Fig. 7, that “piston rod 35 is connected to a piston 37 which slides along the inner surface of cylinder 23, but so engages this surface as to minimize air leakage. Hence as the piston advances, it compresses the air between the piston and a cap 38 attached to the front end of cylinder 23. Cap 38 is provided with a central air port 39 which is blocked by the lowermost wet pellet 16 dropped from the cartridge into the launching chamber. A barrel 40 is coupled to the output of this chamber.” Ex. 1006, 5:27-36. As this quote explains and Fig. 7 shows, the “piston 37” is disposed within and axially aligned with the air compression chamber 23 (called a “cylinder”). The 282 patent shows a similar “air compression chamber” as element 31 on, for example, Fig 2. Ex. 1001, Fig. 2.

183. Third, Rappaport discloses “a spring operatively arranged to bias the piston toward a rest position from a cocked position within the air compression chamber.” Rappaport describes role of the spring: “When a player pulls out the handle, the piston is then at its retracted position and the spring is compressed; and when the handle is released, the expanding spring then advances the piston toward the front end of the cylinder.” Ex. 1005, 2:39-43. That is, the spring is “operatively arranged” to “bias the piston” (“advance[] the piston”) toward a “rest position” (“the front end of the cylinder,” near element 39) from a “cocked position” (the “retracted position”) “within the air compression chamber” (cylinder 23). And Rappaport connects element 26 in Fig. 7 to the spring: “[t]he modified weapon structure shown somewhat schematically in FIG. 7 is similar to that in FIGS. 1 to 6 and includes a pump-operated water supply for the cartridge in which the dry pellets are loaded as well as a cylinder 23 and a piston rod 35 terminating in a handle and surrounded by a helical spring 26.” Ex. 1006, 5:21-26.

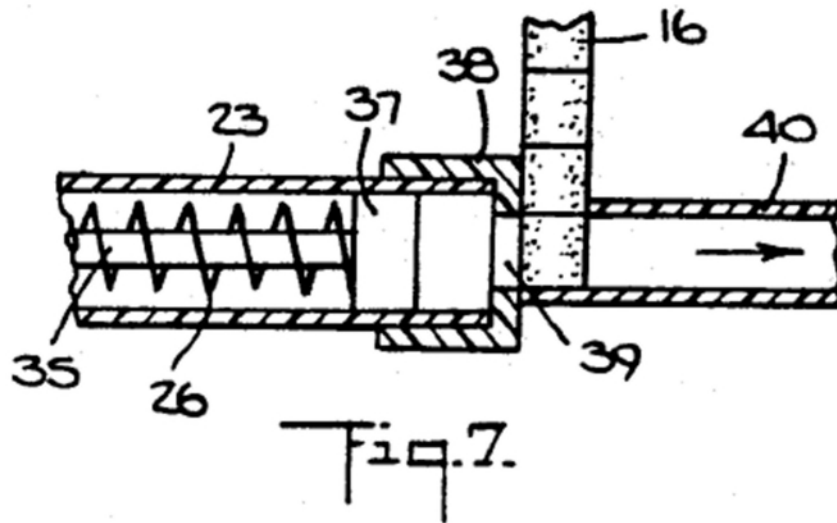
184. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

16. Claim 20

185. Claim 20 adds the following to the limitations in 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.” The limitations of claim 19 are disclosed by the combination of Rappaport and DuneCraft as described above, and Rappaport discloses this claim’s added limitations.

186. First, Rappaport discloses “a smaller diameter tube in communication with the air compression chamber.” Rappaport discloses: “[w]hen, therefore, the handle of the weapon is pulled back by the player to retract piston 37 and in doing so compresses spring 36, and the handle is then released, the piston is advanced at a high velocity by the expanding spray toward front end collar 38. The advancing piston abruptly compresses the air between the piston and the wet pellet blocking air port 39 in collar 38. The resultant pulse of compressed air acts to propel pellet 16 through barrel 40 from which it is discharged.” Ex. 1006, 5:37-45. As Fig. 7 shows, barrel 40 is a “smaller diameter tube” (compared to cylinder 23) “in communication with the air compression chamber” (i.e., “cylinder 23”), through “air port 39,” which in this figure is blocked by a pellet 16 which has fallen into the barrel to prepare for the next launch.



187. Second, Rappaport discloses “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.” Rappaport discloses “[w]hen, therefore, the handle of the weapon is pulled back by the player to retract piston 37 and in doing so compresses spring 36, and the handle is then released, the piston is advanced at a high velocity by the expanding spray toward front end collar 38. The advancing piston abruptly compresses the air between the piston and the wet pellet blocking air port 39 in collar 38. The resultant pulse of compressed air acts to propel pellet 16 through barrel 40 from which it is discharged.” Ex. 1005, 5:37-45.

188. In other words, the “biasing force of the spring” (“compresses spring 36”) after being pulled back by the player, when released, “is sufficient to cause” the piston 37 to “move from the cocked position” (“retract piston 37”) “to the rest position” (at front end collar 38) which “force[s] air from the air compression chamber” (cylinder 23) “into the smaller diameter tube” (barrel 40) through “air port 39” and which “cause[s] a soft-projectile located at the firing position” (“wet pellet blocking air port 39”) “to accelerate and be launched from the projectile launcher” (“propel pellet 16 through barrel 40 from which it is discharged”). In addition to DuneCraft’s soft-projectiles, the Rappaport projectile is a “soft-projectile” for the reasons described above.

189. The combination of Rappaport and DuneCraft therefore discloses all the elements of this claim and renders it obvious.

17. Claim 21 – “wherein the absorbency of the super absorbent polymer is sufficiently limited to allow the soft-projectiles to be launched from the projectile launcher without breaking apart”

190. Claim 21 adds to claim 8 “wherein the absorbency of the super absorbent polymer is sufficiently limited to allow the soft-projectiles to be launched from the projectile launcher without breaking apart.” The limitations of claim 8 are disclosed by the combination of Rappaport and DuneCraft as described above, and DuneCraft discloses this claim’s added limitations.

191. This claim 21 is similar to claim 7, discussed above. Claim 21 is a functional claim in that it requires only that “the absorbency of the super absorbent polymer is sufficiently limited to allow the soft-projectiles to be launched from the projectile launcher without breaking apart.” The absorbent polymer disclosed in DuneCraft satisfies this limitation because the “absorbency of the super absorbent polymer is sufficiently limited to allow the soft-projectiles to be launched from the projectile launcher” (the cartoon tube shown on the packaging or by being thrown) “without breaking apart.” When using those Spit Balls in Rappaport, one of skill in the art would similarly want the projectiles not to break apart.

192. The combination of Rappaport and DuneCraft therefore discloses the element added in this dependent claim and renders it obvious.

D. Claims 8 and 15 Are Obvious Over Illuzzi in View of DuneCraft

1. One of Skill in The Art Would Combine Illuzzi with DuneCraft

193. Illuzzi discloses a toy gun but does not disclose “each soft projectile being formed from hydrated super absorbent polymer” as claimed in claim 1, which is the parent claim to claim 8 (and grandparent to claim 15). DuneCraft discloses “soft projectile[s] being formed from hydrated super absorbent polymer” as described above for claim 1.

194. One of skill in the art would know to combine Illuzzi and DuneCraft to use the hydrated super absorbent polymer projectiles from DuneCraft in Illuzzi’s

gun. Illuzzi discloses a “projectile gun 100” that can use spherical projectiles. Ex. 1011, ¶0067 (“FIG. 13a shows a side (profile) view of a present invention liquid-free projectile 120, and FIG. 13b shows a perspective view thereof. It has a spherical front view and a spherical side view surface 121, and is indeed a sphere.”). Illuzzi also discloses making such projectiles from “polymer.” Ex. 1011, ¶0094 (“FIG. 46 illustrates a cut view of a projectile 460 having a construction of a single material 461”); ¶0095, Table (Figure/Item/Material: 46/461/Polymer”). Illuzzi explains that these projectiles are “solid” then explains that “[b]y ‘solid’ is meant having no liquid, and includes dense, hard materials as well as soft porous materials. These solid projectiles could be foam, plastic, cork, wood, or other material or combinations thereof.” Ex. 1011, ¶0017. Illuzzi further discloses that its projectiles can be “soft” (¶0024 (“plurality of soft liquid-free projectiles”)), like the “squishy” projectiles in DuneCraft.

195. One of skill in the art would know to substitute the polymer balls in DuneCraft for the polymer balls in Illuzzi because doing so is nothing more than a simple substitution of one known element for another to obtain predictable results. The results of putting DuneCraft’s balls into Illuzzi would result in predictable results because Illuzzi already says to use soft, polymer spheres with its paintball gun. Because both DuneCraft and Illuzzi disclose launching soft “polymer” spheres it would be obvious to substitute one projectile for the other. One of skill

in the art would know to make this substitution based on their knowledge of the state of the art as shown by the Kim application, Cake, and Carlson. Exs. 1013, 1014, 1016.

196. Moreover, from Illuzzi's disclosure of a soft polymer spherical projectile, it would be obvious to try DuneCraft's polymer balls. There are only a limited number of different kinds of soft polymer balls that were known and used in the art as projectiles for launching (as shown by Carlson and Cake). One of skill in the art would have tried these different potential solutions with a reasonable expectation of success.

197. Using DuneCraft Spit Balls in Illuzzi's gun would also improve the gun by making it more environmentally friendly in the same manner described for improving Rappaport's gun described in Section V.C.1.

198. The evidence that one of skill in the art would know to combine a gun, and in particular a toy gun, such as Illuzzi's, with a gel or polymer ball, including a super absorbent ball, like DuneCraft's, is the same as that discussed above for the combination of Rappaport and DuneCraft. See Section V.C.1. Carlson, Cake, and the Kim application demonstrate that one of skill in the art would have known to use DuneCraft's super absorbent polymer Spit Balls in Illuzzi's toy gun.

199. For these reasons, one of skill in the art would have combined Illuzzi with DuneCraft to use the DuneCraft polymer balls in the paintball gun disclosed in Illuzzi.

2. Claim 8

200. Claim 8 includes the limitations of claim 1 and adds: “A projectile launcher including the ammunition of claim 1 disposed within a feed chamber of the projectile launcher, and wherein the projectile launcher is adapted to load a soft-projectile from the feed chamber to a firing position.” In addition to DuneCraft’s disclosure of the limitations of claim 1 as described above, Illuzzi discloses this claim’s added limitation.

201. Illuzzi discloses a “projectile launcher”: “The present invention relates to a combination solid projectile and paintball gun. It includes a main housing, a trigger, a barrel, a first projectile port, a second projectile port, means for opening and closing the ports, and an adapter for attachment to the gun for feeding and firing solid projectiles.” Ex. 1011, ¶0017. A “paintball gun” is a projectile launcher.

202. The ammunition in Illuzzi is “disposed within a feed chamber of the projectile launcher”: “Adapter housing 31 contains a plurality of solid projectiles 41 that are fed by gravity individually into paintball feeder port 15 and are subsequently fired with trigger 11 using the force of a compressed gas source 9.”

Ex. 1011, ¶0053. The “solid projectiles” are the “ammunition,” and they are “disposed within a feed chamber of the projectile launcher” by being located inside the adaptor housing 31. Figure 2 shows this, with the projectiles 41 inside the adaptor housing 31:

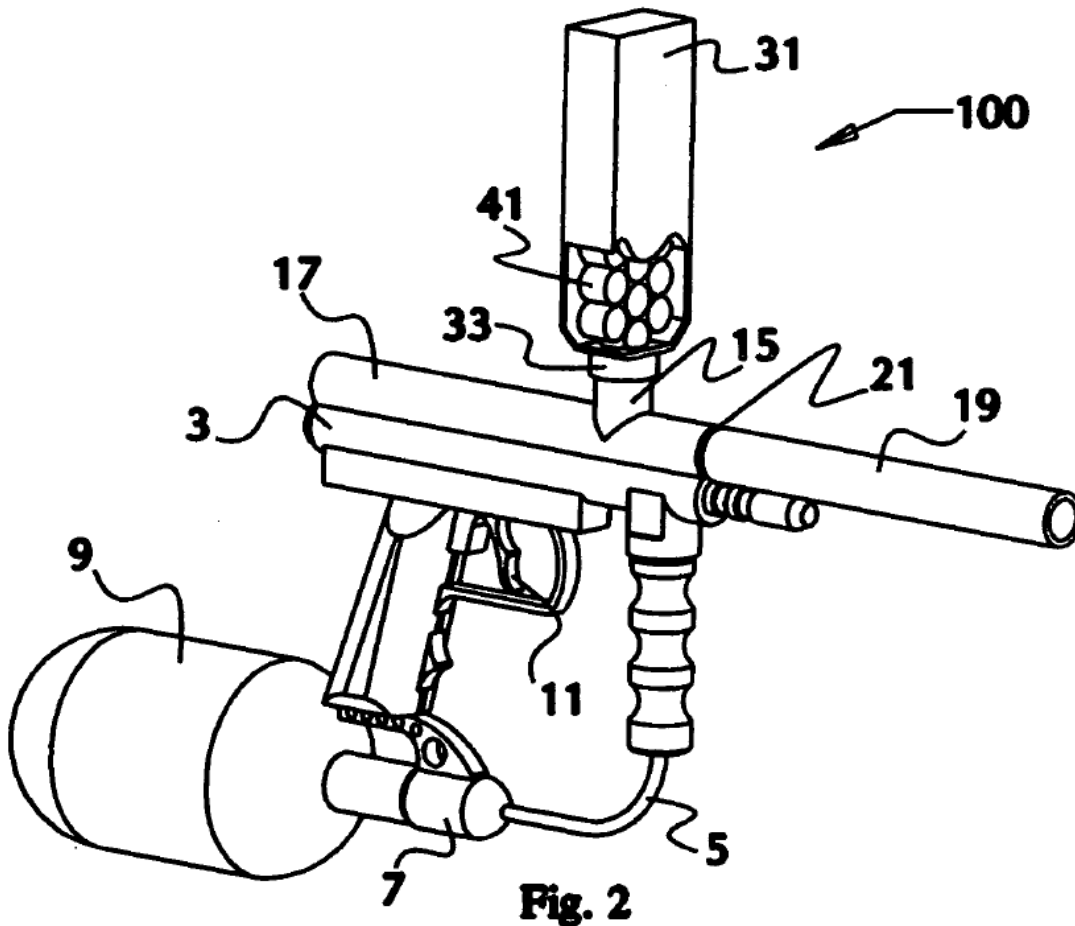


Figure 2 also shows that the “adaptor housing,” which contains the feed chamber, is “of the projectile launcher” in that it is connected to the “projectile gun 100” and feeds the projectiles to that launcher/gun.

203. Illuzzi also discloses “the projectile launcher [] adapted to load a soft-projectile from the feed chamber to a firing position.” In addition to Fig. 2, Illuzzi

discloses that “Adapter housing 31 contains a plurality of solid projectiles 41 that are fed by gravity individually into paintball feeder port 15.” Ex. 1011, ¶[0053]. Thus, Illuzzi’s “projectile launcher” (gun) is “adapted to load soft-projectiles” (“solid projectiles 41”) “from the feed chamber” (“adaptor housing 31”) “to a firing position” (“fed by gravity individually into paintball feeder port 15 and are subsequently fired with trigger 11 using the force of a compressed gas source 9”).

204. DuneCraft discloses the “ammunition of claim 1” in the form of the soft-projectile made from super absorbent polymer disclosed therein, described above for claim 1.

205. Accordingly, the combination of Illuzzi and DuneCraft discloses the elements added by this claim and its parent claim 1 and therefore renders it obvious.

3. Claim 15 – “comprising a firing mechanism that stores energy independent of a user”

206. Claim 15 adds to claim 8 “further comprising a firing mechanism that stores energy independent of a user.” The limitations of claim 8 are disclosed by the combination of Illuzzi and DuneCraft described above, and Illuzzi discloses this claim’s added limitations.

207. Claim 15 recites “a firing mechanism that stores energy independent of a user.” One of skill in the art would readily realize that this claim describes a trigger, which is a well-known way of storing energy in both real and toy guns.

208. Illuzzi discloses: “Trigger 11 is functionally connected to the valve so that when the trigger is pulled, a burst of pressurized gas expands to move the piston to its firing position. The piston will allow a slug of air to travel a relatively short distance at an extremely high velocity. Paintballs are stored in conventional hopper 13 and are fed individually into paintball feeder port 15 and hence into the bore of tube 17. When trigger 11 is pulled, a paintball is fired through barrel 19. Barrel 19 has threads at upstream end 21 for connection and removal to housing 3’s tube 17.” Ex. 1011, ¶0052; ¶0053 (“In FIG. 2, present invention combination solid projectile and paintball projectile gun 100 includes most of the functional features at the prior art gun 1 of FIG. 1, except that hopper 13 has been removed and adapter housing 31 with attachment means 33 has been attached in its place.”). Illuzzi’s “firing mechanism” uses “pressurized gas” to fire a paintball. The pressure under which this gas is held represents energy stored independently of the user. Thus, Illuzzi’s “firing mechanism,” described in the quote above, which includes the trigger, pressurized gas, piston, and barrel, “stores energy independently of the user.”

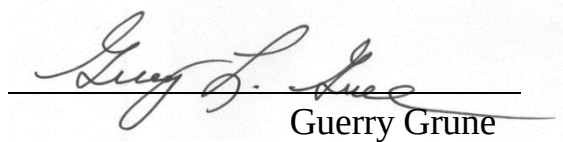
209. The combination of Illuzzi and DuneCraft therefore discloses the element added in this dependent claim and renders it obvious.

* * *

Petition for Inter Partes Review of U.S. Patent No. 8,371,282

I, Guerry Grune, do hereby declare and state, that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, under Section 1001 of Title 18 of the United States Code.

Executed on: December 2, 2022



Guerry Grune