

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SIG SAUER INC.,
Petitioner,

v.

TRUE VELOCITY, INC.,
Patent Owner.

Case No. IPR**2025-00861**
U.S. Patent No. 8,561,543

**DECLARATION OF JOHN NIXON IN SUPPORT OF
PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,561,543**

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polyurethane prepolymer, cellulose, fluoro-polymer, ethylene
inter-polymer alloy elastomer, ethylene vinyl acetate, nylon,
polyether imide, polyester elastomer, polyester sulfone,
polyphenyl amide, polypropylene, polyvinylidene fluoride or
thermoset polyurea elastomer, acrylics, homopolymers,
acetates, copolymers, acrylonitrile-butadinen-styrene,
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polysulfones, polyvinylchlorides, styrene acrylonitriles,
polystyrenes, polyphenylene, ether blends, styrene maleic
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epoxies, phenolics, unsaturated polyesters, bismaleimides,
polyurethanes, silicones, vinylesters, urethane hybrids,
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phenylsulfones with siloxanes, blends of polyphenylsulfones
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- (2) [1 [1b]]: “a primer recess in the top surface that extends toward the bottom surface;” 74
- (3) [1 [1c]]: “a primer flash hole positioned in the primer recess to extend through the bottom surface, and” 76
- (4) [1 [1d]]: “a flange that extends circumferentially about an outer edge of the top surface; and” 77
- c) [1 [2]]: “a substantially cylindrical polymeric middle body comprising” 78
 - (1) [1 [2a]]: “a substantially cylindrical polymeric bullet-end and” 79
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wherein the substantially cylindrical polymeric bullet-end
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7. Claim 10: The polymeric ammunition cartridge of claim 1,
wherein the forward opening end is crimped so that a
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8. Claim 11: The polymeric ammunition cartridge of claim 1,
wherein a bullet is adhesively fitted to the forward opening
end. 83
9. Claim 12: The polymeric ammunition cartridge of claim 1,
wherein the substantially cylindrical polymeric middle body
comprise a polymers selected from the group consisting of
polyurethane prepolymer, cellulose, fluoro-polymer, ethylene
inter-polymer alloy elastomer, ethylene vinyl acetate, nylon,
polyether imide, polyester elastomer, polyester sulfone,
polyphenyl amide, polypropylene, polyvinylidene fluoride or
thermoset polyurea elastomer, acrylics, homopolymers,
acetates, copolymers, acrylonitrile-butadinen-styrene,
thermoplastic fluoro polymers, inomers, polyamides,
polyamide-imides, polyacrylates, polyatherketones, polyaryl-
sulfones, polybenzimidazoles, polycarbonates, polybutylene,
terephthalates, polyether imides, polyether sulfones,
thermoplastic polyimides, thermoplastic polyurethanes,
polyphenylene sulfides, polyethylene, polypropylene,
polysulfones, polyvinylchlorides, styrene acrylonitriles,
polystyrenes, polyphenylene, ether blends, styrene maleic
anhydrides, polycarbonates, allyls, aminos, cyanates,
epoxies, phenolics, unsaturated polyesters, bismaleimides,
polyurethanes, silicones, vinylesters, urethane hybrids,
polyphenylsulfones, copolymers of polyphenylsulfones with
polyethersulfones or polysulfones, copolymers of poly-

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(4)	[1 [1d]]: “a flange that extends circumferentially about an outer edge of the top surface; and”	89
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I, John Nixon, declare as follows:

I. INTRODUCTION

1. I have been asked to submit this declaration on behalf of Sig Sauer, Inc. (“Sig Sauer” or “Petitioner”) in connection with a petition for *inter partes* review of claims 1-19 (“the Challenged Claims”) of U.S. Patent No. 8,561,543 Burrow (EX1001, “the ’543 Patent”), which is assigned to True Velocity, Inc. Specifically, I have been retained as an independent expert consultant by Petitioner to provide my opinions on the technology claimed in, and the patentability or unpatentability of the challenged claims.

2. I have based my opinions on the information available to me as of the date of this declaration. I understand that additional information may become available after this declaration is submitted. If I become aware of additional information following my submission of this declaration I may, if I am permitted, offer additional opinions (including by amending and/or supplementing this declaration) taking into account such new information.

3. I am being compensated for my time at my normal hourly rate. My compensation is in no way contingent upon the outcome of this proceeding, nor the content of my opinions. I have no financial interest in any of the parties, and I have no other interest in this proceeding.

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4. I am not currently, nor have I ever been, an employee of Sig Sauer. I received no compensation for this declaration beyond my normal hourly compensation based on my time actually spent working on this IPR. I will not receive any added compensation based on the outcome of this IPR, any other IPR, or any other proceeding involving the '634 patent.

5. I am an independent Board Certified International Forensic Engineering Scientist – Diplomate of the International Board of Forensic Engineering Sciences (IBFES). I have been a firearms user for over forty years, have been performing technical work, in a professional capacity, on guns, ammunition, and weapons systems since 1986, and have worked in a forensic capacity since 1995. I have a first class honors degree in mechanical engineering, and a master's degree in business administration. I completed residential technical courses in guns, ballistics, and explosives at the Royal Military College of Science (RMCS) UK. I previously worked as a scientist, professional engineer, and project manager for the UK government Ministry of Defence, where my duties included research, design, development, performance assessment, mid-life improvement, reverse engineering of weapons systems, and forensics. Those weapons systems covered handguns, small arms & ammunition, munitions, artillery, tank armament,

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missile systems, and explosives. I studied materials science as a significant part of my engineering degree, and this included polymers and composite materials. While at the Ministry of Defense I was specifically tasked with integrating advanced polymers and composites into current and new ammunition, weapons, and munitions. This integration included candidate material selection, manufacturing considerations, and prototype testing. I am an NRA Certified firearms and personal protection instructor, an NRA certified range safety officer, and I teach concealed carry qualification courses. I was a SIG certified law enforcement armorer from 2006 through 2009. I am registered with FEANI as a professional European Engineer (Eur Ing), am a Chartered Engineer (CEng), a Fellow of the Institution of Mechanical Engineers (FIMechE), a Fellow of the Chartered Management Institute (FCMI), and a former adjunct professor at the Indiana Institute of Technology. I currently serve as President of the International Board of Forensic Engineering Sciences (IBFES) and am a director of the Forensic Specialties Accreditation Board (FSAB).

6. I have provided sworn expert testimony in many U.S. state and federal courts, as an independent expert for both plaintiffs and defendants, and in both civil and criminal matters.

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7. As a result of my professional education and experience, I am qualified to render opinions in the areas of firearms, ammunition, materials science, and manufacturing and production technology, and in particular, the subject matter of the '543 Patent.

II. COMPENSATION

8. I am being compensated as an expert witness in this case at my standard hourly rate of \$445 per hour in addition to out-of-pocket expenses. I have received no additional compensation for my work on this matter and my compensation does not depend, and has not ever depended in any way, on my opinion as expressed in this matter, in any testimony that I may give, or on the outcome of this matter. I am not and have never been employed by SIG Sauer. I have no financial stake in SIG Sauer, the '238 Patent, or the outcome of this IPR or any other matter involving the '238 Patent.

III. MATERIALS CONSIDERED

9. In forming my opinions expressed in this declaration, I have applied my expertise in the field and reviewed and considered the materials cited in this declaration.

10. I have reviewed the '238 patent and its file history. I have also reviewed the prior art and other documents and materials cited herein. My opinions

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are also based in part upon my education, training, research, knowledge, and experience.

11. In order to render my opinions in this matter, I will make reference to the following materials:

Exhibit No.	Description
1001	U.S. Patent No. 8,561,543 (“the ’543 Patent”)
1002	Prosecution History of U.S. Patent No. 8,561,543 (“Prosecution History”)
1004	U.S. Patent No. 3,099,958 (“Daubenspeck”)
1005	U.S. Patent Application No. 2007/0261587 (“Chung”)
1006	George C. Nonte, Jr., <i>Handloading for Handgunners</i> (1978) (“Nonte”)
1007	U.S. Patent No. 3,977,326 (“Anderson”)
1008	International PCT Application No. WO 2008091245 (“Dittrich”)
1009	International PCT Application No. WO 0034732A1 (“Kay-Clough”)
1010	Declaration of Dr. Sylvia D. Hall-Ellis
1011	Definition of cannellure: https://www.merriam-webster.com/dictionary/cannellure
1012	Curriculum Vitae of John Nixon

IV. RELEVANT LEGAL STANDARDS

12. I am not a lawyer and I have no legal training. I have been informed by SIG Sauer's counsel about certain legal principles and standards, which I have assumed and applied for purposes of this declaration. Some of these, which form the legal framework for the opinions I am providing, are summarized below.

13. I have been informed that the following legal principles apply to the analysis of patentability. I also have been informed that, in an inter partes review proceeding, a patent claim is unpatentable if it is shown by a preponderance of the evidence that the claim would have been rendered obvious by one or more published prior art references.

A. Anticipation

14. I have been informed that a patent claim is invalid as anticipated if each and every limitation of the claim is disclosed in a single prior art reference as arranged in the claim. I understand that each element of a patent claim may be disclosed by a prior art reference either expressly or inherently.

15. Further, I have been informed that even an "express" disclosure does not necessarily need to use the same words as the claim. An element of a patent claim is inherent in a prior art reference if the element must necessarily be present, and its presence would be recognized by a person of ordinary skill in the art. I

understand the dispositive question regarding anticipation is whether one skilled in the art would reasonably understand or infer from the prior art reference teaching that every claim element was disclosed in that single reference. However, I understand that inherency cannot be established by mere probabilities or possibilities.

B. Obviousness

16. I have been informed that a patent may not be obtained 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.

17. When considering the issues of obviousness, it is necessary to:

- a) determine the scope and content of the prior art;
- b) ascertain the differences between the prior art and the claims at
- c) issue;
- d) resolve the level of ordinary skill in the pertinent art; and
- e) consider evidence of secondary indicia of non-obviousness (so-called “secondary considerations”) (if available).

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18. The relevant time for considering whether a claim would have been obvious to a person of ordinary skill in the art is the time of alleged invention. I have been asked to assume the relevant time is August 23, 2011.

19. I have been informed that a reference may be modified or combined with other references or with the person of ordinary skill's own knowledge if the person would have found the modification or combination obvious. A person of ordinary skill in the art is presumed to know all the relevant prior art, and the obviousness analysis may take into account the inferences and creative steps that a person of ordinary skill in the art would employ.

20. In determining whether a prior-art reference could have been combined with another prior-art reference or other information known to a person having ordinary skill in the art, the following principles may be considered:

- a) A combination of familiar elements according to known methods is likely to be obvious if it yields predictable results;
- b) The substitution of one known element for another is likely to be obvious if it yields predictable results;

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- c) The use of a known technique to improve similar items or methods in the same way is likely to be obvious if it yields predictable results;
- d) The application of a known technique to a prior art reference that is ready for improvement is likely obvious if it yields predictable results;
- e) Any need or problem known in the field and addressed by the reference can provide a reason for combining the elements in the manner claimed;
- f) A person of ordinary skill often will be able to fit the teachings of multiple references together like a puzzle; and
- g) The proper analysis of obviousness requires a determination of whether a person of ordinary skill in the art would have a reasonable expectation of success—not absolute predictability of success—in achieving the claimed invention by combining prior art references.

21. Whether a prior art reference renders a patent claim unpatentable as obvious is determined from the perspective of a person of ordinary skill in the art.

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While there is no requirement that the prior art contain an express suggestion to combine known elements to achieve the claimed invention, a suggestion to combine known elements to achieve the claimed invention may come from the prior art as a whole or individually, as filtered through the knowledge of one skilled in the art. In addition, the inferences and creative steps a person of ordinary skill in the art would employ are also relevant to the determination of obviousness.

22. When a work is available in one field, design alternatives and other market forces can prompt variations of it, either in the same field or in another. If a person of ordinary skill in the art can implement a predictable variation and would see the benefit of doing so, that variation is likely to be obvious. In many fields, there may be little discussion of obvious combinations, and in these fields market demand—not scientific literature—may drive design trends. When there is a design need or market pressure and there are a finite number of predictable solutions, a person of ordinary skill in the art has good reason to pursue those known options.

23. There is no rigid rule that a reference or combination of references must contain a teaching, suggestion, or motivation to combine references. However, the teaching, suggestion, or motivation test can be a useful guide in establishing a rationale for combining elements of the prior art. This test poses the

question whether there is an express or implied teaching, suggestion, or motivation to combine prior art elements in a way that yields the claimed invention, and avoids impermissible hindsight analysis.

24. I understand that a patent claim is invalid if it is anticipated or rendered obvious by prior art.

V. OVERVIEW OF THE '543 PATENT

A. The Purported Invention

25. The '543 patent generally describes a configuration of a round of ammunition in which a portion of the powder chamber is of a polymeric composition. EX1001 at 1:19-24. The patent states that “Conventional ammunition cartridge casings for rifles and machine guns, as well as larger caliber weapons, are made from brass, which is heavy, expensive, and potentially hazardous.” *Id.* at 1:32-35. The patent states that a lighter weight replacement for brass, such as a polymer, could improve ammunition capabilities. *Id.* at 1:30-38. However, ammunition using polymer cartridge casings must still “meet the reliability and performance standards of existing fielded ammunition and be interchangeable with brass cartridge casing ammunition in existing weaponry.” *Id.* at 1:39-41. Although the specification focuses extensively on manufacturing

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practices, the claims of the '543 Patent are apparatus claims that relate only to ammunition having polymeric components.

26. As the '543 Patent concedes, “plastic cartridge casings have been known for many years” prior to the filing of the '543 Patent’s application. Indeed, the patent describes prior art patents as disclosing:

an ammunition cartridge assembled from a substantially cylindrical polymeric cartridge casing body defining a casing headspace with an open projectile-end and an end opposing the projectile-end, wherein the casing body has a substantially cylindrical injection molded polymeric bullet-end component with opposing first and second ends, the first end of which is the projectile end of the casing body and the second end has a male or female coupling element; and a cylindrical polymeric middle body component with opposing first and second ends, wherein the first end has a coupling element that is a mate for the projectile-end coupling element and joins the first end of the middle body component to the second end of the bullet end component, and the second end is the end of the casing body opposite the projectile end and has a male or female coupling element; and a cylindrical cartridge casing head-end component with an essentially closed base end with a primer hole opposite an open end with a coupling element that is a mate for the coupling element on the second end of the middle body and joins the second end of the middle body component to the open end of the head-end component; wherein the

middle body component is formed from a material more ductile than the material head-end component is formed from but equal or less ductile than the material the bullet-end component is formed from.

Id. at col. 1 l. 60-col. 2, l. 18.

27. Indeed, the only limitation recited in the independent claims of the '543 Patent adding to this description of admitted prior art is “a substantially cylindrical polymeric coupling end connected by a powder chamber, wherein the substantially cylindrical polymeric coupling end extends over the substantially cylindrical coupling element and covers an circumferential surface of the primer flash hole.” *See, e.g., id.* at Claim 1, limitation 2b (emphasis added).

28. The '543 Patent describes the purpose of the invention as overcoming shortcomings in “the known methods of producing plastic or substantially plastic ammunition,” which the patent owner argues include bullets being pushed into the casing, bullets falling out of the casing, the bullet pull being insufficient to create sufficient pressure, the bullet pull not being uniform from round to round, and parts of the casing breaking off and jamming the weapon or becoming projectiles themselves. *Id.* at col. 2, ll. 25-35. The only claim limitations that appear directed to these alleged problems are those added with dependent claims, claiming groove or “cannelure”-type structures in the bullet end of the casing. *See, e.g.,* EX 1001

Claim 8. However, as I demonstrate below, such structures are very old and very well known in the art. It would be obvious for one skilled in the art to make use of such structures, as well as other well-known means of securing bullets into casings, with the claimed invention.

B. Prosecution History

29. U.S. Patent Application No. 13/292,843 (the “’843 Application”), titled “LIGHTWEIGHT POLYMER AMMUNITION CARTRIDGE CASINGS,” was filed on November 9, 2011. EX1002 at 1. The ’843 Application issued as the ’543 Patent on October 22, 2013. EX1001 at 1. The ’843 Application was filed with 23 original claims (including 5 independent claims) and listed Lonnie Burrow as the inventor. EX1002 at 1, 41-47.

30. The application received a first office action on November 28, 2012. *Id.* at 112. The first office action was a restriction and/or election requirement. *Id.* at 113-120. The examiner noted that the application claimed three separate inventions: (1) claims 1-19 claimed a polymeric ammunition cartridge, which is in class 102, subclass 465; (2) claims 20-21 claimed a metal insert for a cartridge, which is in class 102, subclass 469; and (3) claims 22-23 claimed a method of forming an ammunition cartridge, which is in class 86, subclass 19.5. *Id.* at 114.

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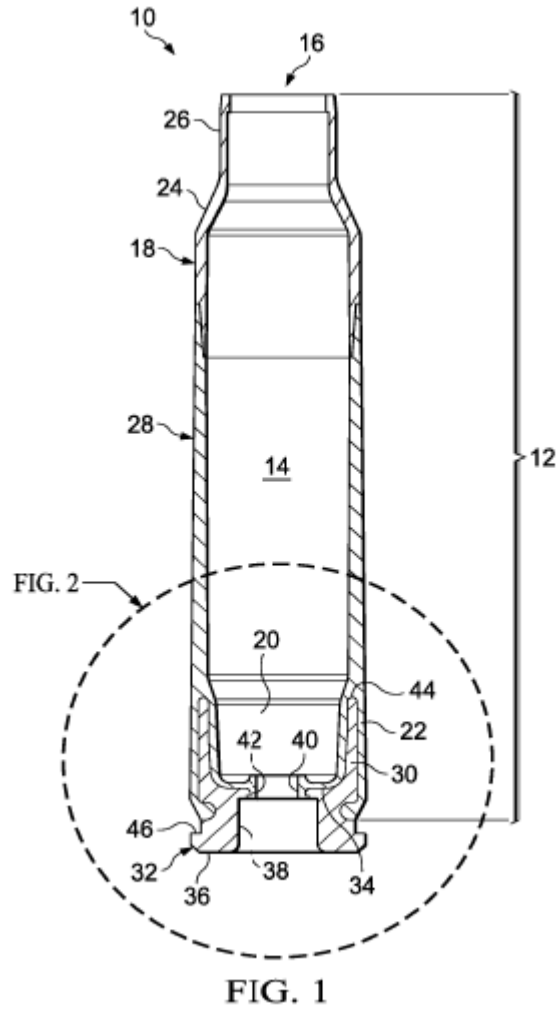
31. The examiner concluded that the two inventions in claim groups (1) and (2) were distinct because the claims in group (1) could be practiced using an insert that was not made from metal and thus were distinct from group (2), which claimed a metal insert, and because group (2) could be practiced with a casing that was not of polymer, such as a metal casing. *Id.* at 114. Groups (2) and (3) were distinct because, as with group (1), the claims covering group (3) could be practiced with an insert that was not made from metal. *Id.* at 115. Groups (1) and (3) were distinct from each other because the cartridge in group (1) could be manufactured by a method different from that claimed in group (3), such as by molding the cartridge as a single entity rather than making the bullet end, the middle body, and the coupling end separately and then assembling them. *Id.* In the November 8, 2012 office action, the examiner further noted that the claims addressed to claimed invention (1) were directed to two patentably distinct species—Cartridge Species A and Cartridge Species B. *Id.* at 117.

32. The examiner instructed the Applicant to make an election to one of the three claimed inventions, even if the Applicant also traversed the restriction requirement. *Id.* at 118. The examiner further instructed the Applicant that, if it elected claimed invention (1), it should elect one of the two claimed species, even

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if it traversed the Examiner's requirement to elect a species: Cartridge Species A, as shown in Figure 1 of the application, or Cartridge Species B, as shown in Figure 7 of the application. *Id.* at 117. If the Applicant chose Species A, then it was required to elect only one of the cartridge portions shown in Figures 2, 3, 5 and 6. If the Applicant chose Species B, then it was required to elect only one of the diffusers shown in Figures 7, 8, 9a, 9b, 9c, 9d, 9e, 9f, 9g, and 9h. *Id.*

33. On January 9, 2013, the Applicant responded to the restriction requirement by electing claimed invention (1) and claims 1-19 of the pending application and cancelling claims 20-23. *Id.* at 128. The Applicant further elected Species A, corresponding to Figure 1, and the cartridge portion shown in Figure 2, shown below:



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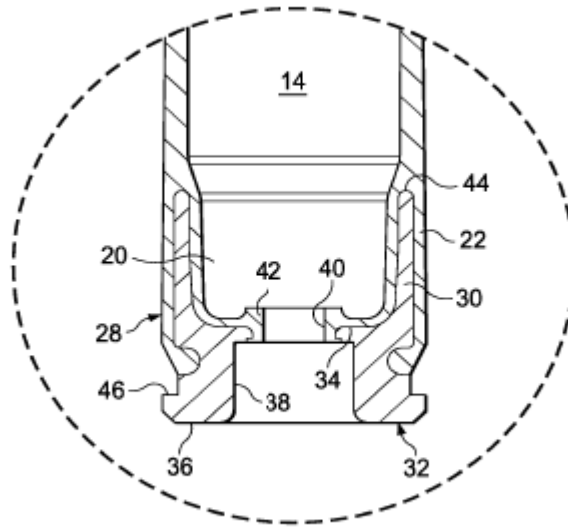


FIG. 2

34. On April 16, 2013, the examiner issued a Notice of Informal or Non-Responsive Amendment, noting that the Applicant's response was not fully responsive to the Office Action. *Id.* at 146, 148. Specifically, the examiner noted that the Applicant failed to inform the examiner which of elected claims 1-19 are generic to cartridge species A and B, which of claims 1-19 are specific to the elected Species A (Figs. 1 and 2) and which of claims 1-19 are specific to any of the features depicted in the non-elected figures related to species A—3, 5, or 6—or specific to the non-elected Species B (shown in figures 7, 8, 9a, 9b, 9c, 9d, 9e, 9f, 9g, and 9h). *Id.* at 148. As an example, the examiner noted that elected claims 15-17 included a diffuser, which is not a component of elected Species A. *Id.*

35. The Applicant responded to this office action on April 23, 2013, and noted that the diffuser in claims 15-17 was merely an added element of those claims. *Id.* at 157. The Applicant argued that the mere fact that the Species B embodiments also included diffusers did not preclude their use in claims directed to other species. *Id.* The Applicant made clear that all claims other than those directed to Figures 1 and 2 had been cancelled. *Id.*

36. On August 16, 2013, the Examiner issued a Notice of Allowance, allowing claims 1-19 and withdrawing the restriction as to species. *Id.* at 166, 169. The Examiner stated that his reasons for allowing the patent were that “the known prior art does not disclose a polymeric ammunition cartridge comprising the substantially cylindrical polymeric coupling end of the polymeric middle body extending over the substantially cylindrical coupling element of the substantially cylindrical insert and covers a circumferential surface of the primer flash hole of the insert, including the other structure and structural relationships as recited in independent claim 1.” *Id.* at 169.

C. The Challenged Claims of the '543 Patent

37. The Petitioner challenges claims 1-19 of the '543 Patent. For ease of reference, the Challenged Claims are provided in a listing above, with numbered claim limitations corresponding to the numbering used throughout.

VI. OVERVIEW OF THE PRIOR ART

A. Daubenspeck

38. U.S. Patent No. 3,099,958 to Daubenspeck (EX1004, “Daubenspeck”) was filed January 12, 1960, and constitutes prior art to the ’543 Patent under at least pre-AIA 35 U.S.C. § 102(a). The inventors were Benjamin K. Daubenspeck, Rex E. Dickey, Donald S. Foote, and Justin H. Whipple. EX. 1004 at 1:4-6. The patent was assigned to the Remington Arms Co., Inc. *Id.* at 1:6-7. Daubenspeck discloses that it relates to “to firearm cartridges and method of manufacture and assembly thereof.” *Id.* at 1:11-12.

39. Daubenspeck further states that a “primary object of the invention is to combine materials of different properties in a way that utilizes the favorable properties of each to its fullest advantage.” *Id.* at 1:14-16. Daubenspeck clarified that this meant that the invention included a primer-carrying head made of a material with high compressive strength that may be precision formed, and “a body or casing of plastic material having high tensile strength and controlled flexibility under expansive pressure.” *Id.* at 1:20-22.

40. The disclosure in Daubenspeck that is most relevant to this petition is the embodiment illustrated in Figures 37, 38, and 40. As described in Daubenspeck, this embodiment comprises a rigid head, and a “molded plastic body

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101 which is injection molded and simultaneously assembled with the head as an insert in the molding die.” *Id.* at 7:67-69. The head comprises a base 102 having a laterally projecting extractor rim 103, and provided at its forward side with a battery cup portion 104 having an inwardly extending annular lip 105 at its forward end. A plurality of annular teeth or ribs 106 are provided upon the outer surface of the battery cup portion for interlocking engagement with the plastic body or casing 101, as will presently more fully appear. The plastic casing 101 is substantially cylindrical and is provided with a powder containing chamber 107, the base of which is in the form of an integral overlay portion 108 molded over the inner end of the battery cup and extended inwardly about the lip 105 to the interior of the primer pocket, a central vent or flash hole 109 being provided in the overlay portion. Additionally the body is molded into interlocking relation with the ribbed outer side of the battery cup as at 110.

41. Daubenspeck was not considered during prosecution of the ’543 Patent. *See generally* EX1002. A POSITA would not consider Daubenspeck to be cumulative the references that were cited during prosecution of the ’543 Patent.

B. Chung

42. Published Patent Application No. 2007/0261587 A1 to Chung (EX1005, “Chung”) was filed November 16, 2006, and published November 15,

2007, and constitutes prior art to the '543 Patent under at least pre-AIA 35 U.S.C. § 102(a). The inventor was Sengshin Chung. EX1005 at p. 1. Although the patent that resulted from Chung was disclosed by the applicant during prosecution of the '543 Patent, However, Anderson was not discussed in the file history and did not form the basis of any office action.

C. Kay-Clough

43. International PCT Application No. WO 2000/ 034732A1 to Kay-Clough (EX1009, "Kay-Clough") was filed December 7, 1999, and constitutes prior art to the '543 Patent under at least pre-AIA 35 U.S.C. § 102(a). The inventor is Mark Hamilton Raymond Kay-Clough. EX1009 at p. 1. Kay-Clough discloses a cartridge case (202), a cartridge (200) and protection means (140) for protecting a primer (232) of a cartridge. *Id.*

44. Kay-Clough was not cited by the Applicant or the Examiner during prosecution of the '543 Patent. Kay-Clough should be considered here because, although it is not anticipatory in its own right, Kay-Clough discloses the use of nylon as a polymeric material suitable for composite cartridge casings. EX1009, at claims 35, 36. As shown below, a POSITA would be motivated to combine Daubenspeck and Kay-Clough to provide this missing limitation in claim 3 of the '543 Patent, thus rendering the claim unpatentable as obvious.

D. Nonte

45. Nonte is a printed publication titled *Handloading for Handgunners*, authored by Maj. George C. Nonte, Jr., which was published no later than December 31, 1978, and constitutes prior art to the '543 Patent under at least pre-AIA 35 U.S.C. § 102(b). EX 1006. Specifically, on its face, Nonte is dated 1987. EX1006 at 2. *See Hulu v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29, at 9 (PTAB Dec. 20, 2019) (precedential). In addition, expert testimony establishes that Nonte had been received, indexed, and cataloged by subject matter in multiple ways around or shortly after December 31, 1978. EX1010; *see also Samsung Elecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1363, 1369 (Fed. Cir. 2019). Therefore, Nonte is prior art under at least pre-AIA 35 U.S.C. § 102(b).

46. Nonte contains detailed descriptions of ammunition casings. In particular, Nonte depicts two casings having cannelures in the form of annular rings formed around the circumference of the casing. EX1006 at 29, 77.

E. Anderson

47. U.S. Patent No. 3,977,326 to Anderson (EX1007, “Anderson”) was filed February 6, 1975, and constitutes prior art to the '543 Patent under at least pre-AIA 35 U.S.C. § 102(a). The inventors were Raymond A. Anderson and John J. Scanlon. EX1007 at p. 1. The patent was assigned to the Remington Arms

Company, Inc. *Id.* Anderson discloses a composite cartridge casing having a plurality of parts, with the parts being made from various materials. *Id.*

48. Anderson was cited by the Examiner during the prosecution of the '543 Patent. However, Anderson was not discussed in the file history and did not form the basis of any office action. Anderson should be considered here because, although it is not anticipatory in its own right, Anderson discloses the use of what the '543 Patent refers to as a “diffuser” in a polymeric cartridge to provide additional stability to the cartridge. As shown below, a POSITA would be motivated to combine Anderson and Daubenspeck to provide this missing limitation in claims 16 and 17 of the '543 Patent, thus rendering those claims unpatentable as obvious.

F. Dittrich

49. International PCT Application No. WO 2008/091245A2 to Dittrich (EX1008, “Dittrich”) was filed January 19, 2007, and constitutes prior art to the '543 Patent under at least pre-AIA 35 U.S.C. § 102(a). The inventor is William A. Dittrich. EX1008 at p. 1. The patent was assigned to General Dynamics Ordnance and Tactical System – Simunition Operations, Inc. *Id.* Dittrich discloses a composite cartridge casing having a plurality of parts, with the parts being made from various materials. *Id.*, Abstract.

50. Dittrich was not cited by Applicant or the Examiner during the prosecution of the '543 Patent; therefore it has not been previously considered. Dittrich should be considered here because it qualifies as an anticipatory reference for at least claim 1 of the '543 Patent. Dittrich discloses “[a] cartridge or ammunition casing ... made of two principal components, one providing the outer casing sidewall and the other, in the form of an external reinforcing member or plug, defining the head end.” EX1008, Abstract. Dittrich further discloses that the cylindrical casing shell or the outer plug can be formed of polymeric plastic materials. *Id.* at pg. 20, ll. 18-26. As will be shown below, the casing shell disclosed in Dittrich has components that extend over coupling ends of the outer plug and cover a surface of a flash hole within a primer recess. *Id.* Figs. 1-2.

51. Dittrich was not considered in the prosecution of the '543 Patent. A POSITA would not consider Dittrich to be cumulative the references that were cited during prosecution of the '543 Patent.

VII. LEVEL OF ORDINARY SKILL IN THE ART

52. A person of ordinary skill in the art, at the time the '543 Patent was filed would have had at least an undergraduate degree in mechanical engineering or a closely related engineering or scientific field such as industrial engineering, or materials science, plus experience in the design and injection molding and

joining/fabrication of polymeric material components. Less work experience may be compensated for by a higher level of education or vice versa. *Id.* It should be noted that I exceeded this definition at the time the '543 Patent was filed, and, in the present declaration, I have offered opinions from the perspective of a POSITA.

VIII. CLAIM CONSTRUCTION

53. It is my understanding that Petitioner has applied the ordinary and customary meaning of the claim terms as they would have been understood by a POSITA at the time of the alleged invention, in the context of the '543 Patent and its prosecution history. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). It is my opinion that no term needs to be expressly construed beyond its plain and ordinary meaning.

IX. DETAILED EXPLANATION OF INVALIDITY GROUNDS

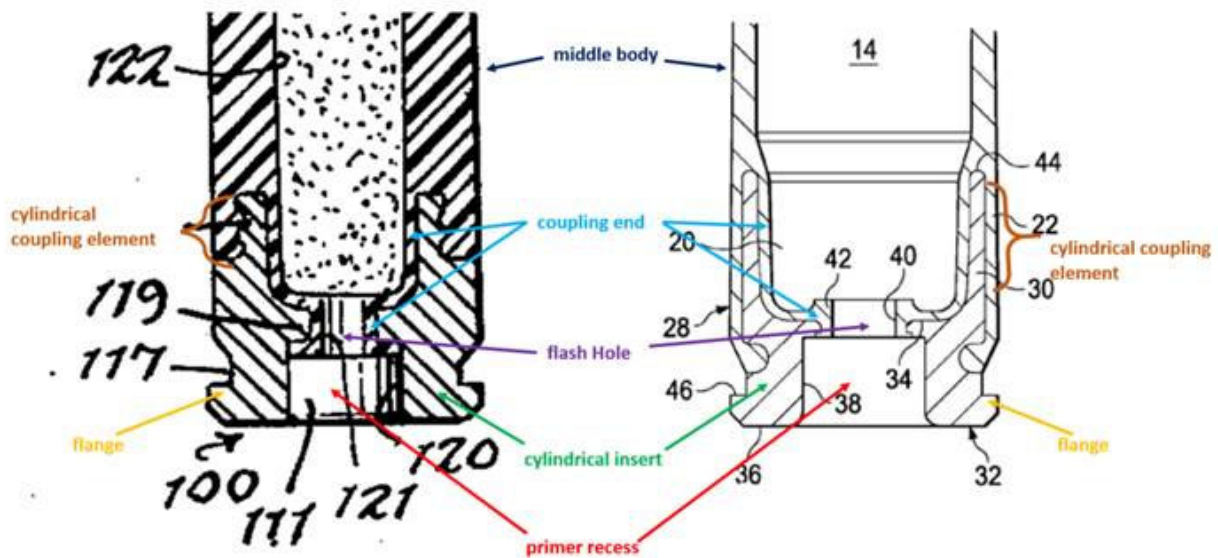
54. It is my opinion that the following grounds establish a reasonable likelihood that the Petitioners will prevail with respect to the Challenged Claims. .

A. GROUND 1: CLAIMS 1, 7 AND 18 OF THE '543 PATENT ARE ANTICIPATED BY DAUBENSPECK

55. For at least the reasons set forth below, it is my opinion that claims 1, 7, and 18 of the '543 Patent are invalid as anticipated by Daubenspeck. The following comparative illustration shows the claim elements of the '543 Patent

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mapped onto the Daubenspeck reference. This summary illustration is provided for ease of reference.

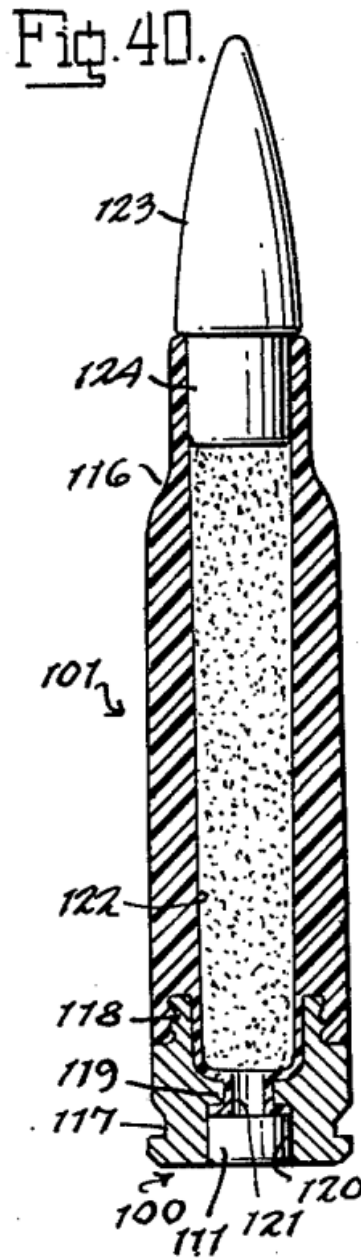


**Daubenspeck Fig 40 (left)
annotated for comparison to Fig 2 of the '543 Patent (right)**

1. Claim 1

- a) [1 [Preamble]]: “A polymeric ammunition cartridge comprising:”

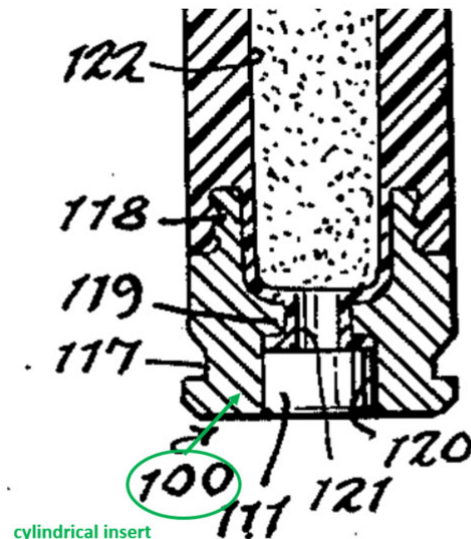
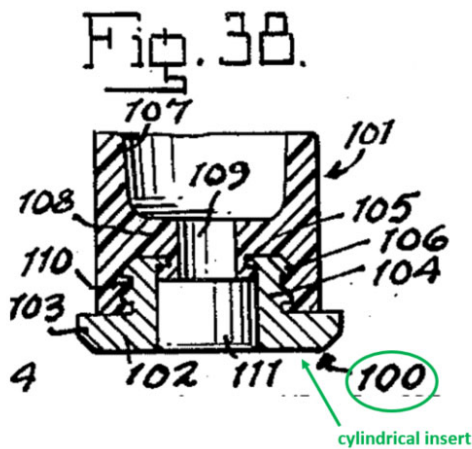
56. To the extent the preamble is determined to be limiting, it is my opinion that Daubenspeck discloses this limitation. Daubenspeck discloses that it relates “to firearm cartridges and method of manufacture and assembly thereof,” including “a body or casing of plastic material having high tensile strength and controlled flexibility under expansive pressure.” EX1004 at 1:11-12, 20-22.



Daubenspeck, Fig. 40 (part 101 is “plastic body,” *Id.* at 7:57)

b) [1 [1]]: “a substantially cylindrical insert comprising”

57. It is my opinion that Daubenspeck discloses this limitation. As shown in Fig. 38 and 40 of Daubenspeck, Daubenspeck describes “a substantially cylindrical insert” and that “[t]he embodiment illustrated in FIGS. 37 and 38 comprises a rigid head 100 of high compressive strength material. . . and a molded plastic body 101 which is injection molded and simultaneously assembled with the head as an insert in the molding die.” EX1004 at 7:54-59.

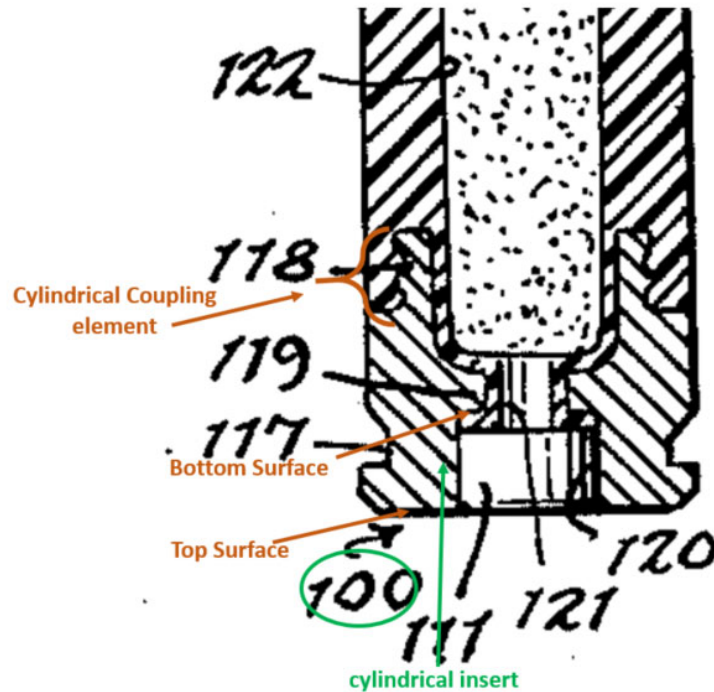
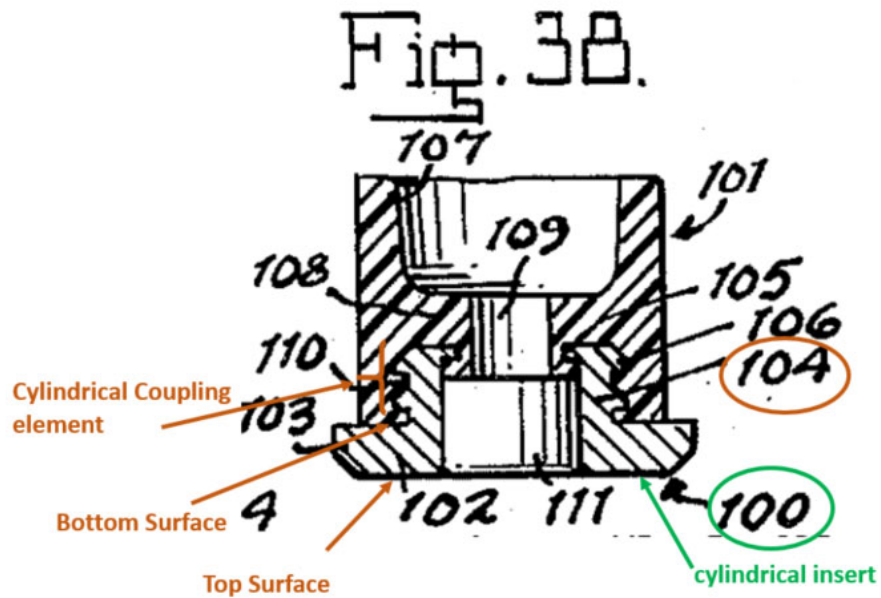


Daubenspeck, Figs. 38 (left) and 40 (right) (annotated to show insert)

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- (1) [1 [1a]]: “a top surface opposite a bottom surface and a substantially cylindrical coupling element that extends from the bottom surface,”**

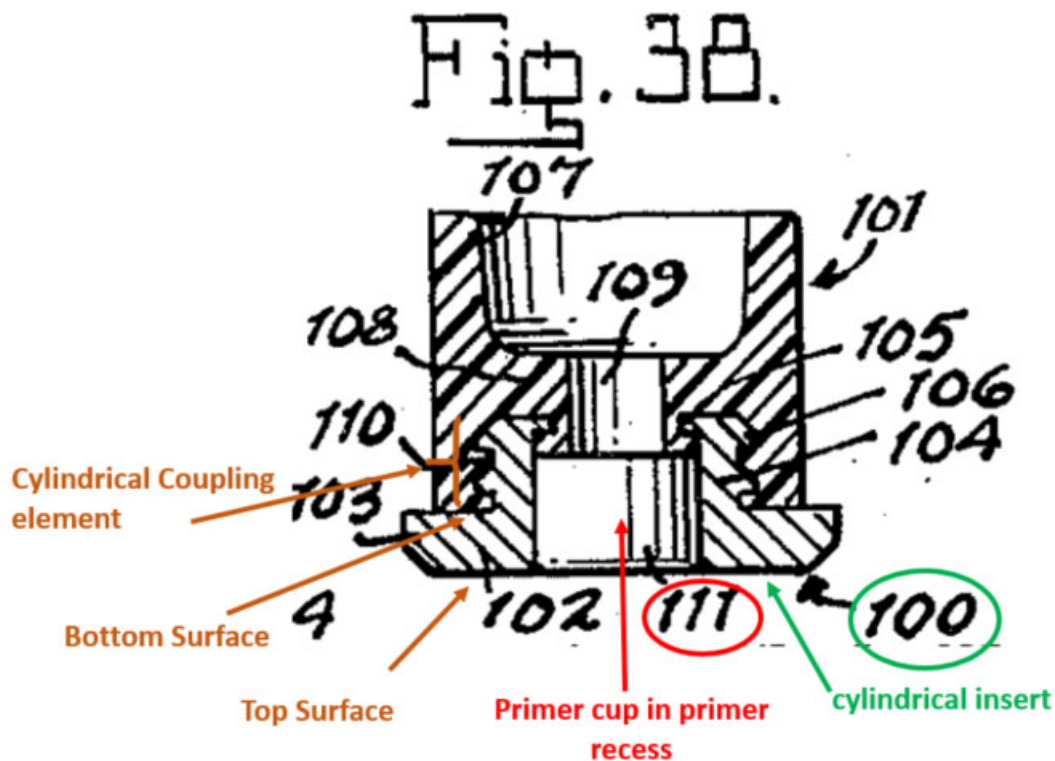
58. It is my opinion that Daubenspeck discloses this limitation. As shown in Figs. 38 and 40 of Daubenspeck, shown below, Daubenspeck describes a substantially cylindrical coupling element in the form of battery cup portion **104** that extends from the bottom surface. EX1004 at 7:59-66 (“The head [100] comprises a base 102 having a laterally projecting extractor rim 103, and provided at its forward side with a battery cup portion 104 having an inwardly extending annular lip 105 at its forward end. “).

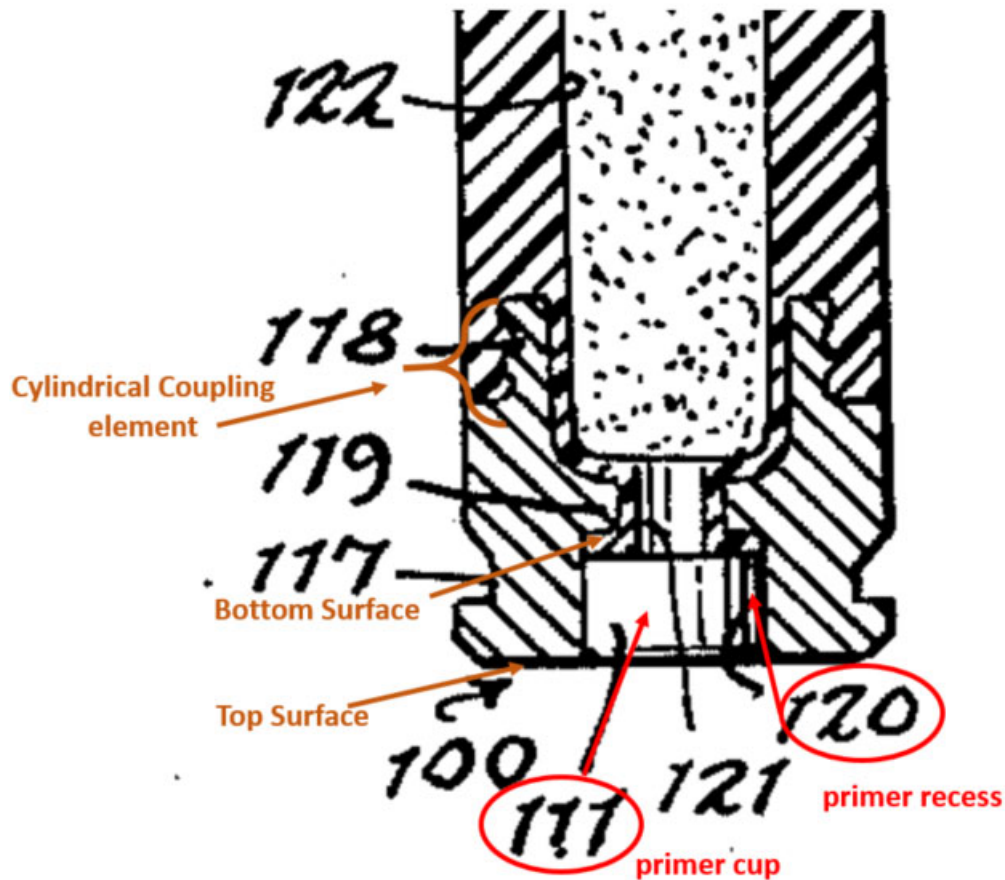


Daubenspeck, Figs. 38 (top) and 40 (bottom) (annotated)

- (2) [1 [1b]]: “a primer recess in the top surface that extends toward the bottom surface;”

59. It is my opinion that Daubenspeck discloses this limitation. The cylindrical insert of Daubenspeck comprises a primer recess (referred to in the patent as a “primer pocket”) in the top surface that extends to the bottom surface. EX1004 at Figs. -38-40. Daubenspeck states, “A conventional primer cup 111 is inserted in the primer pocket 120.” EX1004 at 7:75-8:1 (emphasis added).





Daubenspeck, Figs 38 (top) and 40 (bottom) (annotated)

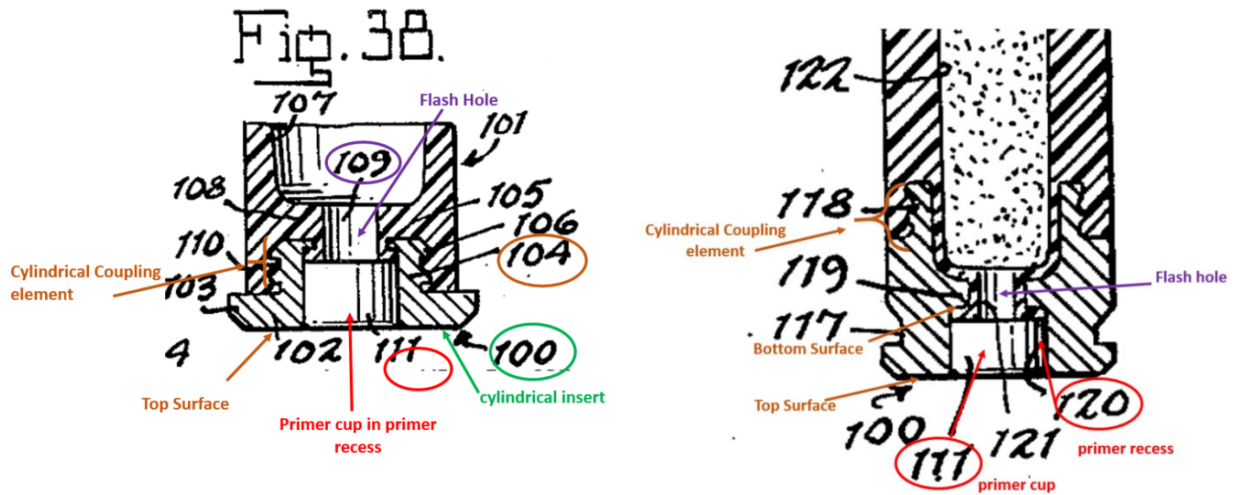
- (3) [1 [1c]]: “a primer flash hole positioned in the primer recess to extend through the bottom surface, and”

60. It is my opinion that Daubenspeck discloses this limitation.

Daubenspeck describes a central vent or flash hole 109 being provided in the overlay portion. EX1004 at Figs. 38-40. As shown in Fig. 38 below, the primer

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recess comprises a primer flash hole 109, and the embodiment show in Fig. 40 illustrates that the primer flash hole 109 extends through the bottom surface.

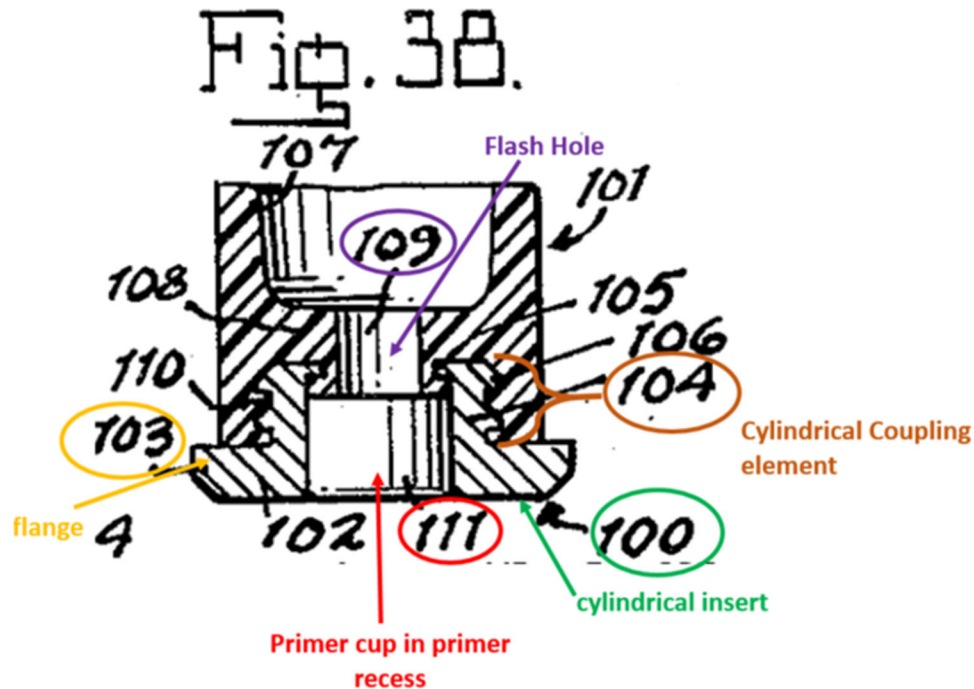


Daubenspeck, Fig. 38 (left) and Fig. 40 (right) (annotated)

- (4) [1 [1d]]: “a flange that extends circumferentially about an outer edge of the top surface; and”

61. It is my opinion that Daubenspeck discloses this limitation.

Daubenspeck describes this “flange” as an “extractor rim” and discloses that “The head comprises a base 102 having a laterally projecting extractor rim 103.”



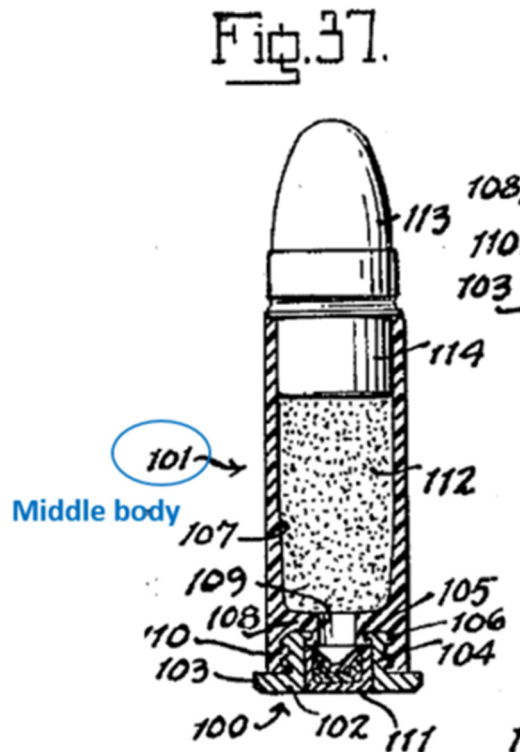
Daubenspeck, Fig. 38 (annotated)

- c) [1 [2]]: “a substantially cylindrical polymeric middle body comprising”

62. It is my opinion that Daubenspeck discloses this limitation.

Daubenspeck discloses that it relates “to firearm cartridges and method of manufacture and assembly thereof,” including “a body or casing of plastic material having high tensile strength and controlled flexibility under expansive pressure.”

EX1004 at 1:11-12, 20-22.



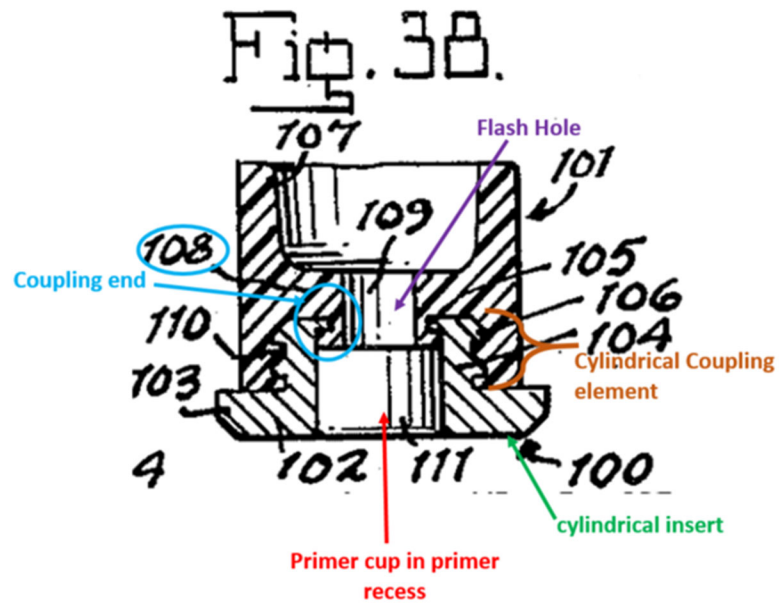
Daubenspeck, Fig. 37 (annotated)

(1) [1 [2a]]: “a substantially cylindrical polymeric bullet-end and”

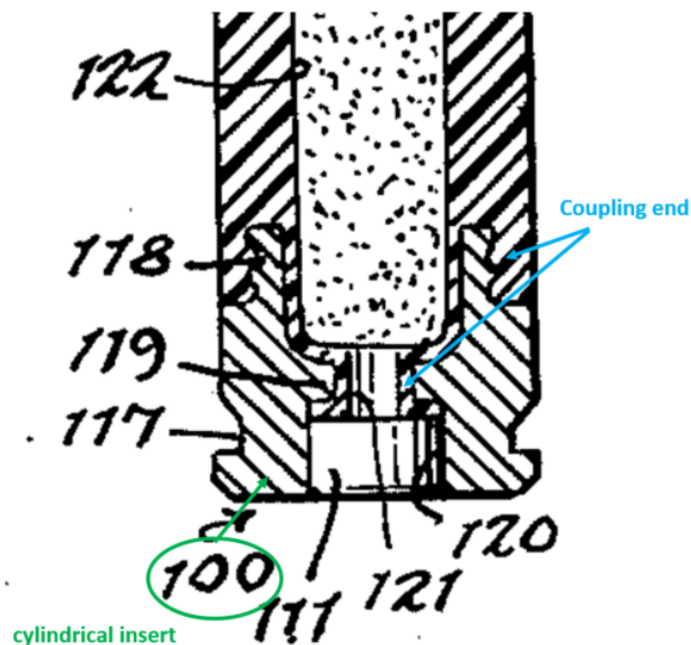
63. It is my opinion that Daubenspeck discloses this limitation. The cartridge disclosed in Daubenspeck has a polymeric middle body **101** that comprises a substantially cylindrical end with an opening for receiving a bullet **113**, where the bullet **113** has a reduced heel **114** that is engaged with a friction fit into the forward open end of the body **101**. EX1004 at 2:32-40.

- (2) [1 [2b]]: “a substantially cylindrical polymeric coupling end connected by a powder chamber, wherein the substantially cylindrical polymeric coupling end extends over the substantially cylindrical coupling element and covers an circumferential surface of the primer flash hole.”

64. It is my opinion that Daubenspeck discloses this limitation. “The plastic casing 101 is substantially cylindrical and is provided with a powder containing chamber 107, the base of which is in the form of an integral overlay portion 108 *molded over the inner end of the battery cup and extended inwardly about the lip 105 to the interior of the primer pocket, a central vent or flash hole 109 being provided in the overlay portion.*” EX1004 at 7:67-72 (emphasis added); Embodiments disclosed in Figs. 38 and 40 of Daubenspeck clearly show this element is met::



Daubenspeck, Fig. 38 (annotated)



Daubenspeck, Fig. 40 (annotated)

- 2. Claim 7: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric bullet-end comprises a forward opening end having a first and a second mechanical interlock for engagement between the forward opening end and a bullet.**

65. It is my opinion that Daubenspeck discloses the limitations added in dependent claim 7. Specifically, Daubenspeck discloses a first and a second mechanical interlock for engagement between the forward opening end and a bullet: “Instead of an integral overlay, however, a separate plastic overlay 129 is provided, and this is preferably joined to the head by insert injection molding. An annular flange 130 surrounding an annular recess 131 is provided upon the head and in the pre-assembled relation this flange projects outwardly and the recess 131 is straight walled, as shown in FIG. 42. In assembling the head and casing the recessed end 132 of the body is engaged in the recess 131 of the head, and thereupon the flange 130 is swaged inwardly by a suitable ring die into interlocking relation with the casing as shown in FIG. 41. The construction of FIG. 41 can be obtained by separate fabrication of the casing and bullet which can be later assembled by a ‘snap fit’.” Thus, Daubenspeck clearly discloses a “first and second mechanical interlock for engagement between the forward opening end and a bullet.” In Daubenspeck, the first and second mechanical interlock are the inner

swage in the bullet head and the adjacent groove in the casing that joins the parts together.

3. Claim 18:

a) 18 [Preamble]: “A polymeric ammunition cartridge comprising:”

66. In the case of claim 18, it is my understanding that the preamble is not limiting because the preamble merely recites limitations restated in the body of the claim. However, to the extent the preamble is construed to be limiting, it is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses “A polymeric ammunition cartridge.”

b) [18 [1]]: “a substantially cylindrical insert comprising”

67. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses “a substantially cylindrical insert.” *Supra* at IX.A.1.b. Daubenspeck discloses this limitation for the same reasons.

(1) [18 [1a]]: “a top surface opposite a bottom surface and a substantially cylindrical coupling element that extends from the bottom surface,”

68. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Figures 37 and 38 of Daubenspeck show “a top surface opposite a

bottom surface and a substantially cylindrical coupling element that extends from the bottom surface.” *Supra* at IX.A.1.b.1.

(2) [18 [1b]]: “a primer recess in the top surface that extends toward the bottom surface,”

69. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses a primer recess in the top surface of the substantially cylindrical insert that extends toward the bottom surface. *Supra* at IX.A.1.b.2. It is my opinion that Daubenspeck discloses this limitation for the same reasons.

(3) [18 [1c]]: “a primer flash hole positioned in the primer recess to extend through the bottom surface,”

70. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses “a primer flash hole positioned in the primer recess to extend through the bottom surface.” *Supra* at IX.A.1.b.3.

Daubenspeck therefore discloses this limitation for the same reasons.

(4) [18 [1d]]: “a flange that extends circumferentially about an outer edge of the top surface;”

71. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses “a flange that extends circumferentially

about an outer edge of the top surface” of the substantially cylindrical insert.

Supra at IX.A.1.b.4.

c) [18 [2]]: “a substantially cylindrical polymeric middle body comprising”

72. It is my opinion that Daubenspeck discloses this limitation. As described above, Daubenspeck discloses that it relates “to firearm cartridges and method of manufacture and assembly thereof,” including “a body or casing of plastic material having high tensile strength and controlled flexibility under expansive pressure.” EX1004 at 1:11-12, 20-22. *Supra* IX.A.1.c.

(1) [18 [2a]]: “a substantially cylindrical polymeric bullet-end and”

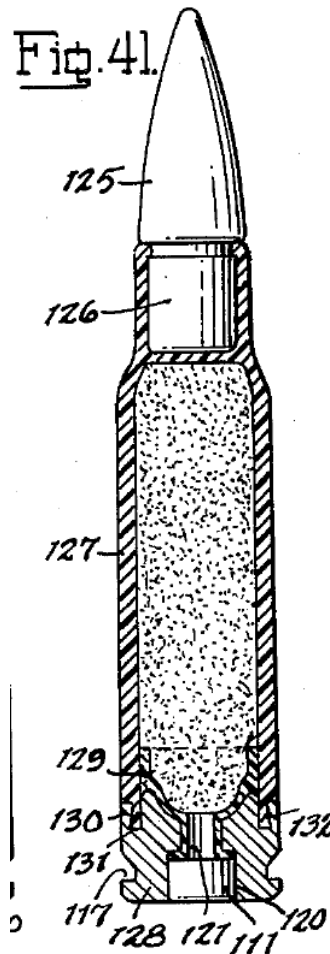
73. It is my opinion that Daubenspeck discloses this limitation. As shown above, the cartridge disclosed in Daubenspeck has a polymeric middle body **101** that comprises a substantially cylindrical end with an opening for receiving a bullet. EX1004 at 2:32-40. *Supra* IX.A.1.c.1.

- (2) [18 [2b]]: “a substantially cylindrical polymeric coupling end connected by a powder chamber, wherein the substantially cylindrical polymeric coupling end extends over the substantially cylindrical coupling element and covers an circumferential surface of the primer flash hole.”

74. As shown above, it is my opinion that Daubenspeck discloses this limitation. “The plastic casing 101 is substantially cylindrical and is provided with a powder containing chamber 107, the base of which is in the form of an integral overlay portion 108 molded over the inner end of the battery cup and extended inwardly about the lip 105 to the interior of the primer pocket, a central vent or flash hole 109 being provided in the overlay portion.” EX1004, 7:67-72 (emphasis added). *Supra* IX.A.1.c.2.

- (3) [18 [2c]]: “a substantially cylindrical polymeric bullet-end upper portion comprising a bullet-end coupling element connected to the substantially cylindrical polymeric bullet end and a forward opening end to engage a bullet.”

75. It is my opinion that Daubenspeck discloses this limitation. One skilled in the art would understand that Figure 41 of Daubenspeck discloses a substantially cylindrical polymeric cartridge having a bullet-end upper portion 126 connected via a bullet-end coupling element with a forward opening end to engage a bullet:



Daubenspeck, Fig. 41

Daubenspeck further discloses that “The construction of FIG. 41 can be obtained by separate fabrication of the casing and bullet which can be later assembled by a ‘snap’ fit.” EX1004, 8:46-48. One skilled in the art would recognize this as a well-known approach to manufacturing. In my experience and based on my knowledge of the art, essentially all ammunition comprises four main components (case,

primer, bullet (projectile), and propellant (powder)), which are assembled after they have each been manufactured.

**B. GROUND 2: CLAIMS 2, 4-6, 10-14 AND 19 OF THE '543
PATENT ARE RENDERED OBVIOUS BY DAUBENSPECK IN
VIEW OF CHUNG.**

76. For at least the reasons below, it is my opinion that claims 2, 4-6, 10-14 and 19 of the '543 Patent are invalid as obvious over Daubenspeck in view of Chung.

1. Motivation to Combine

77. A POSITA would have been motivated to combine Daubenspeck with Chung, and would have had a reasonable expectation of success. Both references are from the same field of endeavor: polymeric cartridge casings for ammunition. EX1004 at 1:1-34; EX1005, abstract

78. A POSITA would have reasonably expected the proposed combination of Daubenspeck and Chung to succeed. Daubenspeck provides a polymer cartridge structure having high tensile strength and controlled flexibility under expansive pressure. EX1005 at 2:31-65. Chung similarly provides polymer cartridge casings for bullets, having a polymeric middle body having high tensile strength to sustain deformation under high interior ballistic pressure, and Chung highlights specific polymers and fastening or interlocking means that are preferred

to achieve these goals. EX1005 at ¶100. It is my opinion that incorporating Chung's teachings into Daubenspeck would be a straightforward combination and well within the capabilities of a POSITA.

79. Daubenspeck, Chung and the '543 Patent are analogous art, as they are all directed to polymeric ammunition cartridges. *See* EX1001, Abstract; EX1004 at 1:1-3; EX1005, Abstract.

2. Claim 2: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric middle body is formed from a ductile polymer.

80. It is my opinion that Daubenspeck discloses the limitations of independent claim 1. *Supra* at IX.A.1.

81. It is my opinion that Chung discloses the limitations added in dependent claim 2. Namely, Chung discloses a middle body of a polymer casing is comprised of a ductile polymer. EX1005, abstract, ¶16, claim 2.

3. Claim 4: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric middle body is formed from a fiber-reinforced polymeric composite.

82. It is my opinion that Chung discloses the limitations added in dependent claim 4. Specifically, Chung discloses that the middle body is "formed from a fiber-reinforced polymeric composite." EX1005, ¶17, claim 3.

- 4. Claim 5: The polymeric ammunition cartridge of claim 4, wherein the fiber-reinforced polymeric composite contains between about 10 and about 70 wt % glass fiber fillers, mineral fillers, or mixtures thereof.**

83. It is my opinion that Chung discloses the limitations added in dependent claim 5. With respect to the fiber reinforced polymeric composite, Chung discloses that the polymeric composite contains between 1- 70 wt. % glass fiber fillers, mineral fillers, or mixtures thereof. EX1005, ¶ 73, claim 4.

- 5. Claim 6: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric bullet-end and bullet are further welded or bonded together.**

84. It is my opinion that Chung discloses the limitations added in dependent claim 6. Chung discloses a substantially cylindrical polymeric bullet-end and bullet are welded or bonded together, when consolidate powder is used. EX1005, ¶ 77, claim 56.

- 6. Claim 10: The polymeric ammunition cartridge of claim 1, wherein the forward opening end is crimped so that a polymeric material flows into an annular groove of a bullet.**

85. It is my opinion that Chung discloses the limitations added in dependent claim 10. Specifically, Chung discloses that the casing mouth can be crimped at the tip to increase further the frictional resistance. Crimping the case mouth 17 with or without heat can force polymeric material to flow into the

annular grove 13 of the projectile, thus increasing the bullet pull force. EX1005, ¶ 83, Figs. 6a and 6b. *See also*, claim 17 of Chung, “...wherein said casing mouth is crimped at said tip so that polymeric material at said tip flows into said annular groove of said projectile.”

7. Claim 11: The polymeric ammunition cartridge of claim 1, wherein a bullet is adhesively fitted to the forward opening end.

86. It is my opinion that Chung discloses the limitations added in dependent claim 11. Specifically, Chung notes that the middle body and bullet-end components may be joined by adhesive bonding. “The middle body and bullet-end components may be joined by adhesive bonding, solvent welding, spin welding, vibration welding, ultrasonic welding or laser welding” EX1005, ¶ 20.

8. **Claim 12: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric middle body comprise a polymers selected from the group consisting of polyurethane prepolymer, cellulose, fluoro-polymer, ethylene inter-polymer alloy elastomer, ethylene vinyl acetate, nylon, polyether imide, polyester elastomer, polyester sulfone, polyphenyl amide, polypropylene, polyvinylidene fluoride or thermoset polyurea elastomer, acrylics, homopolymers, acetates, copolymers, acrylonitrile-butadinen-styrene, thermoplastic fluoro polymers, inomers, polyamides, polyamide-imides, polyacrylates, polyatherketones, polyaryl-sulfones, polybenzimidazoles, polycarbonates, polybutylene, terephthalates, polyether imides, polyether sulfones, thermoplastic polyimides, thermoplastic polyurethanes, polyphenylene sulfides, polyethylene, polypropylene, polysulfones, polyvinylchlorides, styrene acrylonitriles, polystyrenes, polyphenylene, ether blends, styrene maleic anhydrides, polycarbonates, allyls, aminos, cyanates, epoxies, phenolics, unsaturated polyesters, bismaleimides, polyurethanes, silicones, vinylesters, urethane hybrids, polyphenylsulfones, copolymers of polyphenylsulfones with polyethersulfones or polysulfones, copolymers of poly-phenylsulfones with siloxanes, blends of polyphenylsulfones with polysiloxanes, poly(etherimide-siloxane) copolymers, blends of polyetherimides and polysiloxanes, and blends of polyetherimides and poly(etherimide-siloxane) copolymers.**

87. It is my opinion that Chung discloses the limitations added in dependent claim 12. Specifically, Chung discloses that the middle body component can comprise various polymers, including poly-phenylsulfones with siloxanes.

EX1005, ¶ 20, claim 12.

9. **Claim 13: The polymeric ammunition cartridge of claim 1, wherein the forward opening end comprises a neck with a plurality of internal structures for supporting a bullet.**

88. It is my opinion that Chung discloses the limitations added in dependent claim 13. Specifically, Chung discloses “[i]n an alternate embodiment, the bullet-end component may be made of a ductile polymer and is molded with a plurality of internal structures for supporting the projectile and holding it in place”. EX1005, ¶ 22.

10. **Claim 14: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical coupling element is a male coupling element with a straight skirt interlock surface that tapers to a smaller diameter at the forward portion on the skirt tip to mate with a female coupling element of the substantially cylindrical polymeric coupling end.**

89. It is my opinion that Chung discloses the limitations added in dependent claim 14. Chung discloses that the “[t]he interlock surface 36 of male coupling element 32 also preferably tapers from a larger diameter at the rearward most portion thereof to a smaller diameter at the forward portion, while the thickness of skirt 44 also increases from skirt base 39 to skirt tip 37 so that when contacted with the interlock surface 36 of male coupling element 32, a physical snap-fit or molded-in mechanical interlock results between head-end component 38 and middle body component 28.” EX1005, ¶ 74-75, claim 23, (emphasis added).

Chung further notes that this straight skirt interlock configuration with tapering ends can be reversed where the female component of the interlock is on the middle body and male component (i.e. tapering skirt tip) is on the end component insert, as required in claim 14. “In an alternate embodiment, the female coupling element can be formed on the second end of the middle body component and the male coupling element can be formed on the open end of the casing head-end component. Thus, the middle body component can have male coupling elements on both ends, female coupling elements on both ends, or a male coupling element on one end and a female coupling element on the opposite end.” EX1005, ¶ 75. In addition, claim 28 of Chung discloses “... wherein said male coupling element of said middle body component is formed with a straight interlock surface that tapers to a smaller diameter at the coupling element tip, and said female coupling element of said head-end component is formed with a straight skirt interlock surface that tapers to a smaller diameter at the forward portion on the skirt tip.”

11. Claim 19: The polymeric ammunition cartridge of claim 18, wherein the forward opening end has one or more annular rings positioned to receive a corresponding two or more annular grooves in the bullet.

90. It is my opinion that Chung discloses the limitations added in dependent claim 19. Chung discloses an embodiment in FIGS. 6a, where projectile

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14 has an annular groove 13 positioned to receive the tip of casing mouth 17 to increase the frictional resistance of the interference fit between projectile 14 and casing neck 26. Chung further discloses the cartridge comprises “neck and shoulder define an annular inner recess for supporting a projectile.” EX1005, claim 35. It is also my opinion that the reference to “corresponding two or more annular grooves in the bullet” is a typographical or clerical error, given that the antecedent reference in Claim 19 is to “**one or more** annular rings” (emphasis added). In an embodiment with more annular rings on the cartridge case than grooves on the bullet, the system would not work because when assembled the superfluous annular ring (or rings) on the cartridge case would cause a bulge that would render the round of ammunition unusable (unchamberable). In fact, a POSITA would understand that such an imbalance would create problems. It seems clear that “one of more annular rings” on the case would correspond in equal number with “one or more annular grooves” on the bullet.

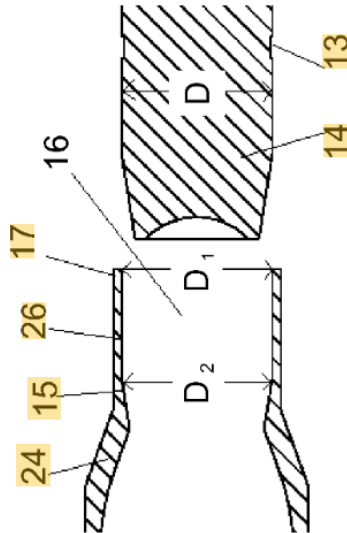


Fig. 6a of Chung (annotated)

C. GROUND 3: CLAIM 3 OF THE '543 PATENT IS RENDERED OBVIOUS BY DAUBENSPECK IN VIEW OF KAY-CLOUGH

91. For at least the reasons below, it is my opinion that claim 3 the '543 Patent is invalid as obvious over Daubenspeck in view of Kay-Clough.

1. Motivation to Combine

92. A POSITA would have been motivated to combine Daubenspeck with Kay-Clough, and would have had a reasonable expectation of success. Both references are from the same field of endeavor: cartridge casings for ammunition. EX1004 at 1:1-34; EX1009 at Abstract.

93. A POSITA would have reasonably expected the proposed combination of Daubenspeck and Kay-Clough to succeed. Daubenspeck provides a polymer cartridge comprising a primer and material structure having high tensile

strength and controlled flexibility under expansive pressure. Daubenspeck discloses that the polymer cartridge can be product by injection molding. Kay-Clough similarly discloses polymer cartridge casings for ammunition, wherein the cartridge can be injection molded from a polymeric material, such as nylon. EX1009, claims 35 and 36. Thus, Kay-Clough suggests that nylon is a known and suitable polymer for use with injection molded ammunition cartridges. It is my opinion that using nylon as the polymer in the ammunition disclosed by Daubenspeck would have been straightforward combination and well within the capabilities of a POSITA.

2. Claim 1

94. It is my opinion that Daubenspeck discloses the limitations of independent claim 1. *Supra* at IX.A.1.

3. Claim 3. The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric middle body comprises a nylon polymer.

95. It is my opinion that Daubenspeck discloses the limitations of claim 1. *Supra* at IXA1. Daubenspeck further discloses a variety of polymeric compounds which can be used for the middle body casing, although it is silent as to the use of nylon. Kay-Clough discloses use of nylon as suitable material for polymeric material for a cartridge casing (i.e. a polymeric middle body). EX1009, claims 35

and 36. Therefore, it is my opinion that the use of nylon as the specific polymer of choice would have been obvious and well within the knowledge of a POSITA.

D. GROUND 4: CLAIMS 8 AND 9 OF THE '543 PATENT ARE RENDERED OBVIOUS BY DAUBENSPECK IN VIEW OF NONTE

96. For at least the reasons below, it is my opinion that claims 8 and 9 of the '543 Patent are invalid as obvious over Daubenspeck in view of Nonte.

1. Motivation to Combine

97. A POSITA would have been motivated to combine Daubenspeck with Nonte, and would have had a reasonable expectation of success. Both references are from the same field of endeavor: cartridge casings for ammunition. EX1004 at 1:1-34; EX1006 at 29, 77.

98. A POSITA would have reasonably expected the proposed combination of Daubenspeck and Nonte to succeed. Daubenspeck provides a polymer cartridge structure having high tensile strength and controlled flexibility under expansive pressure. EX1004 at 2:31-65. Nonte similarly depicts polymer cartridge casings for bullets. EX1006 at 29, 77. It is my opinion that incorporating Nonte's teachings into Daubenspeck would be a straightforward combination and well within the capabilities of a POSITA.

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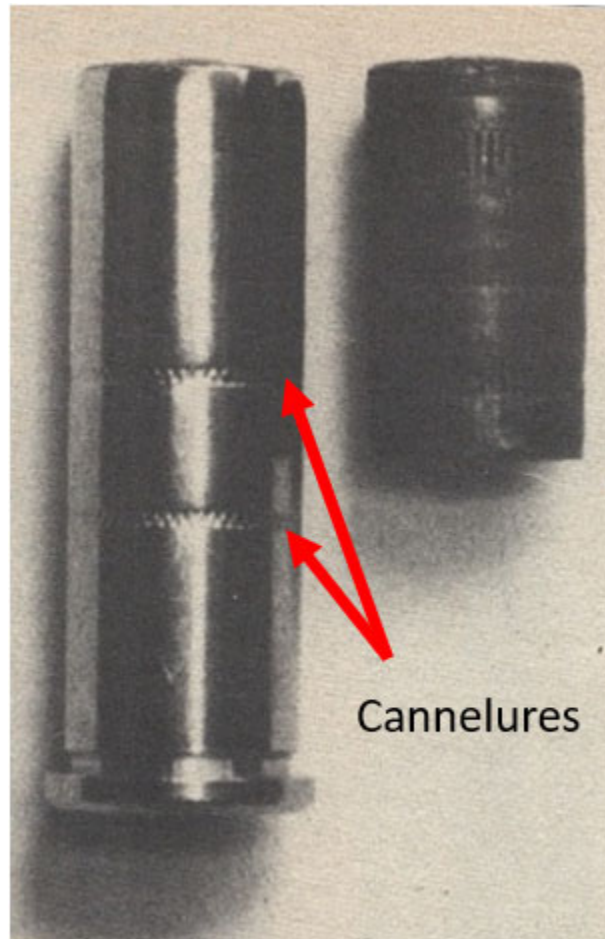
99. Daubenspeck, Nonte and the '543 Patent are analogous art, as they are all directed to ammunition cartridges. *See* EX1001, Abstract; EX1004 at 1:1-3; EX1006, 29, 27.

2. Claim 1

100. It is my opinion that Daubenspeck discloses the limitations of independent claim 1. *Supra* at IX.A.1.

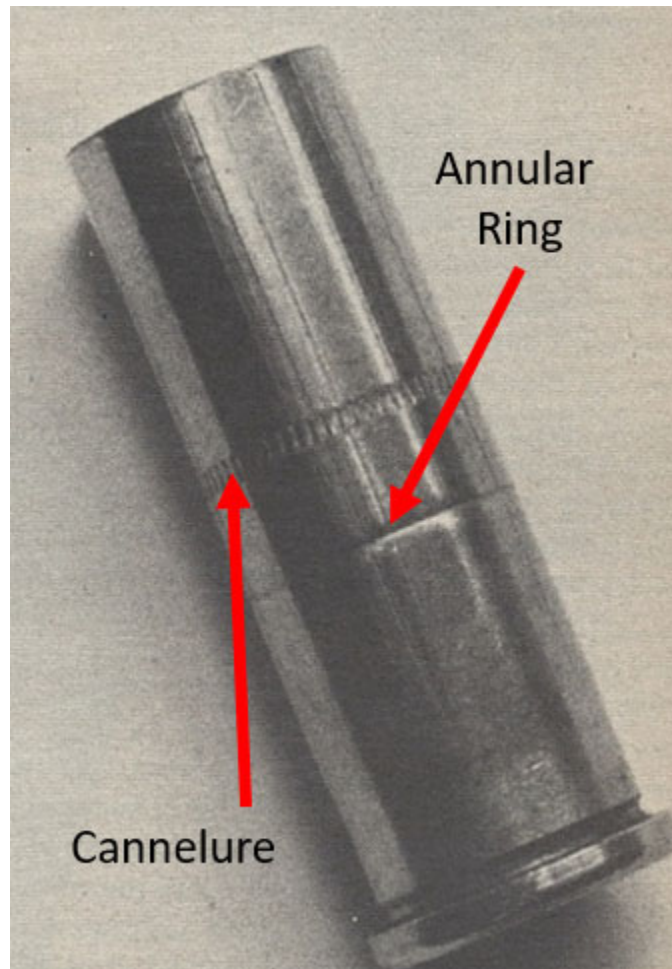
3. Claim 8: The polymeric ammunition cartridge of claim 1, wherein the forward opening end comprises one or more cannellures formed on an outer circumferential surface of the forward opening end.

101. It is my opinion that Nonte discloses the limitations added in dependent claim 8. Nonte depicts a .38 Special, mid-range, full wadcutter target load and bullet depicting two cannellures formed on an outer circumferential surface of the forward opening end. EX1006 at 29. This disclosure teaches one or more cannellures formed on an outer circumferential surface of the forward opening end.



Nonte at 29 (figure, annotated)

102. Nonte depicts a second casing having one cannellure formed on an outer circumferential surface of the forward opening end. EX1006 at 29. It is my opinion that this disclosure also teaches one or more cannellures formed on an outer circumferential surface of the forward opening end.



Nonte at 77 (figure, annotated)

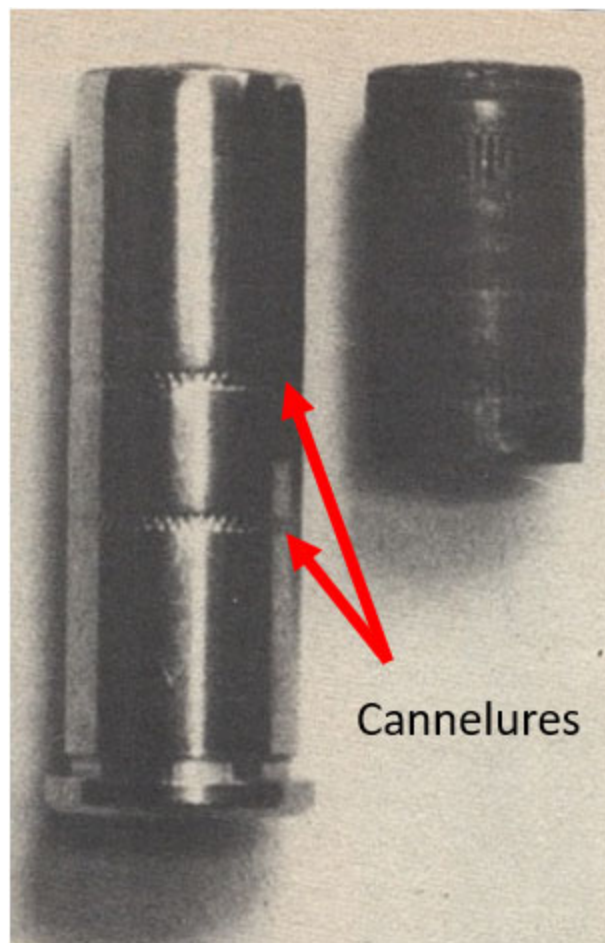
4. **Claim 9: The polymeric ammunition cartridge of claim 1, wherein the forward opening end comprises one, two, three, or more annular rings that mate with one, two, three, or more corresponding annular grooves positioned on the bullet.**

103. It is my opinion that Nonte discloses the limitations added in dependent claim 9. Nonte depicts a .38 Special, mid-range, full wadcutter target load and bullet depicting two cannelures, which form annular rings that are

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configured to mate with corresponding annular grooves positioned on the bullet.

EX1006 at 29. It is my opinion that this disclosure teaches one, two, three, or more annular rings that mate with one, two, three, or more corresponding annular grooves positioned on the bullet.

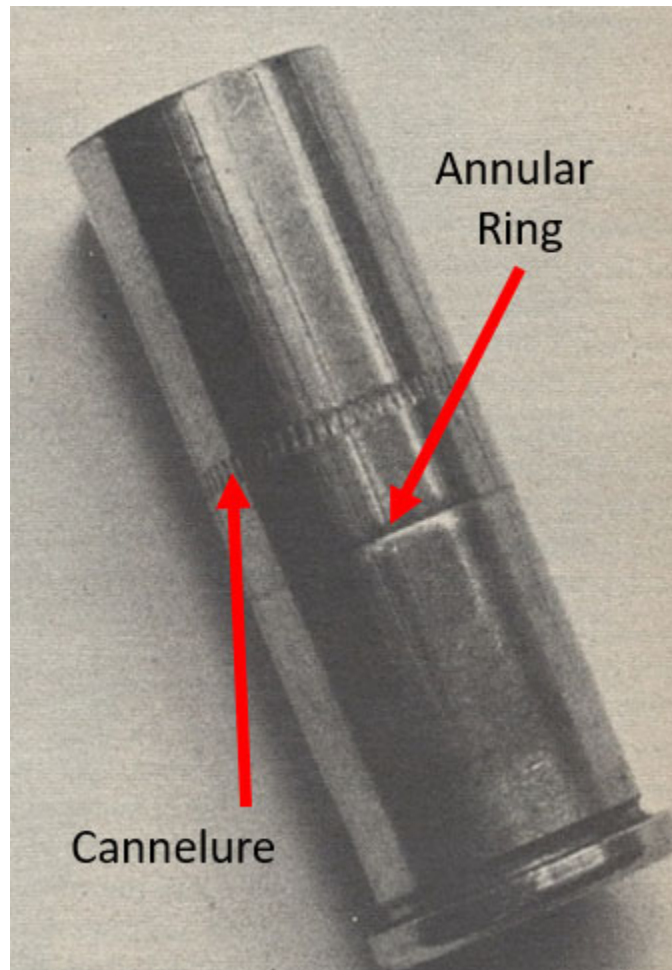


Nonte at 29 (figure, annotated)

104. Nonte depicts a second casing having one cannellure formed on an outer circumferential surface of the forward opening end as well as a second

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annular ring. EX1006 at 29. One, two, three, or more annular rings that mate with one, two, three, or more corresponding annular grooves positioned on the bullet.



Nonte at 77 (figure, annotated)

E. GROUND 5: CLAIMS 15-17 OF THE '543 PATENT ARE RENDERED OBVIOUS BY DAUBENSPECK IN VIEW OF ANDERSON.

1. Motivation to combine

105. It is my opinion that a POSITA would have been motivated to combine the teachings of Daubenspeck with Anderson, and would have had a reasonable expectation of success. Both references are from the same field of endeavor: polymer cartridge casings for ammunition. EX1004 at 1:1-34; EX1007, Abstract.

106. It is my opinion that a POSITA would have reasonably expected the proposed combination of Daubenspeck and Anderson to succeed. Daubenspeck provides a polymer cartridge comprising a primer and material structure having high tensile strength and controlled flexibility under expansive pressure.

Daubenspeck discloses the use of a traditional primer cup inserted in the primer recess base insert. EX1004 at 2:31-65. Anderson similarly discloses composite polymer cartridge casings for bullets, having a primer recess in a base insert.

EX1007, Abstract, Figs 4 and 5. A conventional primer is then inserted into flanged cup 50 when the cartridge is to be loaded. A POSITA would understand that placing this reinforcing flanged cup 50 between the polymeric casing and a primer recess would provide protection to the polymer against heat and pressure

caused from the primer ignition. Anderson further discloses a flanged cup which has a cylindrical recess into which a conventional primer is inserted. A circumferential flange extends about the primer cup and extends into the flash hole with a tubular extension and tip/lip. EX1007 at 3:43-67, Figs. 4 and 5. This configuration aids in securing the base insert rim to the casing. Incorporating Anderson's teachings into Daubenspeck would result in providing a more secure fit of the base insert to the casing. It is my opinion that this would be a straightforward combination and well within the capabilities of a POSITA.

107. Daubenspeck, Anderson and the '543 Patent are analogous art, as they are all directed to composite polymeric ammunition cartridges. *See* EX1001, Abstract; EX1004 at 1:1-3; EX1007, Abstract.

2. Claim 1

108. It is my opinion that Daubenspeck discloses the limitations of independent claim 1. *Supra* at IX.A.1.

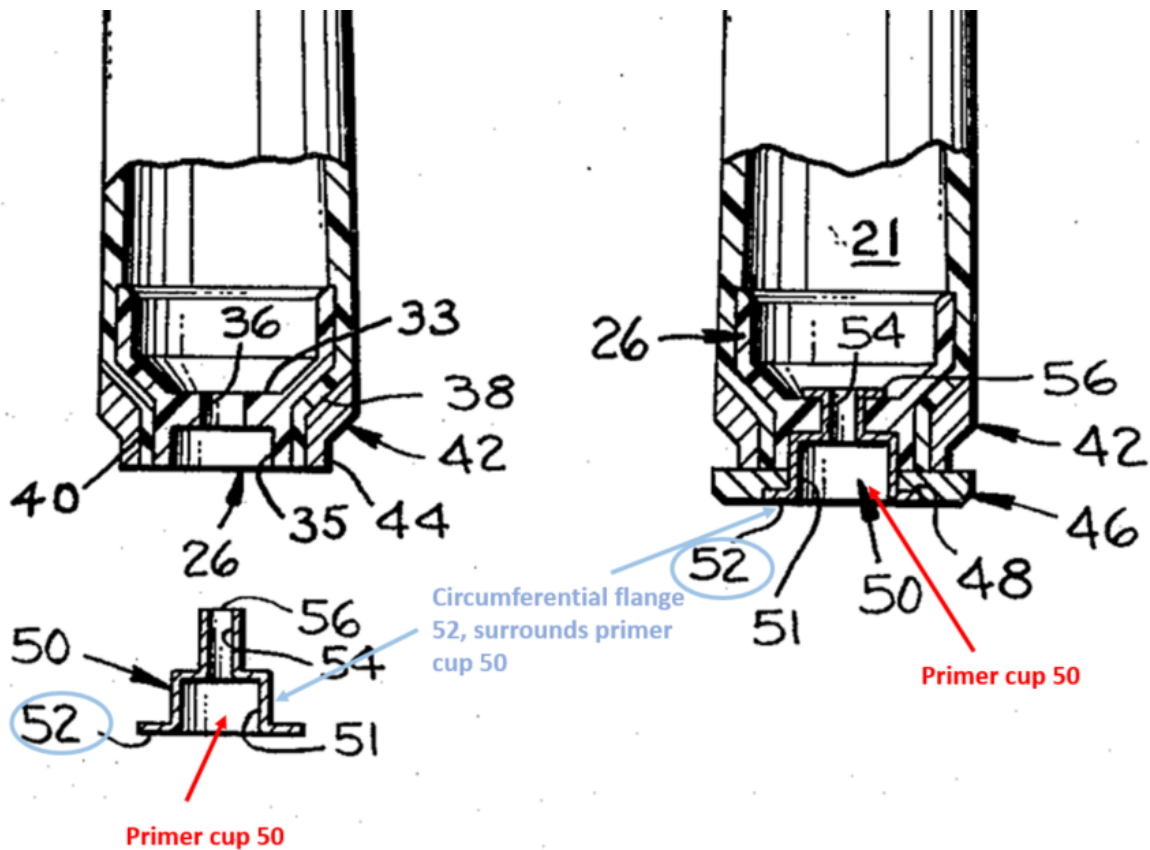
3. Claim 15: The polymeric ammunition cartridge of claim 1, further comprising a diffuser positioned in the primer recess comprising a diffuser flash hole aligned with the primer flash hole.

109. It is my opinion that Daubenspeck discloses a primer recess. *Supra* at IX.A.1.b.2. Daubenspeck also discloses a primer flash hole. *Supra* at IX.A.1.b.3.

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However, it is my opinion that Daubenspeck does not disclose a diffuser positioned in the primer recess comprising a diffuser flash hole aligned with the primer flash hole. Anderson remedies this deficiency in Daubenspeck.

110. It is my opinion that Anderson discloses a flanged cup member 50, having a circumferential flange 52. Figures 4 and 5 of Anderson, shown below, disclose a flanged cup member 50 having a structure surrounding it (flange 52, with a flash hole having tubular walls 54). The flash hole of the cup member aligns with the primer flash hole 36. EX1007 at 3:43-67, Figs. 4 and 5. Anderson discloses that "[t]he flanged cup 50, shown prior to assembly with the casing in FIG. 4, has a cylindrical recess 51 into which a conventional primer (not shown) is later inserted when the cartridge casing is to be loaded" *Id.* The flanged cup 50 with circumferential structure 52 disclosed in Anderson acts as a diffuser and has a similar structure to the diffuser claimed in the '543 Patent.



Anderson, Fig. 4 (left) and Fig. 5 (right), (annotated)

4. Claim 16:

- a) 16 [Preamble]: “A polymeric ammunition cartridge having a diffuser comprising:”

111. In the case of claim 16, the preamble is not limiting because the preamble merely recites limitations restated in the body of the claim. However, to the extent the preamble is construed as limiting, it is my opinion that Daubenspeck

discloses this limitation. As discussed above, Daubenspeck discloses “A polymeric ammunition cartridge.” EX1004 at 7:75-8:2.

b) [16 [1]]: “a substantially cylindrical insert comprising”

112. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses “a substantially cylindrical insert.” *Supra* at IX.A.1.b. Daubenspeck discloses this limitation for the same reasons.

(1) [16 [1a]]: “a top surface opposite a bottom surface and a substantially cylindrical coupling element that extends from the bottom surface,”

113. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Figures 37 and 38 of Daubenspeck show “a top surface opposite a bottom surface and a substantially cylindrical coupling element that extends from the bottom surface.” *Supra* at IX.A.1.b.1.

(2) [16 [1b]]: “a primer recess in the top surface that extends toward the bottom surface,”

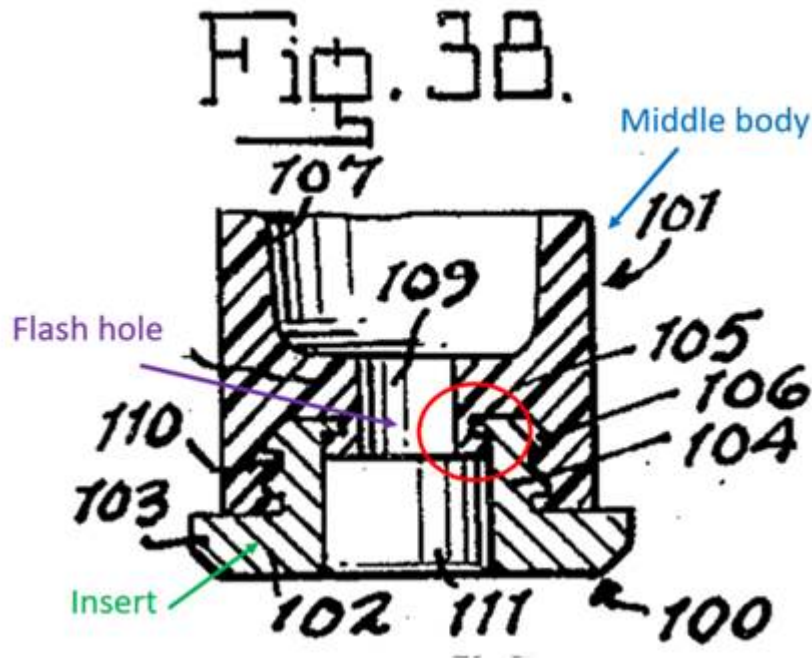
114. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses a primer recess in the top surface of the substantially cylindrical insert that extends toward the bottom surface. *Supra* at IX.A.1.b.2. Daubenspeck discloses this limitation for the same reasons.

(3) [16 [1c]]: “a primer flash hole positioned in the primer recess to extend through the bottom surface,”

115. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses “a primer flash hole positioned in the primer recess to extend through the bottom surface.” *Supra* at IX.A.1.b.3. Daubenspeck therefore discloses this limitation for the same reasons.

(4) [16 [1d]]: “a flange that extends circumferentially about an outer edge of the top surface;”

116. It is my opinion that Daubenspeck discloses this limitation. As discussed above, Daubenspeck discloses “a flange that extends circumferentially about an outer edge of the top surface” of the substantially cylindrical insert. *Supra* at IX.A.1.b.4.



Annotated Figure 38, from Daubenspeck, Depicting Insert and Flange

- c) [16 [2]]: “a diffuser positioned in the primer recess comprising a diffuser flash hole aligned with the primer flash hole; and;”

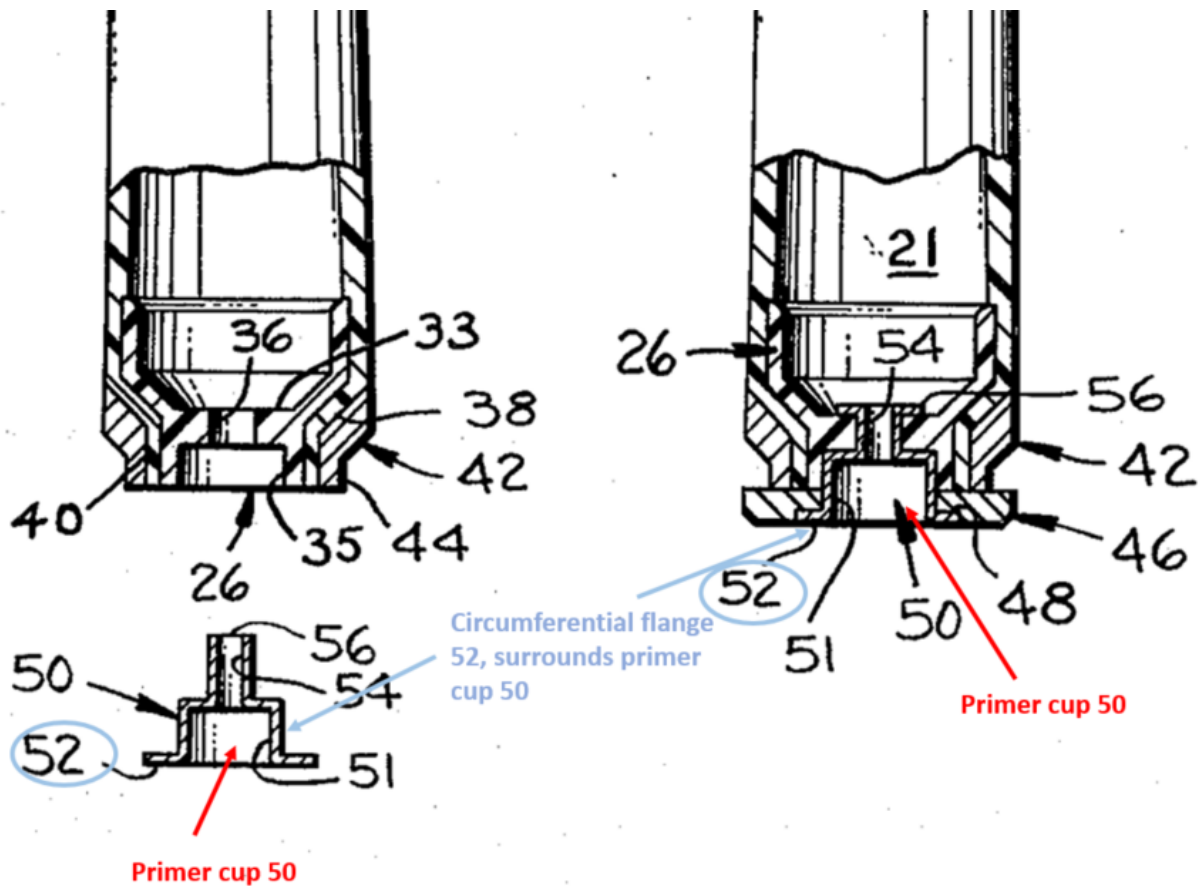
117. Although Daubenspeck discloses a primer recess and flash hole, Daubenspeck does not disclose a diffuser positioned in the primer recess comprising a diffuser flash hole aligned with the primer flash hole. It is my opinion that Anderson remedies this deficiency in Daubenspeck.

118. Anderson discloses a flanged primer cup 50, having a circumferential flange 52. Figures 4 and 5 of Anderson, shown below, disclose a flanged cup 50 having a structure surrounding it (flange 52, with a flash hole having tubular walls

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54). The flash hole of the flange cup 50 aligns with the primer flash hole 36.

EX1007, col 3: 43-67, Figs. 4 and 5. A conventional primer is then inserted into flanged cup 50. It is my opinion that a POSITA would understand that placing this reinforcing flanged cup 50 between the polymeric casing and a primer recess would provide protection to the polymer against heat and pressure caused from the primer ignition, in addition to improving structural integrity. The flanged cup structure 50 disclosed in Anderson is a similar structure to the “diffuser” claimed in the Patent ’543.



Anderson, Fig. 4 (left) and Fig. 5 (right), (annotated)

d) [16 [3]]: “a substantially cylindrical polymeric middle body comprising”

119. It is my opinion that Daubenspeck discloses this limitation. As described above, Daubenspeck discloses that it relates “to firearm cartridges and method of manufacture and assembly thereof,” including “a body or casing of plastic material having high tensile strength and controlled flexibility under expansive pressure.” EX1004 at 1:11-12, 20-22. *Supra* IX.A.1.c.

(1) [16 [3a]]: “a substantially cylindrical polymeric bullet-end and”

120. It is my opinion that Daubenspeck discloses this limitation. As shown above, the cartridge disclosed in Daubenspeck has a polymeric middle body **101** that comprises a substantially cylindrical end with an opening for receiving a bullet. EX1004 at 2:32-40. *Supra* IX.A.1.c.1.

(2) [16 [3b]]: “a substantially cylindrical polymeric coupling end connected by a powder chamber, wherein the substantially cylindrical polymeric coupling end extends over the substantially cylindrical coupling element and covers an circumferential surface of the primer flash hole.”

121. As shown above, it is my opinion that Daubenspeck discloses this limitation. “The plastic casing 101 is substantially cylindrical and is provided with a powder containing chamber 107, the base of which is in the form of an integral overlay portion 108 *molded over the inner end of the battery cup and extended inwardly about the lip 105 to the interior of the primer pocket, a central vent or flash hole 109 being provided in the overlay portion.*” EX1004 at 7:67-72 (emphasis added). *Supra* IX.A.1.c.2.

5. Claim 17: The polymeric ammunition cartridge of claim 16, wherein the diffuser has a primer flash hole with a flash hole lip extending into a bore of the primer flash hole.

122. It is my opinion that Anderson discloses the limitations of this claim. Specifically, Anderson, in Fig. 5 (reproduced above), discloses a diffuser with a primer flash hole having a flash hole lip extending into a primer flash hole (elements 54 and 56 of Fig. 5 reproduced above). EX1007, Fig. 5.

F. GROUND 6: CLAIMS 1, 2, 4-6, AND 10-14 OF THE '543 PATENT ARE RENDERED OBVIOUS BY CHUNG IN VIEW OF DAUBENSPECK.

123. For at least the reasons below, claims 1, 2, 4-6, and 10-14 of the '543 Patent are invalid as obvious over Chung in view of Daubenspeck.

1. Motivation to Combine

124. It is my opinion that a POSITA would have been motivated to combine Chung and Daubenspeck, and would have had a reasonable expectation of success. Both references are from the same field of endeavor: polymer cartridge casings for ammunition. EX1004 at 1:1-34; EX1005, abstract

125. It is my opinion that a POSITA would have reasonably expected the proposed combination of Chung and Daubenspeck to succeed. Chung provides polymer cartridge casings for bullets, having polymeric middle body which has high tensile strength to sustain deformation under high interior ballistic pressure

and highlights specific polymers and fastening or interlocking means which are preferred to achieve these goals. EX1005, ¶ [100]. Daubenspeck similarly provides a polymer cartridge structure having high tensile strength and controlled flexibility under expansive pressure. EX1005 at 2:31-65. It is my opinion that incorporating Daubenspeck's teachings into Chung would be a straightforward combination and well within the capabilities of a POSITA.

126. Chung, Daubenspeck and the '543 Patent are analogous art, as they are all directed to polymeric ammunition cartridges. *See* EX1001, Abstract; EX1004 at 1:1-3; EX1005, Abstract.

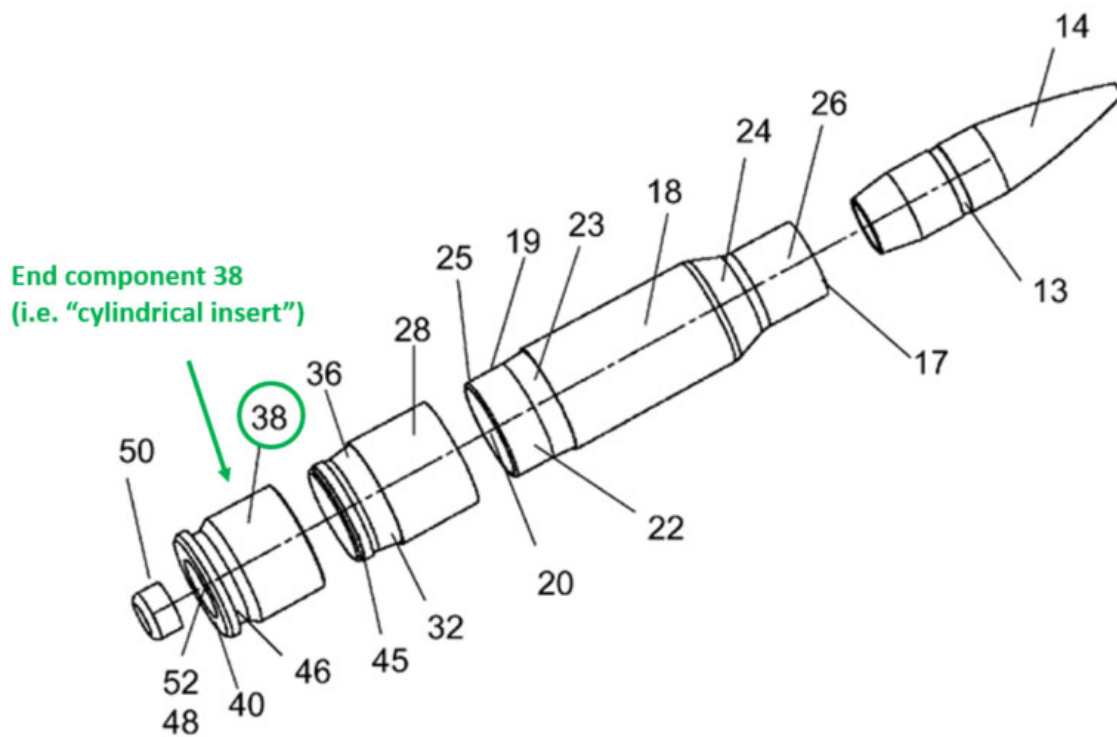
2. Claim 1

a) [1 [Preamble]]: “A polymeric ammunition cartridge comprising:”

127. To the extent the preamble is limiting, it is my opinion that Chung discloses this limitation. Chung discloses that it relates to “[a]n ammunition cartridge assembled from (1) a substantially cylindrical polymeric cartridge casing...” EX1005, Abstract, claim 1.

b) [1 [1]]: “a substantially cylindrical insert comprising”

128. It is my opinion that Chung discloses this limitation. EX1005, Abstract. As shown in Fig. 3 reproduced below, Chung discloses an “end component 38” which is cylindrical in shape.

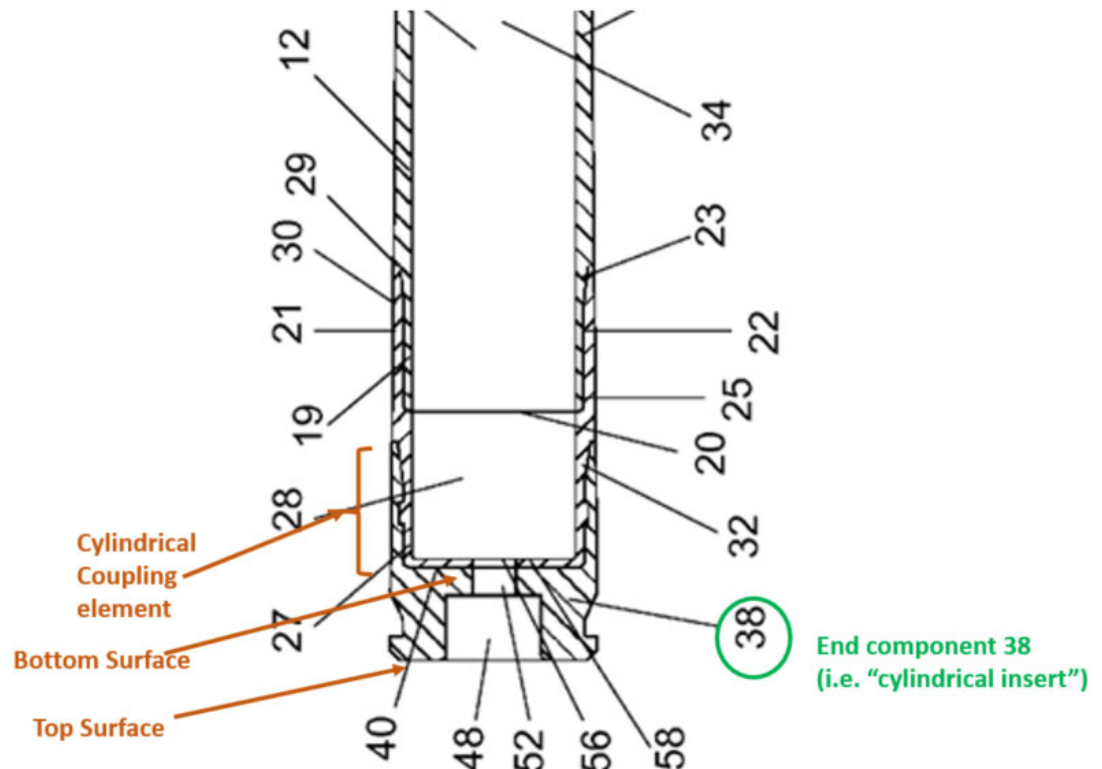


Chung, Fig. 3 (annotated to show cylindrical insert)

(1) [1 [1a]]: “a top surface opposite a bottom surface and a substantially cylindrical coupling element that extends from the bottom surface,”

129. It is my opinion that Chung discloses this limitation. EX1005, ¶ 72, Fig. 2. As shown in Fig. 2 of Chung, reproduced below, Chung describes a

substantially cylindrical coupling element that extends from the bottom surface of the end component 38 (i.e. “cylindrical insert”).



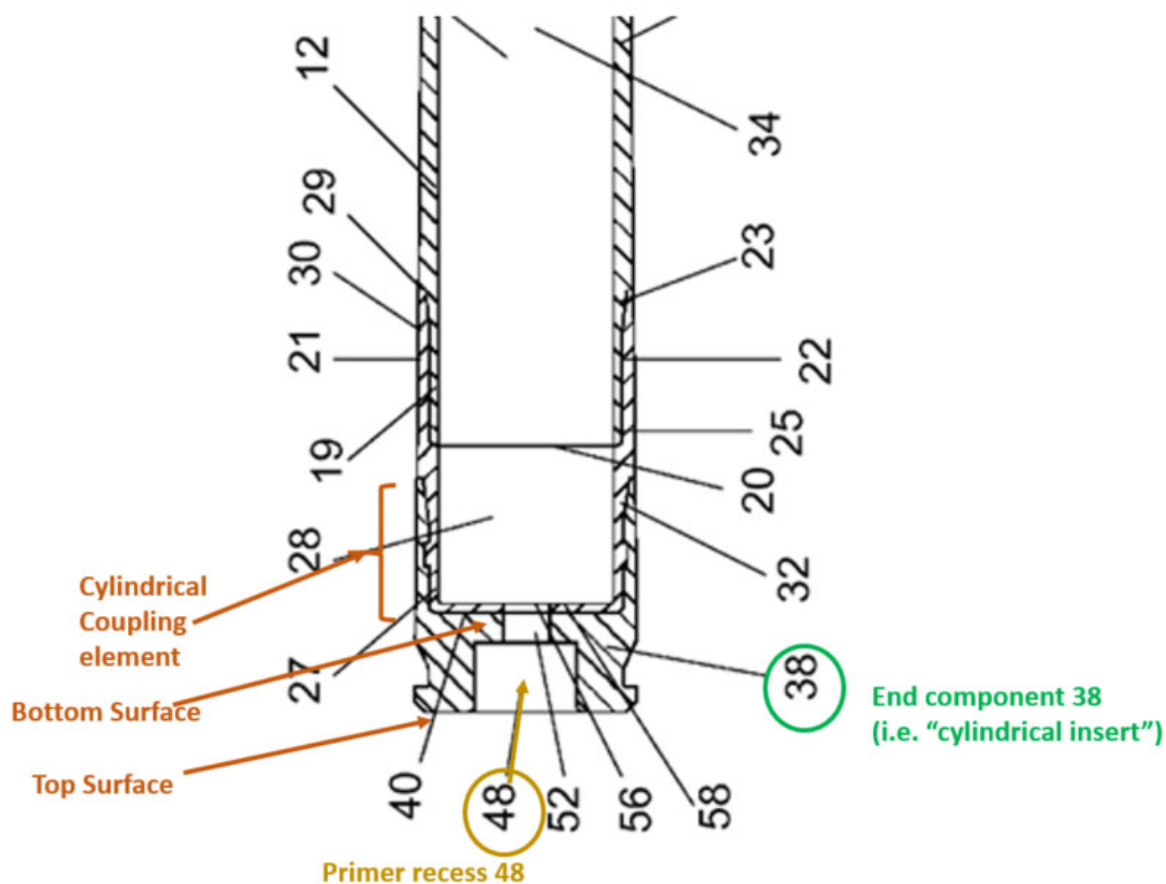
Chung, Fig. 2 (annotated to show “cylindrical coupling element”)

(2) [1 [1b]]: “a primer recess in the top surface that extends toward the bottom surface;”

130. It is my opinion that Chung discloses this limitation. The cylindrical insert of Chung comprises a primer recess in the top surface that extends to the bottom surface, as shown below in annotated Fig. 2. Chung specifically discloses

“[h]ead-end component 38 has an extraction groove 46 cut therein and a primer
recess 48 formed therein for ease of insertion of the primer 50.” EX1005, ¶ 76

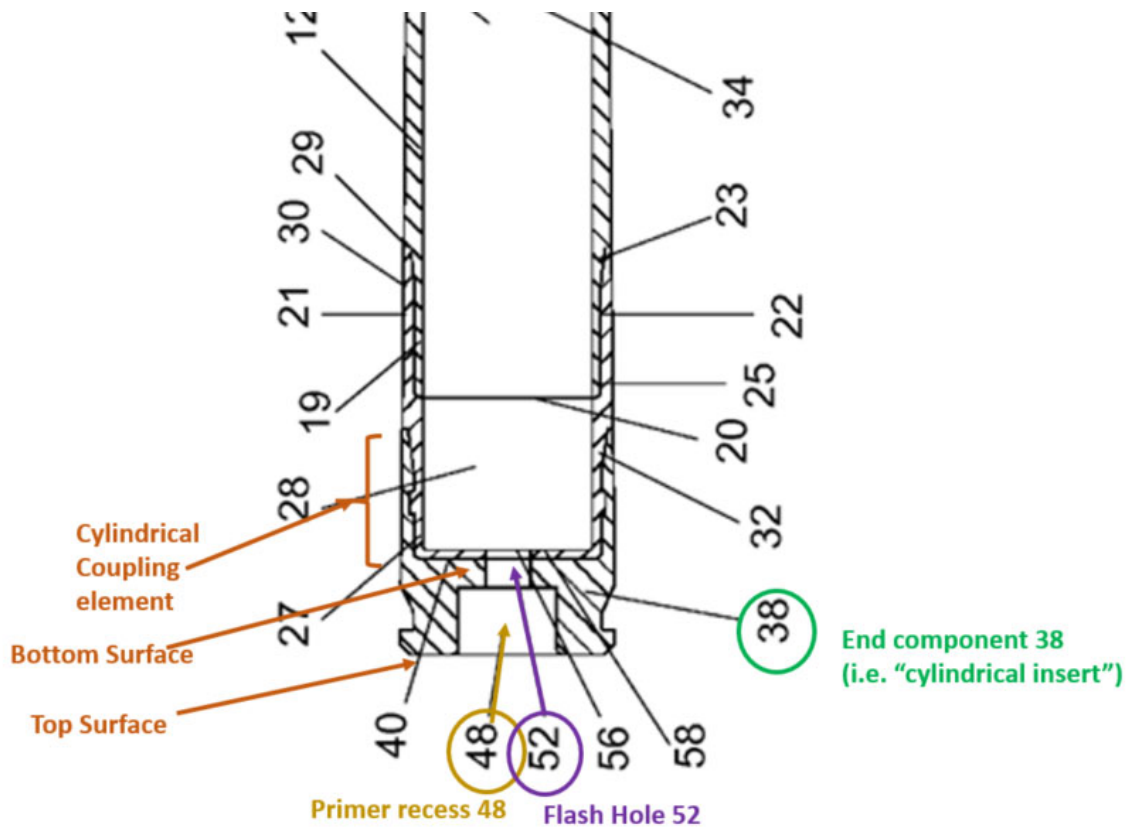
(emphasis added), Fig. 2.



Chung, Fig. 2 (annotated to show “primer recess”)

(3) [1 [1c]]: “a primer flash hole positioned in the primer recess to extend through the bottom surface, and”

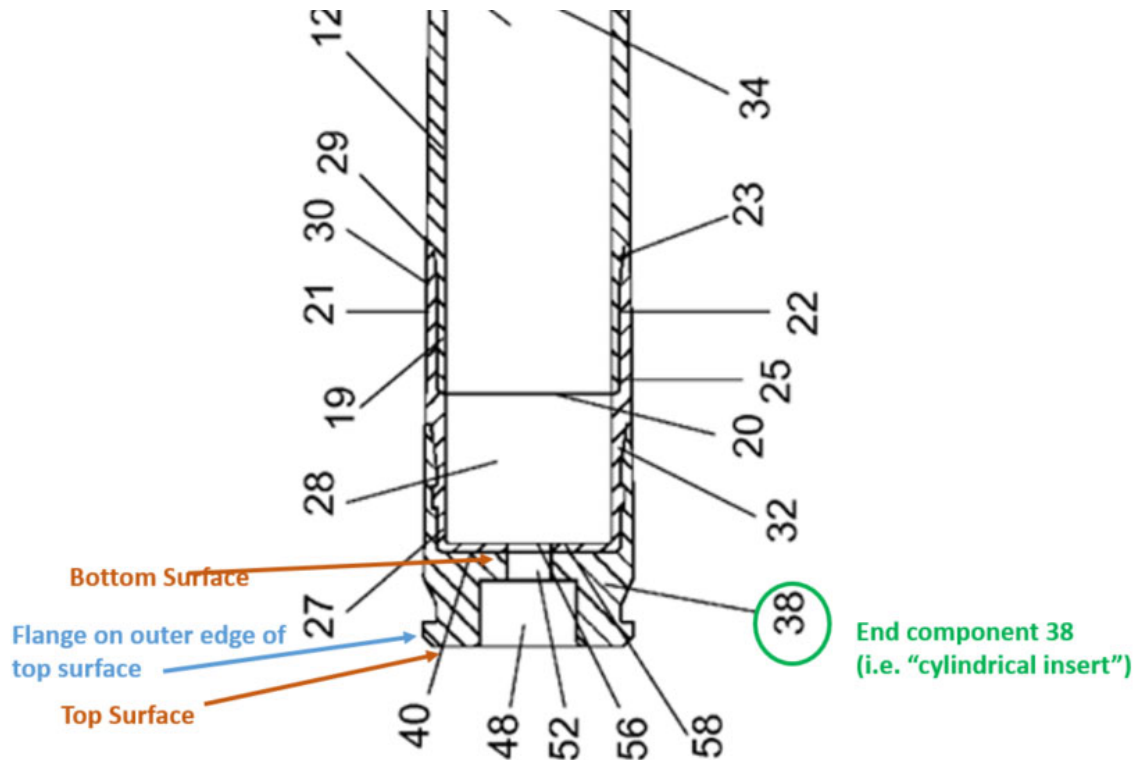
131. It is my opinion that Chung discloses this limitation. Chung describes a primer flash hole 52. Specifically, Chung notes “[a] primer flash hole 52 communicates through the base end 40 of head-end component 38 into the powder chamber 34 so that upon detonation of primer 50 the powder in powder chamber 34 will be ignited.” EX1005, ¶ 76 (emphasis added), Fig. 2. As shown in Fig. 2 below, the flash hole 52 extends through the bottom surface.



Chung, Fig. 2 (annotated to show "flash hole")

- (4) [1 [1d]]: "a flange that extends circumferentially about an outer edge of the top surface; and"

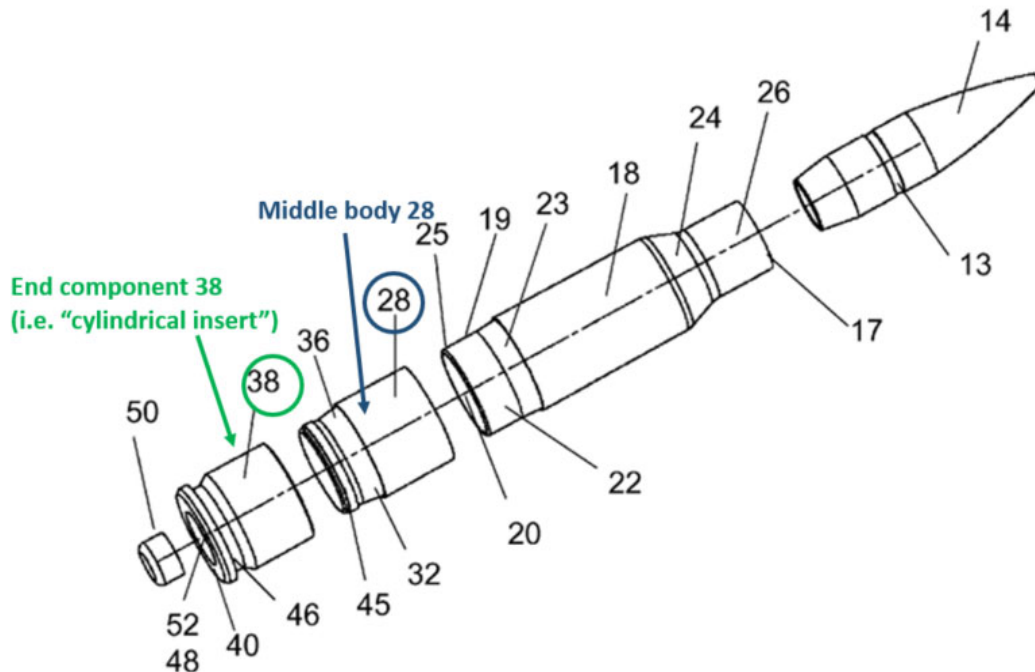
132. It is my opinion that Chung discloses this limitation. Fig. 2 below shows a flange that is circumferential about an exterior edge of the top surface of the end component 38.



Chung, Fig. 2 (annotated to show flange of end component 38)

- c) [1 [2]]: “a substantially cylindrical polymeric middle body comprising”

133. It is my opinion that Chung discloses this limitation. Chung discloses “[p]olymer casing 12 also has a substantially cylindrical open-ended middle body component 28. The middle body component extends from a first end with a female coupling element 30 to a second end with a male coupling element 32.” Chung also discloses the middle body is comprised of a polymeric material. EX1005, ¶ 51, 67 (emphasis added), Fig. 3.



Chung, Fig. 3 (annotated to show “middle body 28”)

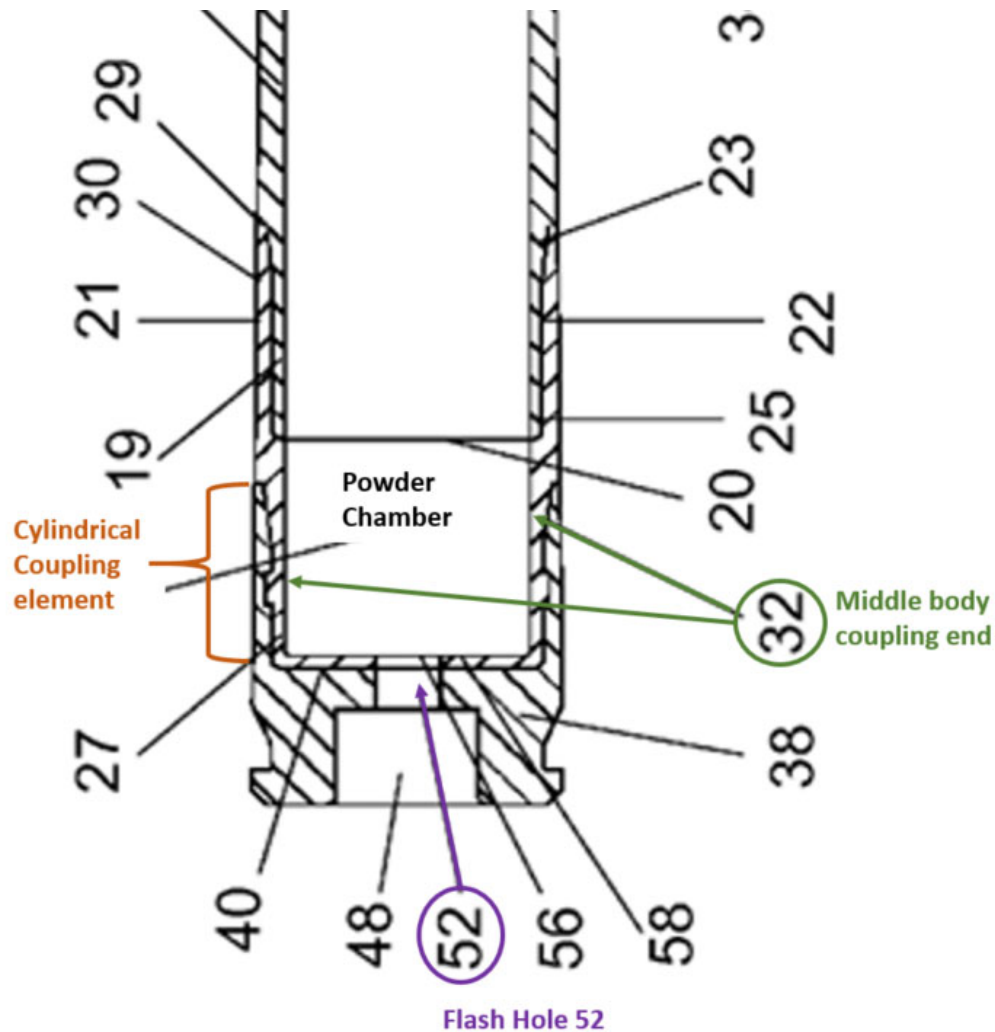
- (1) [1 [2a]]: “a substantially cylindrical polymeric bullet-end and”

134. It is my opinion that Chung discloses this limitation. The polymeric middle body disclosed in Chung comprises “...*opposing first and second ends, wherein the first end has a coupling element that is a mate for the bullet-end coupling element and thereby joins the first end of the middle body component to the second end of the bullet-end component...*” EX1005, ¶ 51 (emphasis added).

- (2) [1 [2b]]: “a substantially cylindrical polymeric coupling end connected by a powder chamber, wherein the substantially cylindrical polymeric coupling end extends over the substantially cylindrical coupling element and covers an circumferential surface of the primer flash hole.”

135. It is my opinion that Chung discloses portions of this limitation.

Chung discloses that the middle body has a substantially polymeric coupling end connected by a powder chamber. EX1005, ¶ 71, Figs. 2 and 4. As shown in Fig. 2 of Chung, reproduced below, the coupling end 32 of middle body 28 is connected to the powder chamber. The coupling end 32 also extends over the substantially cylindrical coupling element of the insert 38 and covers a surface of the insert 38. EX1005, ¶ 74.



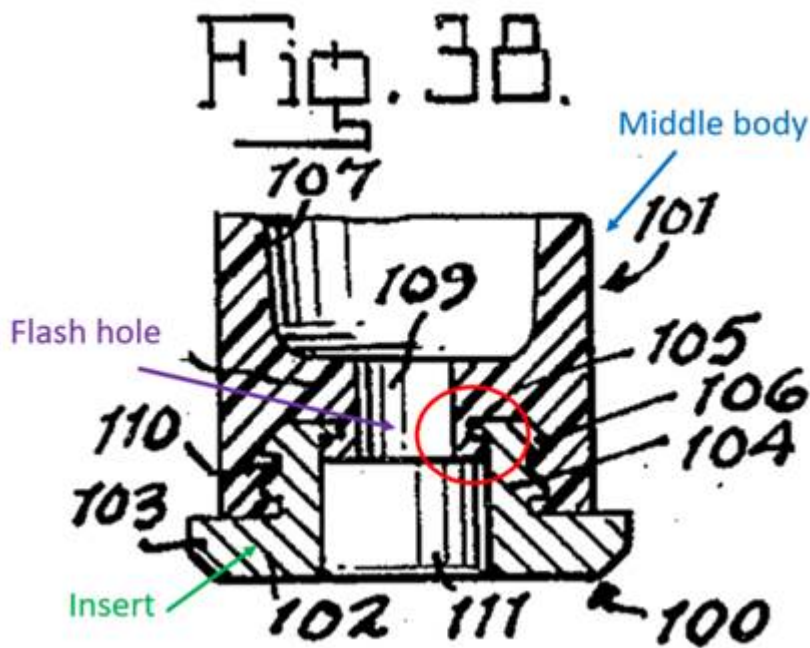
Chung, Fig. 2 (annotated to show coupling end)

136. It is my opinion that although Chung discloses that the coupling end extends over and around the flash hole, as seen in Fig. 2 above, Chung does not appear to disclose that the coupling end covers a circumferential surface of the primer flash hole.

137. It is my opinion that Daubenspeck remedies this deficiency in Chung.

Daubenspeck discloses an embodiment wherein a polymeric middle body comprises a cylindrical coupling end that covers a circumferential surface of the primer flash hole, as shown in the section within the red circle in Fig. 38 below.

EX1005 at Fig. 38. It would have been obvious to a POSITA to combine the configuration taught in Daubenspeck into the design of Chung, to provide an improved fit to the cartridge to withstand heat and pressure stress and avoid separation between the casing and the insert.



Daubenspeck, Fig. 38 (annotated)

3. **Claim 2: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric middle body is formed from a ductile polymer.**

138. Chung discloses this limitation. *Supra* at IX.B.2.

4. **Claim 4: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric middle body is formed from a fiber-reinforced polymeric composite.**

139. Chung discloses this limitation. *Supra* at IX.B.3

5. **Claim 5: The polymeric ammunition cartridge of claim 4, wherein the fiber-reinforced polymeric composite contains between about 10 and about 70 wt % glass fiber fillers, mineral fillers, or mixtures thereof.**

140. Chung discloses this limitation. *Supra* at IX.B.4

6. **Claim 6: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric bullet-end and bullet are further welded or bonded together.**

141. Chung discloses this limitation. *Supra* at IX.B.5

7. **Claim 10: The polymeric ammunition cartridge of claim 1, wherein the forward opening end is crimped so that a polymeric material flows into an annular groove of a bullet.**

142. Chung discloses this limitation. *Supra* at IX.B.6

8. **Claim 11: The polymeric ammunition cartridge of claim 1, wherein a bullet is adhesively fitted to the forward opening end.**

143. Chung discloses this limitation. *Supra* at IX.B.7

9. **Claim 12: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical polymeric middle body comprise a polymers selected from the group consisting of polyurethane prepolymer, cellulose, fluoro-polymer, ethylene inter-polymer alloy elastomer, ethylene vinyl acetate, nylon, polyether imide, polyester elastomer, polyester sulfone, polyphenyl amide, polypropylene, polyvinylidene fluoride or thermoset polyurea elastomer, acrylics, homopolymers, acetates, copolymers, acrylonitrile-butadinen-styrene, thermoplastic fluoro polymers, inomers, polyamides, polyamide-imides, polyacrylates, polyatherketones, polyaryl-sulfones, polybenzimidazoles, polycarbonates, polybutylene, terephthalates, polyether imides, polyether sulfones, thermoplastic polyimides, thermoplastic polyurethanes, polyphenylene sulfides, polyethylene, polypropylene, polysulfones, polyvinylchlorides, styrene acrylonitriles, polystyrenes, polyphenylene, ether blends, styrene maleic anhydrides, polycarbonates, allyls, aminos, cyanates, epoxies, phenolics, unsaturated polyesters, bismaleimides, polyurethanes, silicones, vinylesters, urethane hybrids, polyphenylsulfones, copolymers of polyphenylsulfones with polyethersulfones or polysulfones, copolymers of poly-phenylsulfones with siloxanes, blends of polyphenylsulfones with polysiloxanes, poly(etherimide-siloxane) copolymers, blends of polyetherimides and polysiloxanes, and blends of polyetherimides and poly(etherimide-siloxane) copolymers.**

144. Chung discloses this limitation. *Supra* at IX.B.8

10. **Claim 13: The polymeric ammunition cartridge of claim 1, wherein a bullet is adhesively fitted to the forward opening end.**

145. Chung discloses this limitation. *Supra* at IX.B.9

11. **Claim 14: The polymeric ammunition cartridge of claim 1, wherein the substantially cylindrical coupling element is a male coupling element with a straight skirt interlock surface that tapers to a smaller diameter at the forward portion on the skirt tip to mate with a female coupling element of the substantially cylindrical polymeric coupling end.**

146. Chung discloses this limitation. *Supra* at IX.B.10

G. GROUND 7: CLAIM 1 OF THE '543 PATENT IS ANTICIPATED BY DITTRICH

147. For at least the reasons below, claim 1 of the '543 Patent is invalid as anticipated by Dittrich.

1. Claim 1

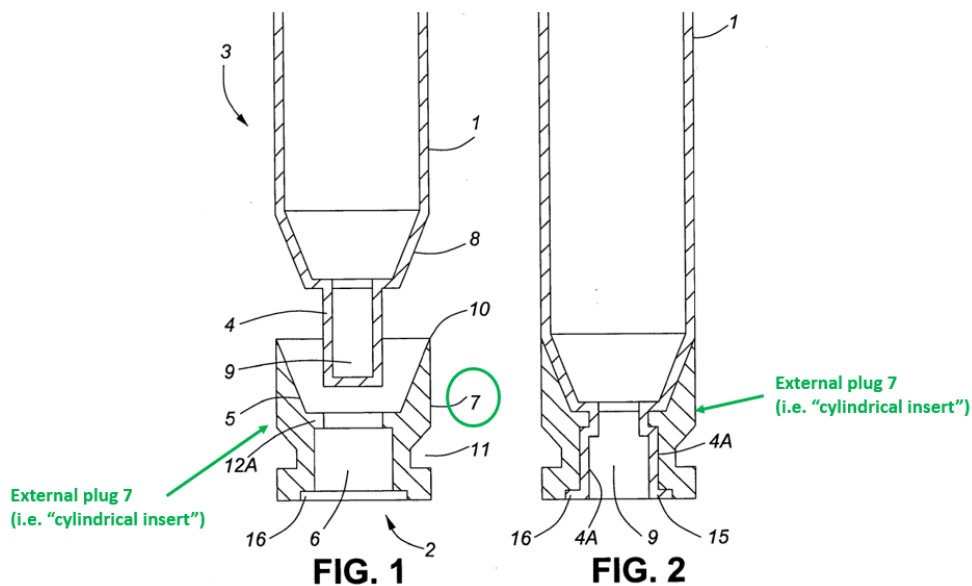
- a) **[1 [Preamble]]: “A polymeric ammunition cartridge comprising:”**

148. To the extent the preamble is limiting, Dittrich discloses this limitation. Dittrich discloses that it relates “[a] cartridge or ammunition casing” and further details that “[m]aterials which may be used for the outer cylindrical sidewall and casing shell...” include “polymeric plastic materials”. EX1008 at abstract, p. 18, ll. 18-24.

- b) **[1 [1]]: “a substantially cylindrical insert comprising”**

149. It is my opinion that Dittrich discloses this limitation. As shown in Figs. 1 and 2 of Dittrich, an “external plug 7” having a substantially cylindrical

outer shape aligns with cylindrical casing 1 and is fitted together as shown in Fig. 2 below. Dittrich specifically discloses that “[t]he casing wall 1 extends with seamless continuity inwardly from its maximum circular cross-section, over the inner surface of the external plug 7, conforming to the shape of such plug 7 until such casing wall extension or “casing shell” 8 reaches the boundary 5 of the primer well opening 6.” EX1008 at pg. 18, ll. 5-9.



Dittrich, Figs. 1 and 2 (annotated to show cylindrical insert)

- (1) [1 [1a]]: “a top surface opposite a bottom surface and a substantially cylindrical coupling element that extends from the bottom surface,”

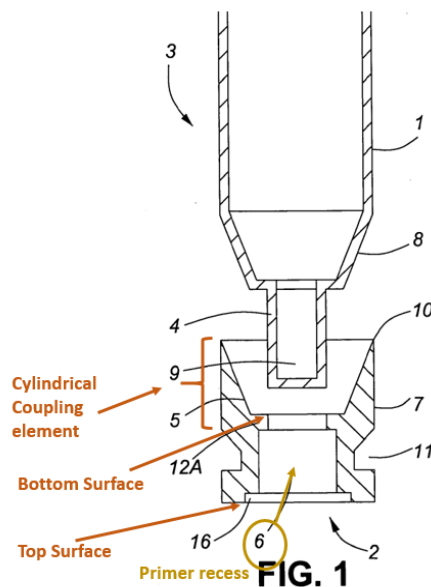
150. It is my opinion that Dittrich discloses this limitation. EX1008, Fig.

1. As shown in Fig.1 of Dittrich, annotated below, Dittrich discloses that the

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U.S. Patent No. 8,561,543***

external plug 7 has a top surface opposite a bottom surface and a substantially cylindrical coupling element that extends from the bottom surface. “The exterior plug 7... is dimensioned to extend sufficiently forwardly along the cartridge casing sidewall 1 to ensure that the forward end 10 of the exterior plug 7 extends at least to and preferably a little beyond the open portion at the breach of a firearm...”

EX1008 at pg. 17, ll. 26-27 to pg. 18, ll. 1-4.



Dittrich, Fig. 1 (annotated to show cylindrical coupling element)

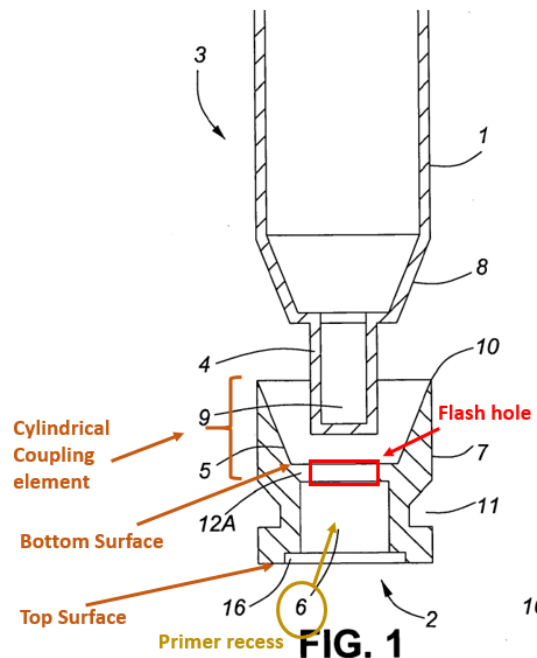
- (2) [1 [1b]]: “a primer recess in the top surface that extends toward the bottom surface;”

151. It is my opinion that Dittrich discloses this limitation. The cylindrical insert of Dittrich, as shown in Fig. 1 above, comprises a primer recess (referred to

as a “primer well opening 6”) in the top surface that extends to the bottom surface.
EX1008 at Figs 1-2. Dittrich discloses, “...the primer well [is intended to receive]
the primer cap with a friction fit...” EX1008 at p.18, LL. 15-19.

**(3) [1 [1c]]: “a primer flash hole positioned in the
primer recess to extend through the bottom
surface, and”**

152. It is my opinion that Dittrich discloses this limitation. Dittrich shows
a smaller opening at one end of the primer well 6, said opening extending through
the bottom surface, as seen in annotated Fig. 1 below. EX1008 at Figs. 1-2.



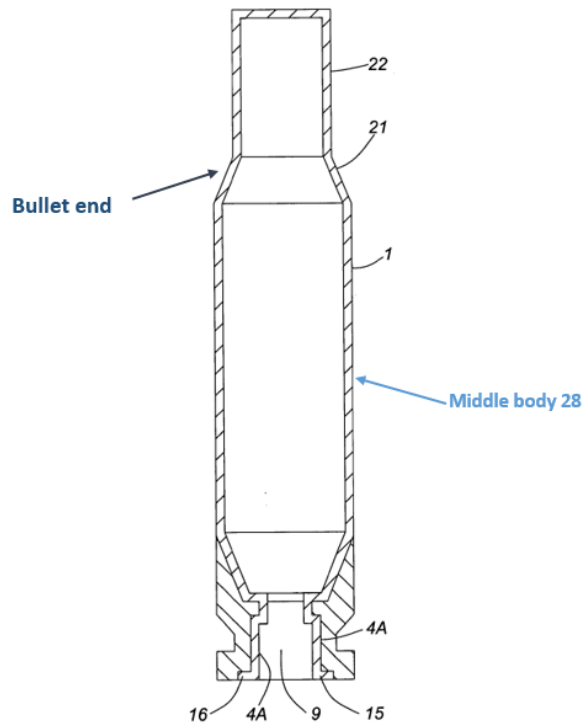
Dittrich, Fig. 1 (annotated to show flash hole)

**(4) [1 [1d]]: “a flange that extends
circumferentially about an outer edge of the top
surface; and”**

153. It is my opinion that Dittrich discloses this limitation. Dittrich describes “extraction groove 11” which is formed at one end of the plug 7 and has a protruding flange section about an outer edge of the top surface, as can be seen in Fig. 1 shown above. EX1008 at Fig. 1.

**c) [1 [2]]: “a substantially cylindrical polymeric middle
body comprising”**

154. It is my opinion that Dittrich discloses this limitation. Dittrich discloses cylindrical casing 3 having a casing side wall 1, which is equivalent to a “middle body” and has a forward end 22, where a bullet or projectile would be fitted thereon. EX1008 at Fig. 2. “Once a casing is formed as described above, it may be followed by a reduction in the diameter of the forward end of the casing 3 as shown in Figure 2 to form a shoulder 21 and forward extension 22 of reduced diameter the casing. As stated in Dittrich, it is well known that materials which may be used for the outer cylindrical sidewall and casing shell in accordance with the invention include ... polymeric plastic material.” EX1008 at pg. 20, ll. 18-26 (emphasis added).



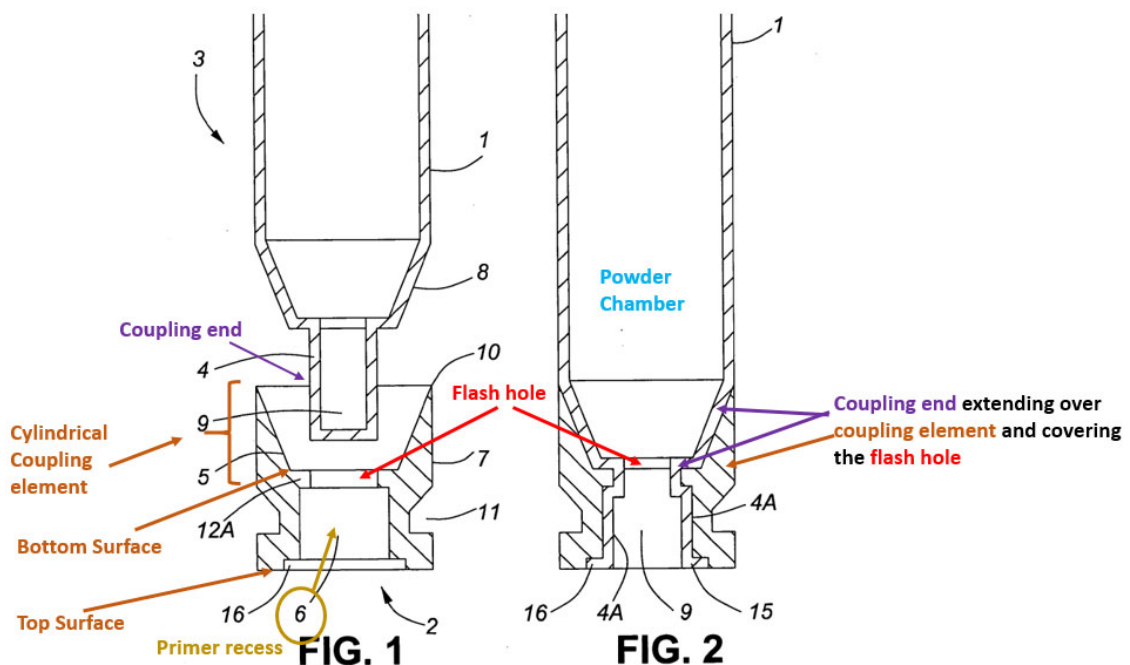
Dittrich, Fig. 2 (annotated to show middle body and bullet-end)

(1) [1 [2a]]: “a substantially cylindrical polymeric bullet-end and”

155. It is my opinion that Dittrich discloses this limitation. The cartridge disclosed in Dittrich has a polymeric middle body as shown above in Fig. 2 that comprises a substantially cylindrical end for receiving a projectile (annotated on Fig. 2 above). EX1008 at p. 22, ll. 4-7.

- (2) [1 [2b]]: “a substantially cylindrical polymeric coupling end connected by a powder chamber, wherein the substantially cylindrical polymeric coupling end extends over the substantially cylindrical coupling element and covers an circumferential surface of the primer flash hole.”

156. It is my opinion that Dittrich discloses this limitation. The casing disclosed by Dittrich is substantially cylindrical, can be comprised of polymeric materials, and is provided with a powder containing chamber (“A casing for cartridge ammunition, the casing having a head end and an interior volume for containing propellant”) EX1008, Claim 1.



Dittrich, Figs. 1 and 2 (annotated to show coupling end)

157. The casing disclosed in Dittrich has a coupling end (referred to as “casing shell extension 4”, shown in Figs. 1-2 above) which extends over the cylindrical coupling element of the plug 7, and further extends down to cover a circumferential surface of the flash hole (shown at Fig. 2 above). Dittrich specifically details that “[t]he casing shell extension 4 defines the actual walls of the primer well. That is, the casing shell extension 4 extends along the side of the wall of the central opening 6 in the external plug 7, reaching outwardly to the exterior face of the head end 2 of the casing 3 and thus forming the cylindrical walls of the primer well for receiving the primer cap with a friction fit.” EX1008, pg.18, ll. 15-19 (emphasis added).

X. SECONDARY CONSIDERATIONS

158. I am not aware of any secondary considerations of non-obviousness in connection with any of Grounds 2-6. *Supra* at IX.C - IX.E. In my opinion, each of Grounds 2-6 present such strong cases of obviousness that secondary considerations could not overcome the fact that the claimed invention is a known use of prior art elements. I reserve the right to analyze and offer my opinion with respect to any secondary considerations raised by the Patent Owner or its expert.

XI. CONCLUSION

159. I currently hold the opinions that I have expressed in this declaration. However, my analysis may continue, and I may acquire or receive additional information or insights that may result in revised or supplemental observations or opinions.

160. I reserve the right to amend, expand, or correct this Declaration should errors or omissions be discovered or additional information become available.

161. I understand this declaration will be used as evidence in a contested case before the PTAB.

162. I declare that all statements made herein on 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, or both, under Section 1001 or Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the '543 Patent.

***Declaration of John Nixon re:
Petition for Inter Partes Review of
U.S. Patent No. 8,561,543***

I declare under penalty of perjury that the foregoing is true and correct.

Executed: April 14, 2025

John Nixon

John Nixon