

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

RTG PARTS, LLC,
Petitioner

IPR2022-00083
U.S. Patent No. 10,866,045

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104**

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PETITIONER’S EXHIBIT LIST

Ex.1001	U.S. 10,866,045
Ex.1002	Prosecution History of U.S. 10,866,045
Ex.1003	Declaration of Stephen Batzer
Ex.1004	Curriculum Vitae of Stephen Batzer
Ex.1005	Russian Patent 2,588,558 by Gromov (“Gromov”)
Ex.1006	Certified translation of Gromov
Ex.1007	U.S. Patent 3,226,869 by Musgrave (“Musgrave”)
Ex.1008	U.S. Patent 4,589,218 by Teppa (“Teppa”)
Ex.1009	U.S. Patent 8,739,446 by Sullivan (“Sullivan”)
Ex.1010	U.S. Patent No. 2,217,848 by Schillstrom (“Schillstrom”)
Ex.1011	Russian Patent 2,121,641 by Lebedinets (“Lebedinets”)
Ex.1012	Certified translation of Lebedinets
Ex.1013	U.S. Patent No. 8,991,086 by Fitzpatrick (“Fitzpatrick”)

I. INTRODUCTION

Pursuant to 35 U.S.C. §§ 311, 314(a), and 37 C.F.R. § 42.100, RTG Parts, LLC (“Petitioner”) requests that the Board review and cancel as unpatentable under 35 U.S.C. §103(a) claims 1-7, 9, 11-19 (the “Challenged Claims”) of U.S. 10,866,045 (the “’045 patent,” Ex.1001).

II. GROUNDS FOR STANDING

Petitioner certifies that the ’045 patent is eligible for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the patent claims. 37 C.F.R. § 42.104(a).

III. NOTE

If the Board institutes trial, Petitioner will cease asserting in the co-pending litigation the combination of references on which trial is instituted for the claims on which trial is instituted.

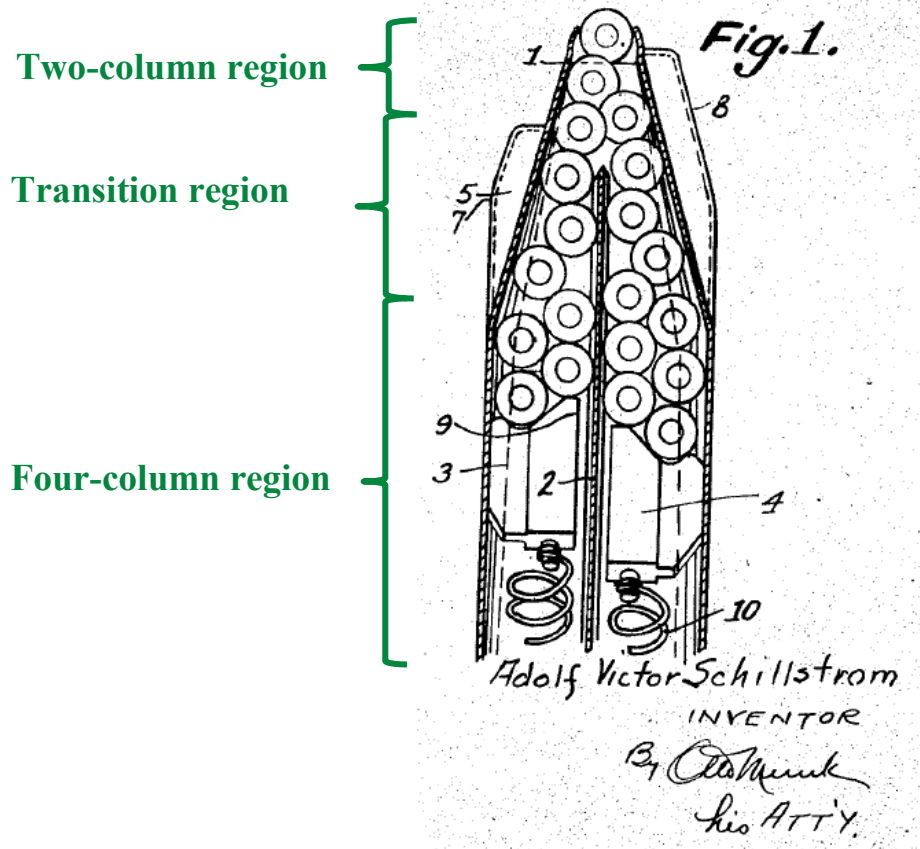
Petitioner cites to exhibits’ page numbers or column and line numbers when available. **Emphasis** in quoted material has been added. Claim terms are presented in *italics*.

IV. BACKGROUND

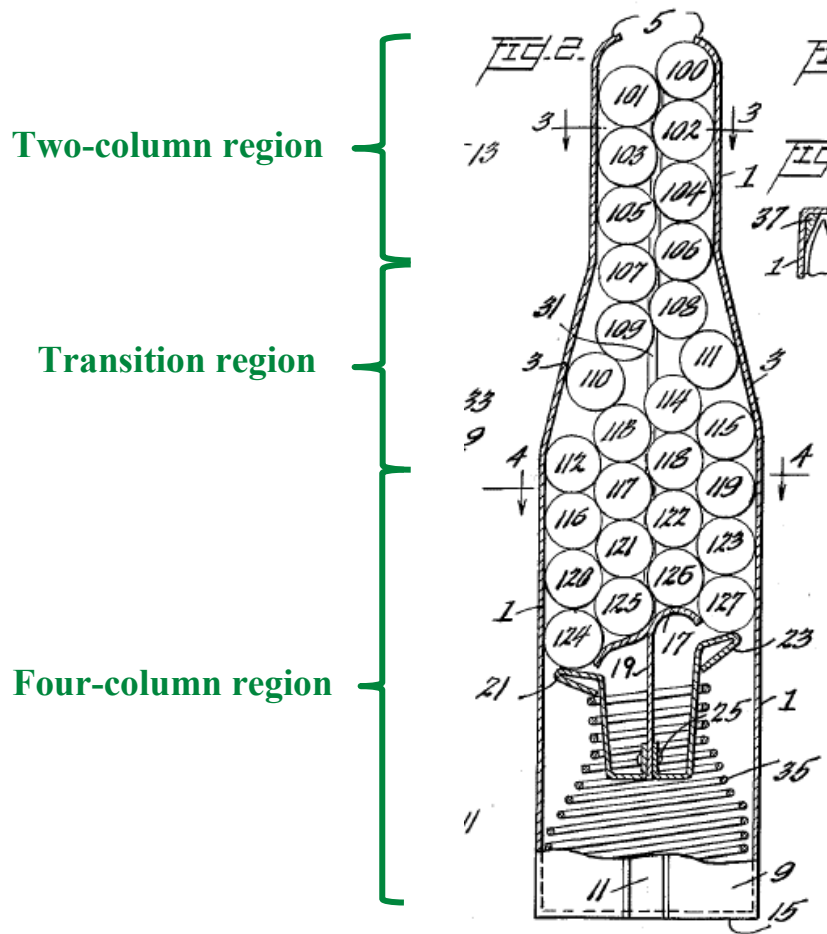
A. High-Capacity Magazine with Three Regions

The ’045 patent relates to high-capacity magazines. *See* Ex.1003@¶¶26-42.

High-capacity magazines including magazines capable of storing four columns of cartridges (“quad-stack” magazines) were well known. Ex.1003@¶27. *See* Exs.1007, 1008, 1010. Like the’045 patent magazine, these prior-art magazines included three regions: a four-column region, a transition region, and a two-column region. Ex.1003@¶¶27-29. The four-column region consists of two double columns of cartridges. In each double column, the cartridges are staggered against each other in a zipper-like fashion. The two-column region includes a single double row of cartridges. The cartridges in this two-column region are staggered against each other until the cartridges are fed, one by one, from the magazine into the weapon’s chamber. A transition region is located between the four- and the two-column regions. This region transitions the cartridges from the four-column configuration to the two-column configuration and often had slanted or curved sides to achieve this purpose. *Id.* A high-capacity magazine designed as early as 1938 is shown below:

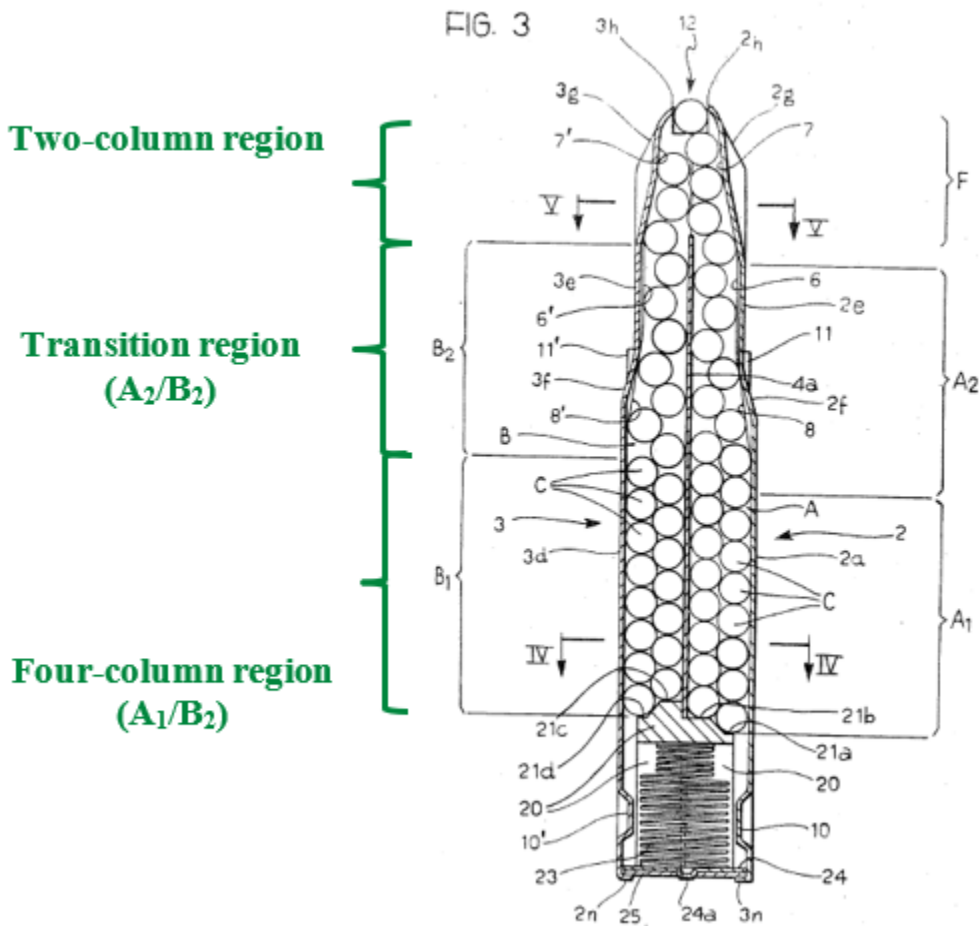


Ex.1010@Figure 1 (annotated); Ex.1003@¶27. A quad-stack magazine from 1969 is shown below:



Ex.1007@Figure 2 (annotated); Ex.1003@¶28.

A quad-stack magazine from 1986 is shown below:



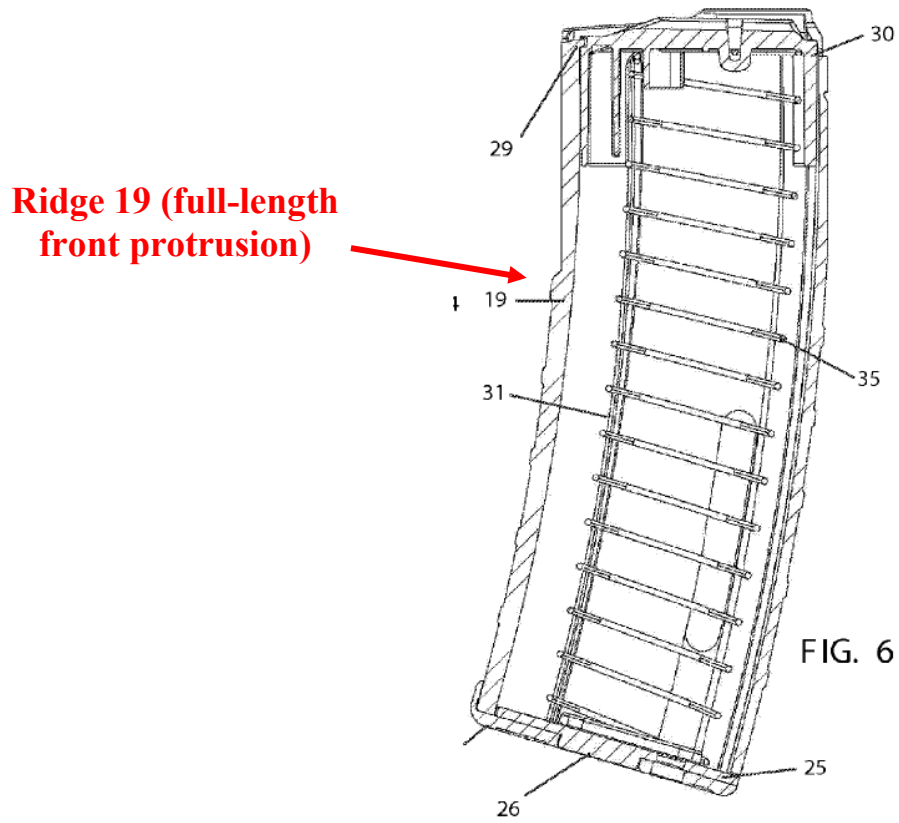
Ex.1008@Figure 3 (annotated); Ex.1003@¶¶29-30.

Some prior art quad-stack magazines suffered from a defect: cartridge or feeder jamming when cartridges were merged from a four-column to a two-column configuration. Ex.1003@¶31. Improvements made to minimize jamming generally took one of two forms: (1) improvements to protrusions on the inside of the magazine; and (2) improvements to the feeder mechanism that pushed cartridges through the magazine toward the magazine opening and into the weapon. *Id.*

B. Protrusions

Protrusions, also referred to as ribs or partitions, are structures located on the inside surfaces of the magazine. Ex.1003@¶32. Protrusions can perform multiple functions: (1) guide the feeder as it travels up the magazine and prevent the feeder from tilting and rolling, reducing feeder malfunction; (2) separate cartridges into distinct columns; and (3) provide additional rigidity or strength without significantly increasing magazine weight. *Id.*@¶33.

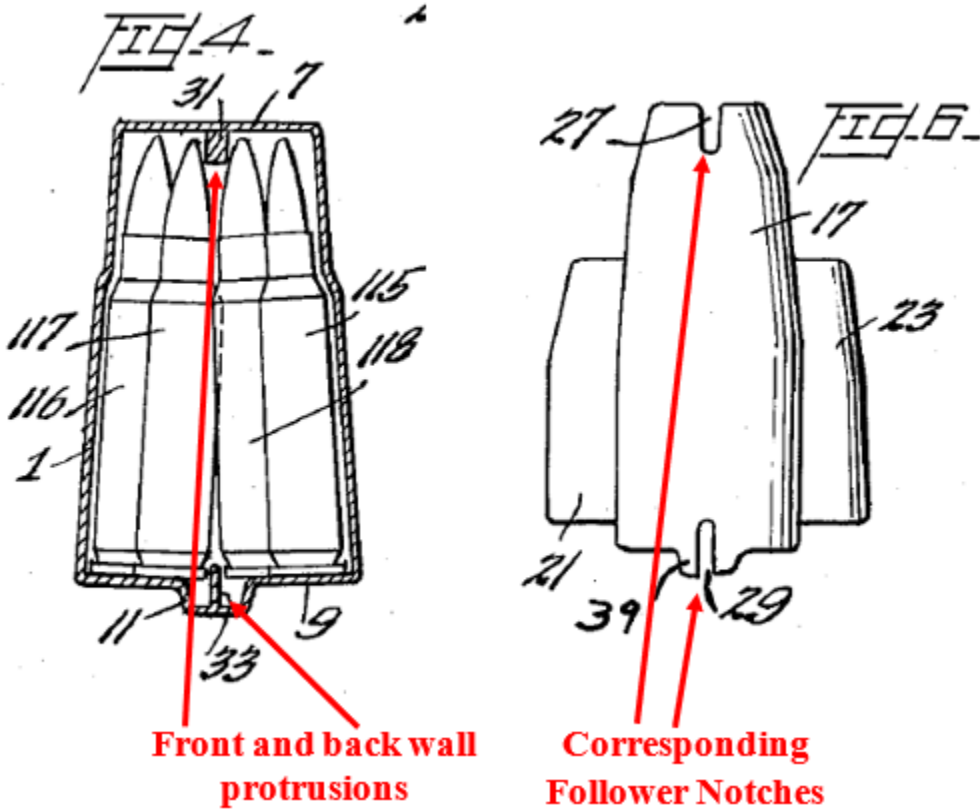
For example, Fitzpatrick describes the now ubiquitous Magpul PMAG AR-15/M16 magazine. *Id.*@¶32. The PMAG has been widely available for more than a decade and consists of a polymer, double-column rifle magazine with a “ridge 19” running from the top of the magazine to the bottom along the inside front wall. *Id.*



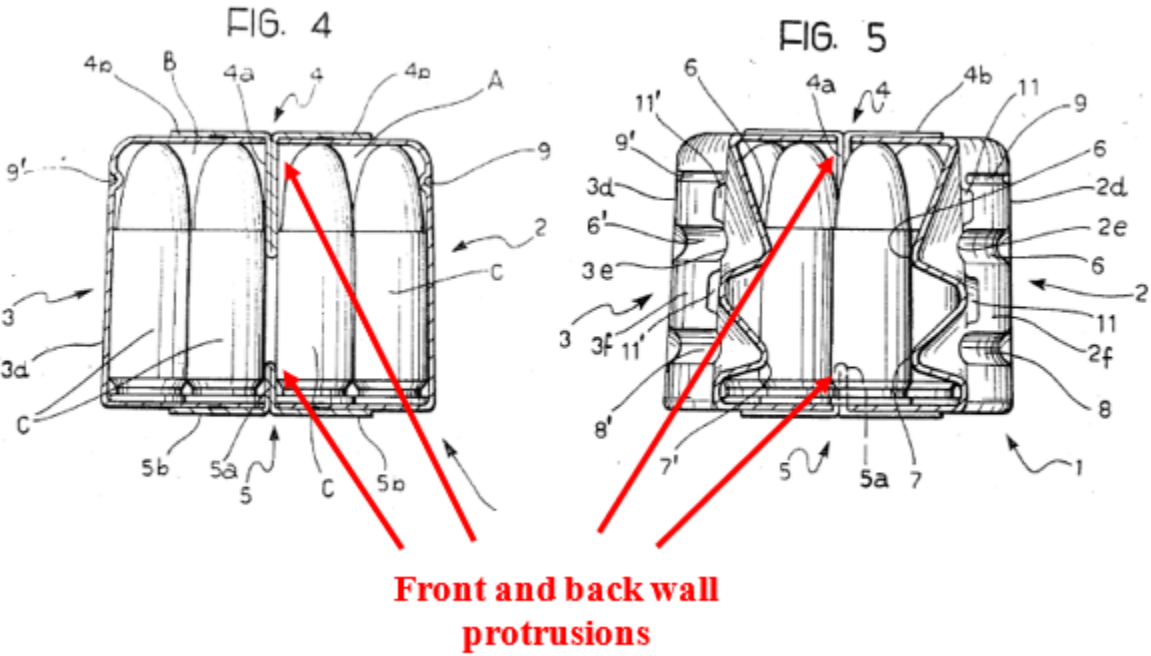
Ex.1013@Figure 6.

Front and back protrusions were known since at least as early as the 1960s.

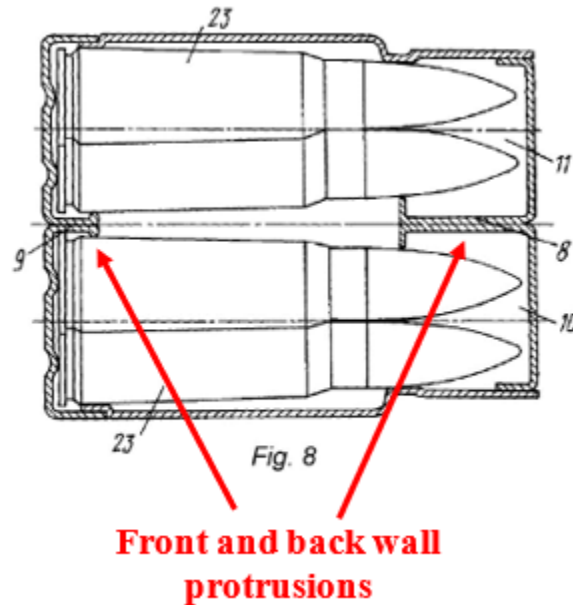
Ex.1003@¶34.



Ex.1007 @Figures 4 and 6 (annotated); Ex.1003¶34.



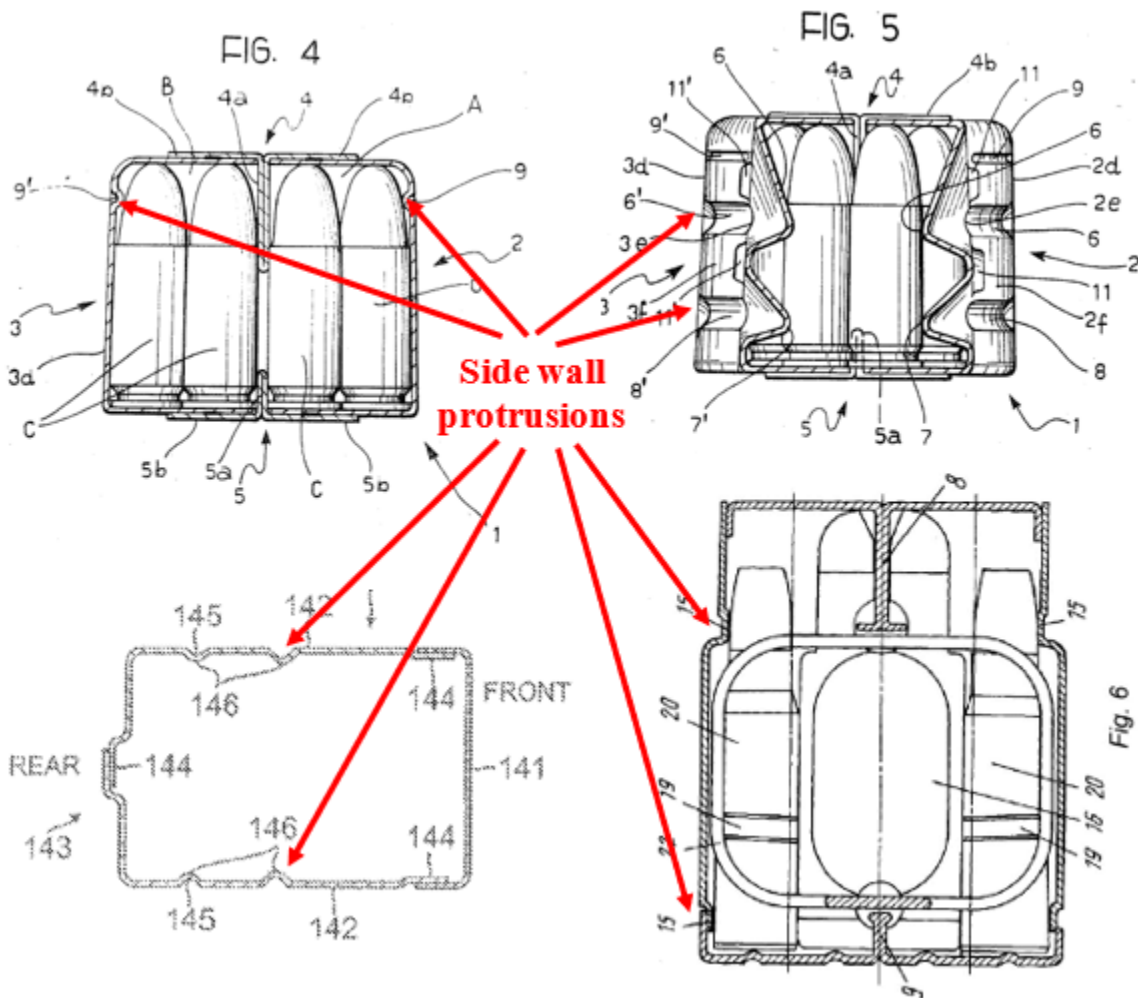
Ex.1008@Figures 4 and 5 (annotated); Ex.1003¶35.



Ex.1012@Figure 8 (annotated); Ex.1003¶36.

Protrusions on the side walls of the magazine were also known at least as early as 1986. *Id.*¶38. The location and number of side-wall protrusions corresponds to the size and shape of the cartridges stored in the magazine.

Id.¶39. Side-wall protrusions can perform three different functions: (1) guiding cartridges (Ex.1008@3:55-58; Ex.1012@5); (2) decreasing friction between cartridges and the magazine (Ex.1009@18:36-41); and (3) adding strength (Ex.1008@2:49-5). *Id.* Figures below depict side wall protrusions in the prior art:



Ex.1008@Figure 4 and 5 (top row, annotated); Ex.1009@Figure 53 (bottom-left, annotated); Ex.1012@Figure 6 (bottom-right, annotated); Ex.1003@¶38-39.

C. Two-Feeder Mechanism

The purpose of a feeder (also known as a follower or described as an elevator)—a separate component—is to push the cartridges up the magazine when the firearm is being repetitively fired. Ex.1003@¶40. A single feeder is typically used in single-stack or double-stack magazines that have a uniform width for the

entire length of the magazine. *Id.* ¶41. Because a quad-stack magazine transitions cartridges from a four-column region, through a transition region, and then to a two-column region, a conventional single feeder may not efficiently or reliably push four staggered columns of cartridges into two staggered columns of cartridges. *Id.* A two-feeder mechanism containing an inner-feeder nested in an outer-feeder was known to reliably advance cartridges in a quad-stack magazine. *Id.*

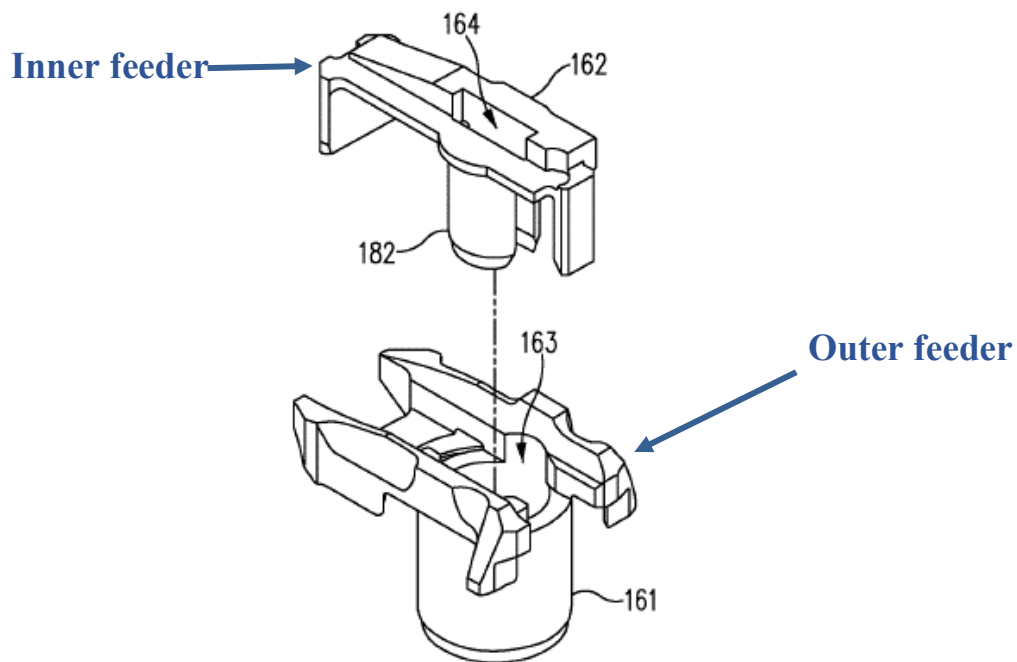


FIG. 34

Id.; Ex.1009@Figure 34 (annotated). The nested mechanism allows four cartridges to be stacked and pushed up the magazine until the outer feeder reaches the transition region. *Id.* ¶1003 ¶42. Using Sullivan (figure below) as an example, once

the wider outer feeder reaches a critical point within the transition region, it stops moving up the magazine and the narrower inner follower exits the outer follower and continues to push the cartridges through the remainder of the transition region, through the two-column region, and finally to the lips of the magazine.

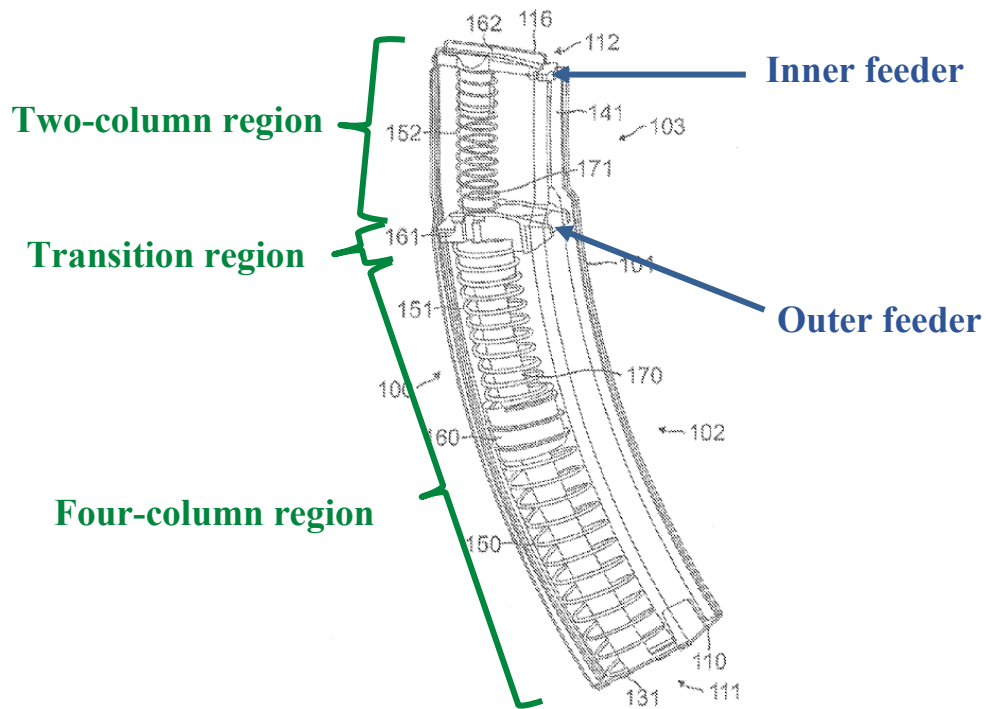


FIG. 27

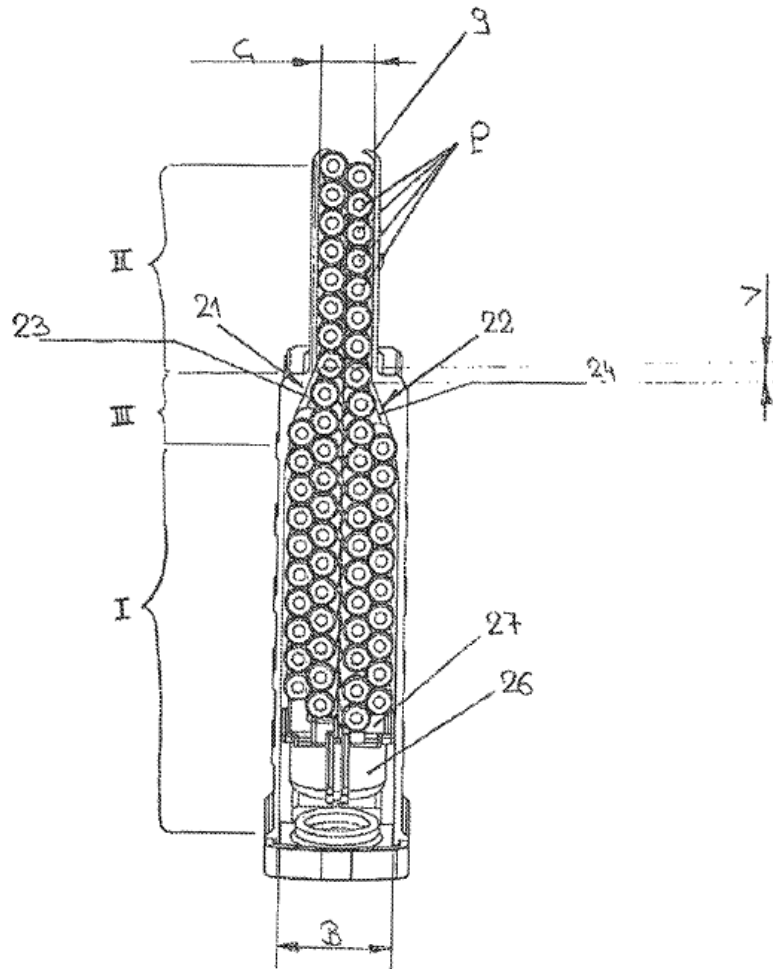
Id.; Ex.1009@Figure 37.

V. SUMMARY OF THE '045 PATENT

The '045 patent relates to “a cartridge magazine for a firearm.”

Ex.1001@Abstract. Lower region I of the magazine accommodates “four stacks of cartridges,” while upper region II accommodates “two stacks of cartridges.”

Ex.1001@Abstract. Regions I and II are connected by a transitional region III. See Ex.1001@7:50–63, Figure 5, below:



Ex.1001@Figure 5.

The '045 patent discloses and claims interior front- and rear-wall protrusions protruding “into the interior space of the housing and extend[ing] along the Z-axis.” Ex.1001@5:34–43. The '045 patent also discloses and claims side-wall

protrusions protruding “into the interior space of the housing.” Ex.1001@7:13–15.

VI. PROSECUTION HISTORY

During prosecution, the applicant responded to the examiner’s rejection by adding the language of claim 2 into claim 1. Ex.1002@83-84. The Applicant argued that “**the cited references fail to disclose the front and rear protrusions 10, 11 of the present invention which extend along the Z-axis in between the three regions I, II, III of the magazine 2,**” after which the claims were allowed. Ex.1002@84.

VII. EFFECTIVE PRIORITY DATE OF THE ’045 PATENT

The ’045 patent claims priority to PCT/EP2018/000558, filed Dec. 13, 2018 and a German application no. 102018000740 filed Jan. 30, 2018. Petitioner does not waive any right or opportunity it may have to dispute the priority date of the ’045 patent in this or another forum where the issue is relevant.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

A Person of Ordinary Skill in The Art (“POSITA”) in January 2018 would have had a working knowledge of weaponry pertinent to the ’045 patent, including the use of magazines. A POSITA would have had a bachelor’s degree in mechanical engineering, or an equivalent, and two years of professional experience

relating to firearms and munitions. Ex.1003@¶21. Lack of professional experience can be remedied by additional education, and vice versa. *Id.*

IX. CLAIM CONSTRUCTION

Petitioner submits that for purposes of this proceeding all terms have their ordinary meaning.

X. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE

A. Challenged claims

Petitioner challenges claims 1-7, 9, 11-19 of the '045 patent.

B. Statutory grounds for challenges

Grounds	Claims	Basis under 35 U.S.C. § 103
#1	1-7, 9, 11-15, 18-19	Gromov and Musgrave
#2	16, 17	Gromov, Musgrave, and Sullivan
#3	19	Gromov, Musgrave, and Sullivan

Gromov published June 27, 2016; Musgrave January 4, 1966; Sullivan June 3, 2014. Gromov, Musgrave, and Sullivan are printed publication prior art under 35 U.S.C. § 102(a)(1).

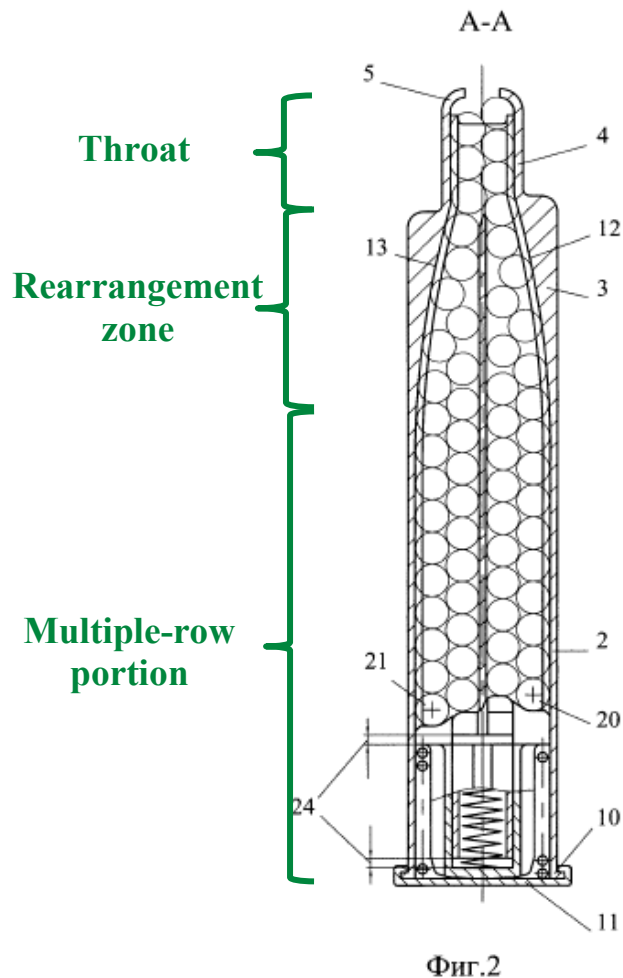
Petitioner's obviousness grounds rely on the combined teachings of the prior art and not on a physical incorporation of elements. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012).

Petitioner also cites to additional prior art as evidence of the background knowledge of a POSITA and to provide contemporaneous context to support Petitioner's assertions regarding what a POSITA would have understood from the prior art in the grounds. *See Yeda Research v. Mylan Pharm. Inc.*, 906 F.3d 1031, 1041-1042 (Fed. Cir. 2018) (affirming the use of “supporting evidence relied upon to support the challenge”); 37 C.F.R. § 42.104(b).

C. Ground 1

1. Gromov

Like the '045 patent, Gromov is directed to a high-capacity magazine that accommodates four columns of cartridges. Ex.1006@Abstract. The magazine housing, depicted in Figure 2 below, has “a wide multiple-row portion 2, a rearrangement zone 3 and a throat 4.” Ex.1006@5.

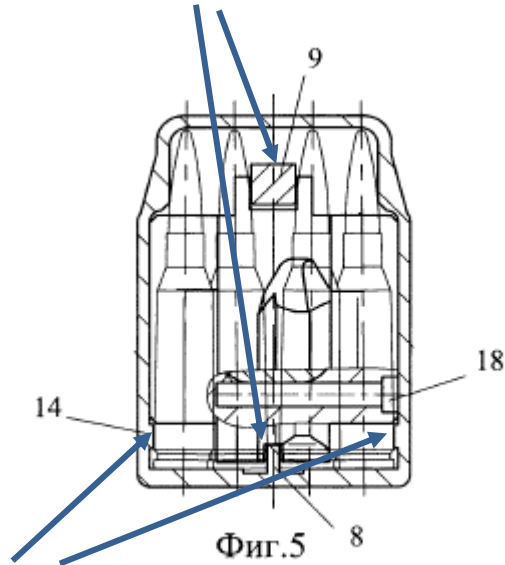


Ex.1005@Figure 2 (annotated); Ex.1003@49. In wide multiple-row portion 2, the cartridges are staggered in “two double-row channels.” Ex.1006@5. In throat 4, the cartridges are staggered in two row channels. Ex.1006@5. In rearrangement zone 3 the cartridges are rearranged “from two double-row streams into a single double-row stream.” Ex.1006@5.

Gromov’s magazine includes protrusions, including front and back wall protrusions called partitions 8 and 9, and side wall protrusions called “cartridge

tracks 14.” Ex.1006@5.

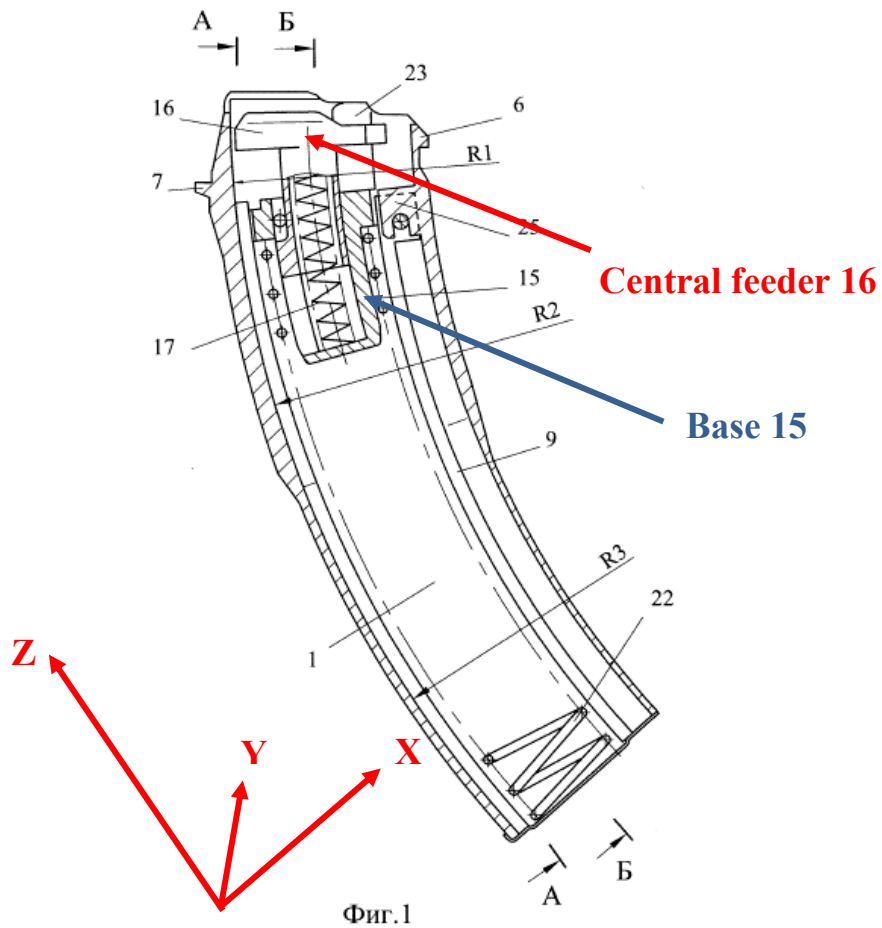
Front and back wall protrusions



Side wall protrusions

Ex.1006@Figure 5 (annotated); Ex.1003@¶50.

The magazine includes a compound feeder, depicted in Figure 1 below, that consists of “a base 15, a central feeder 16, a spring 17, and an axle 18 securing these parts.” Ex.1006@5.

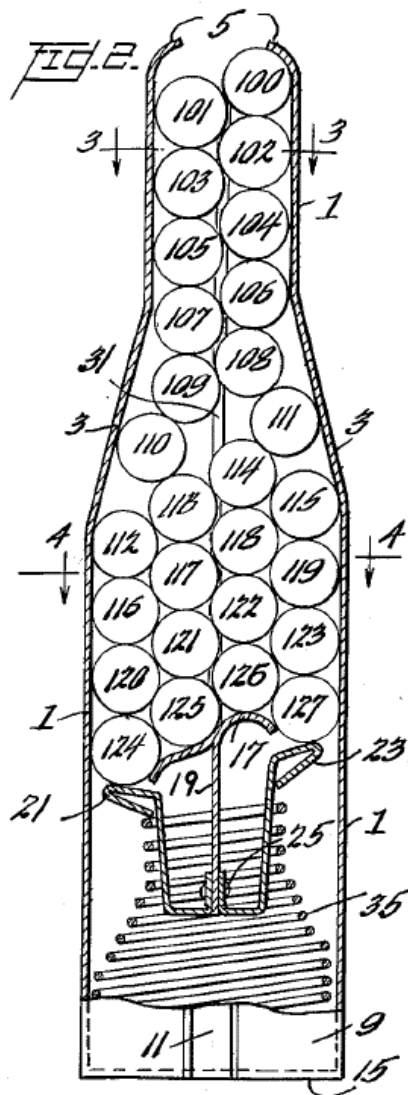


Ex.1006@Figure 1 (Annotated); Ex.1003@¶51.

2. Musgrave

Musgrave discloses a magazine with “four rows of cartridges.” Ex.1003¶53;

Ex.1007@1:16. Musgrave’s magazine is depicted in Figure 2, below:



Ex.1007@Fig.2.

Musgrave recognizes that “the bottle-neck shape and the tapered body” of prior art magazines may result in jamming. Ex.1007@1:35–37. To address this defect, Musgrave’s magazine includes a guide 31 mounted “[o]n the interior of front wall 7” that “may extend substantially from top to bottom of front wall 7.”

Ex.1007@2:21–28; Ex.1003@¶55.

3. Reasons to combine Gromov and Musgrave

Gromov and Musgrave are analogous art to the '045 patent.

Ex.1001@Abstract; Ex.1006@5, Figure 2; Ex.1007@2:21-36, Figures 2-4.

A POSITA recognized both a design need and a market demand for a reliable quad-stack magazine, including the need to reliably divide and guide cartridges and for a reliable follower. Ex.1003@¶56. Recognizing these demands, a POSITA would have been motivated to combine Gromov and Musgrave to arrive at the Challenged Claims in Ground I for a number of reasons, including:

(1) to extend Gromov's front-wall protrusion, partition 9, to the two-column region or throat 4 of the magazine, as taught in Musgrave, to guide cartridges through the magazine and prevent jamming (Ex.1007@2:21-27);

(2) to extend Gromov's partition 9 into throat 4 to guide the follower through the magazine, as taught in Musgrave, to prevent jamming (Ex.1007@2:50-54);

(3) to extend Gromov's partition 9 into throat 4 to increase the strength of the magazine, in view of the knowledge of a POSITA (Ex.1013@4:25-28); and

(4) to extend Gromov's partition 9 into throat 4 to reduce jamming, because it would have been obvious to try. Ex.1003@¶56.

Combining Gromov and Musgrave would have been well within a POSITA's skillset and there would have been at least a reasonable expectation of

success when making the combination, as confirmed by the prior art. *Id.* Gromov's partition 9, when extended into throat 4, as taught in Musgrave, would be performing the same function and operating in the same way as it was originally in Gromov, and would provide the predictable result of increased magazine reliability. *Id.*

First, a POSITA would have been motivated to extend Gromov's partition 9 into throat 4, the two-column region, to reliably divide and guide cartridges all the way through the magazine, as expressly taught by Musgrave. Ex.1003@¶¶58-59; *see, e.g.*, Ex.1007@2:21-27 (“On the interior of front wall 7 is mounted a guide 31 which is located on the longitudinal axis of the magazine. **The dimensions of guide 31 are so chosen that it may provide a surface against which the bullet ends of cartridges on either side of the longitudinal axis of the magazine may bear.** Guide 31 may extend substantially from top to bottom of front wall 7.”); *Id.*@3:12-14 (“There are now two pairs of staggered rows, **separated at the front and rear of the magazine compartment by guides 31** and 33 respectively.”); *Id.*@4:18-19 (Claim 1 reciting “**cartridge guide means** on the interior of said front wall.”). In addition to the express teachings of Musgrave, a POSITA would have been further motivated knowledge, skill, and experience to extend Gromov's partition 9 into throat 4 to divide and reliably guide cartridges. Ex.1003@¶59; *see, e.g.*, Ex.1013@4:25-32 (Fitzpatrick teaches “The second purpose [of ridge 19] is to

divide tips of cartridges, left from right, in their off-set stacking in the magazine.”).

Second, a POSITA would have been motivated to extend Gromov’s partition 9 into the two-column region or throat 4, as taught in Musgrave, to guide feeder 16 and thereby diminish the likelihood of the feeder jamming in magazine throat 4.

Ex.1003@¶60. As the feeder 16 pushes cartridges up the housing and through the two-column region or throat 4, the feeder will tilt forward and backward and roll side-to-side. *Id.* The tilt (also known as pitch) and roll (rotation about the axis generally parallel with the weapon’s barrel) results in the feeder 16 applying uneven force to the cartridges, which may cause jamming. *Id.* A POSITA would have thus sought to reduce the possibility of feeder 16 jamming in throat 4. *Id.*

Musgrave expressly teaches a solution for jamming caused by feeder tilt and roll in a quad-stack magazine. *Id.* Musgrave discloses a guide 31 or front-wall protrusion that keeps the feeder (referred to as a follower) centered in the magazine and

thereby alleviates follower tilt and roll. *Id.*; Ex.1007@1:35-38 (“Notch 27 on the main follower is so shaped as to engage guide 31 and, similarly, notch 29, also on the main follower is adapted to engage guide 33. **This engagement keeps the**

follower assembly properly centered when it is in the lower part of the magazine, as shown in FIGURE 2.”), *see also* Ex.1013@4:30-32 (“The third

purpose [of ridge 19 on the inside front magazine wall] is to provide an additional interface with the follower 30 to prevent forward linear and axial tilt.”);

Ex.1008@3:20-23 (“The elevator member 20 [magazine follower] is mounted for movement in the container 1 along the webs or flanges of the said sections 4, 5, **which act as guides**, under the action of a helical spring 23 with rectangular coils.”). In the combination, Gromov’s partition 9 (*first protrusion*) would extend along the four-column region, the rearrangement region, and into the two-column region with predictable results. Ex.1003@¶60. The extended partition 9 would keep feeder 16 in the center of the housing and reduce the likelihood of the feeder jamming in the two-column region or throat 4. *Id.* A POSITA would have been motivated in view of the express teachings of Musgrave as well as in view of the knowledge of a POSITA to increase the reliability of Gromov by extending partition 9 into the magazine throat 4. *Id.*; *see, e.g.*, Ex.1013@4:30-32; Ex.1008@3:20-23.

Third, a POSITA would have been motivated to extend Gromov’s partition 9 (*first protrusion*) into throat 4 as shown in Musgrave to add strength to the magazine. Ex.1003@¶61. A POSITA understood that interior protrusions or ribs add strength to a magazine without adding significant weight. *Id.*; *see, e.g.*, Ex.1008@2:49-51 (“The shaped wall 2c has **a further stiffening rib 9** which extends longitudinally over the wall portions 2e, 2f and 2d.”); Ex.1013@4:25-28 (“The ridge [19] serves three purposes. The first purpose is to **provide additional stability and strength to the magazine body 10.**”). A POSITA would have

known that Musgrave's guide 31, which "extend[s] substantially from top to bottom of front wall 7," added strength to the Musgrave magazine and to the Musgrave throat region. Ex.1003@¶61. Accordingly, it would have been obvious to a POSITA to extend Gromov's partition 9 (*first protrusion*) into throat 4 as shown in Musgrave to add strength to the Gromov magazine. *Id.*

Fourth, extending Gromov's partition 9 (*first protrusion*) into throat 4 to guide cartridges and prevent follower jamming would have been obvious to try. *Id.*@¶62. As illustrated by the prior art using a front protrusion in the two-column region of a high-capacity magazine was an identified, predictable solution for guiding cartridges and followers. *Id.*; *see, e.g.*, Ex.1006@Figures 1 and 5 (showing front partition 9 and rear partition 8); Ex.1008@Figures 2-4 (showing front protrusion flange 4a and rear protrusion flange 5a); Ex.1012@Figure 4 (showing front partition 8 and rear partition 9); Ex.1013@Figures 7 and 8 (showing front ridge 19 in a double-stack magazine); Ex.1007@Figures 2-4 (showing front guide 31 and rear guide 33 and compound follower platform 19 with auxiliary platforms 12 and 23). Extending partition 9 into throat 4 would have been obvious to try as an extended or full-length front protrusion was an identified, predictable solution for increasing reliability in high-capacity and quad-stack magazines. Ex.1003@¶62. A POSITA would have had a reasonable expectation of success when extending partition 9 into throat 4 because the

extended partition 9 would be performing the same function and in the same way within the Gromov magazine, and making the modification would require no more than ordinary skill. *Id.*

A POSITA would have had a reasonable expectation of success when combining Gromov and Musgrave. Ex.1003@¶63. As explained above, extending the partition 9 of Gromov into throat 4 as taught by Musgrave would take no more than the application of ordinary skill for a POSITA. *Id.* This is confirmed by the '045 patent, which—consistent with the prior art—does *not* state or suggest that a full-length front protrusion was new, beyond the application of ordinary skill, required experimentation, required novel materials, or required novel manufacturing techniques. *Id.* In the case of a molded magazine body, for example, modification of Gromov to extend partition 9 into throat 4 would require no more than easy and minor changes to the mold. *Id.* This is confirmed by Fitzpatrick which teaches a molded polymer magazine with a ridge 19 running along the inside front wall. *Id.*; *see, e.g.*, Ex.1013@Abstract (teaching a “reinforced polymer” magazine); Ex.1013@4:25-32 (discussing advantages of ridge 19); Ex.1013@5:55 (referencing the “molding process.”). Likewise, in the case of a stamped alloy magazine body, modification of Gromov to extend partition 9 into throat 4 would require no more than minor changes to the punch(es) and die(s). Ex.1003@¶63; *see, e.g.*, Ex.1008@5:26-29 (“In the

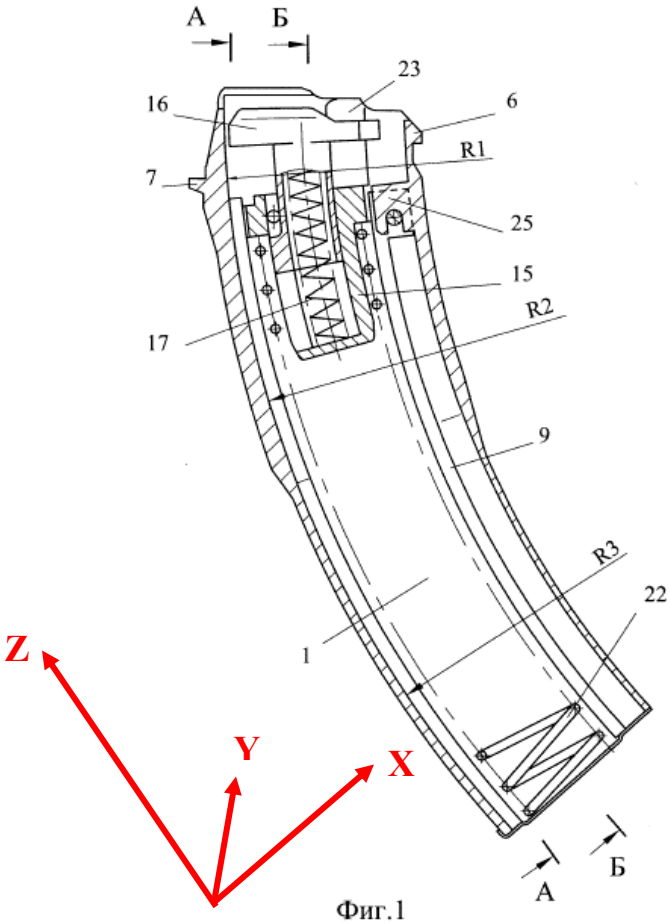
embodiment illustrated, the magazine may be formed entirely of cut, folded and pressed sheet metal. **It is thus simple and economical to manufacture and very quick to assemble.**”). For at least these reasons, a POSITA would have had a reasonable expectation of success when combining Gromov and Musgrave to arrive at the Challenged Claims in Ground I. Ex.1003@¶63

4. Claim 1

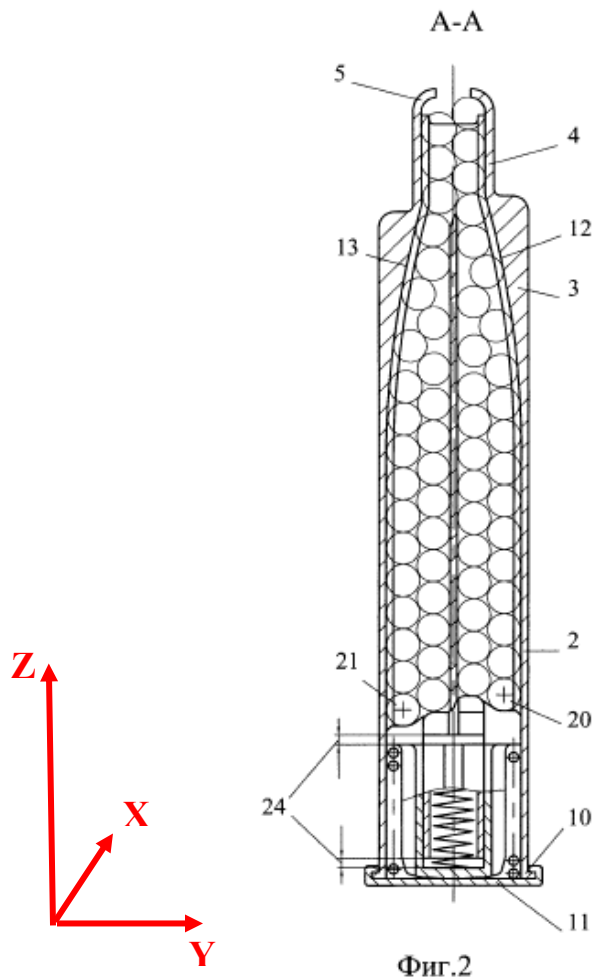
[1.0] A housing for a cartridge magazine for a firearm, which extends along an X-axis, a Y-axis and a Z-axis, comprising:

To an extent the preamble is limiting, Gromov discloses it. Ex.1003@¶64. Gromov discloses “**magazine consists of a housing 1**” that stores *cartridges* for *firearms* such as “automatic or semi-automatic **firearms**, as well as magazine-fed handheld light machine guns.” Ex.1006@3, 5; Ex.1003@¶65.

Because magazine housing is a three-dimensional object, and a three-dimensional object extends in three-directions, the *housing* extends *along an X-axis, a Y-axis and a Z-axis*, as depicted in Figures 1 and 2:



Ex.1005@Figure 1 (Annotated); Ex.1003@¶66

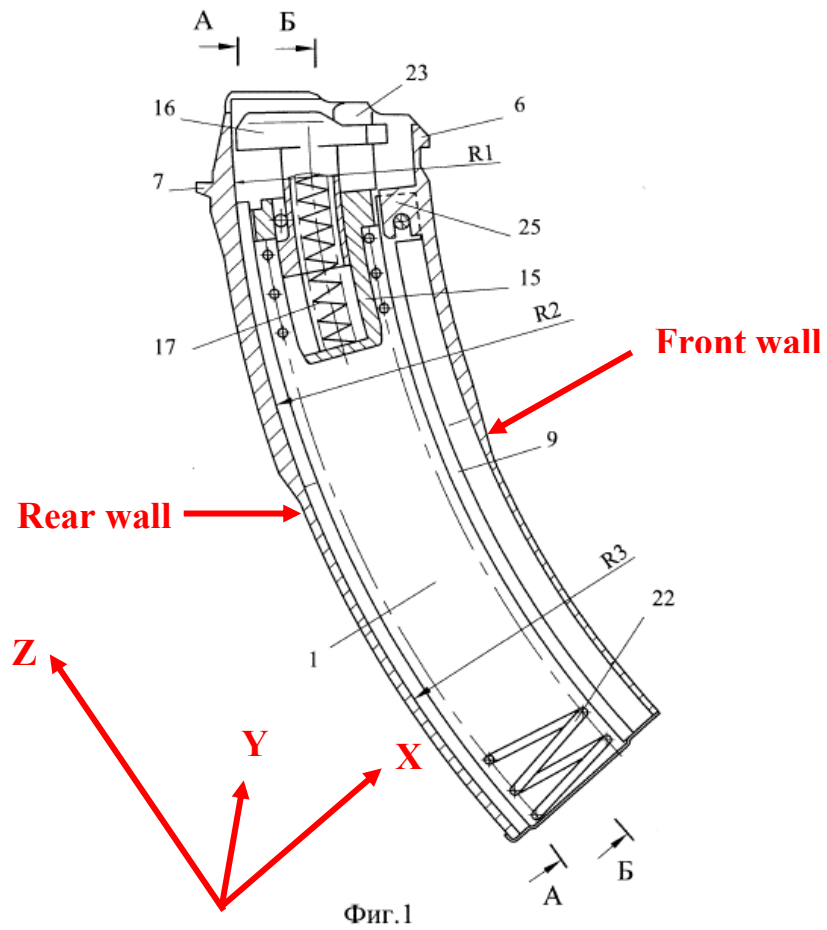


Ex.1005@Figure 2 (Annotated); Ex.1003@¶66.

[1.1] *a front wall*; [1.2] *a rear wall*;

As depicted in Figure 1, Gromov discloses “*a front wall*” and “*a rear wall*.”

Ex.1003@¶70.

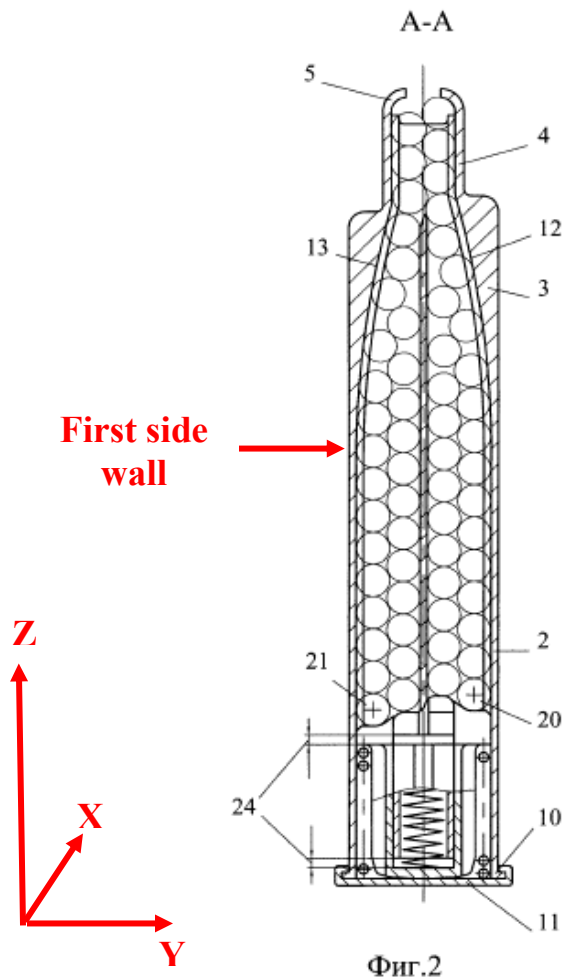


Ex.1005@Figure 1 (Annotated); Ex.1003@¶70.

[1.3] *a first side wall; and*

As depicted in Figure 2, Gromov discloses “*a first side wall.*”

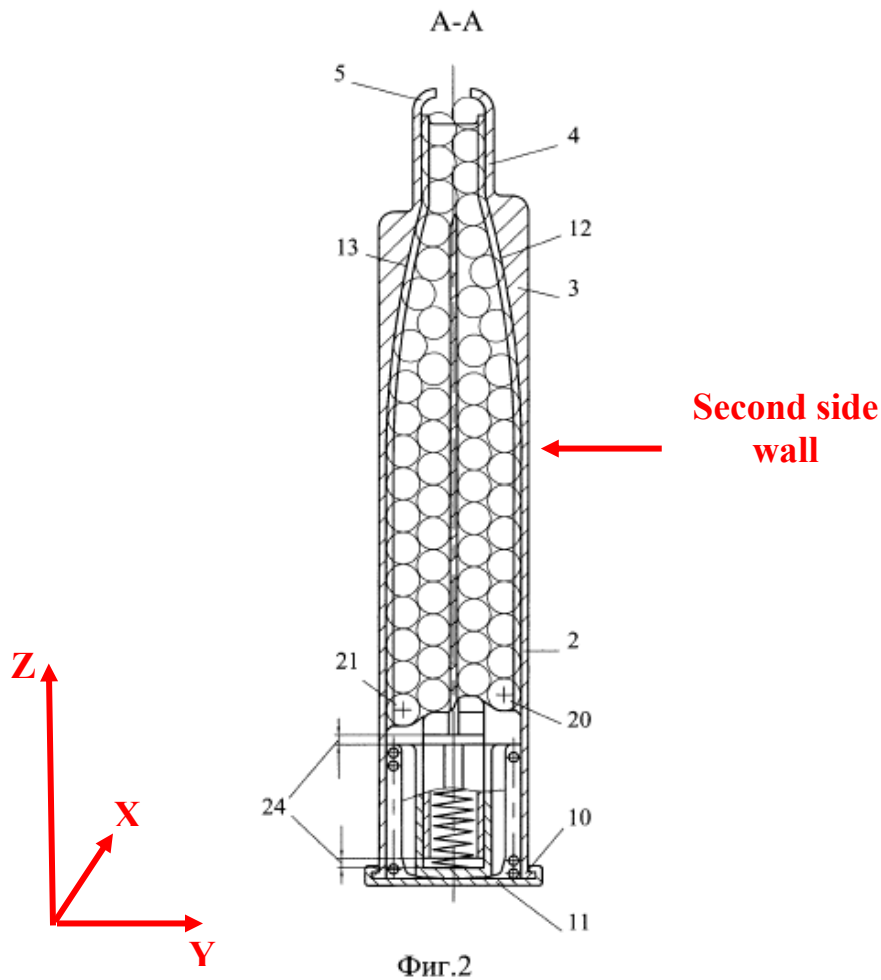
Ex.1003@¶72.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶72.

[1.4] *a second side wall, inside surfaces of the front wall, the rear wall, the first side wall and the second side wall forming an interior space consisting of a first region and a second region, between the first region and the second region a transitional region is formed which connects the first region and the second region with one another;*

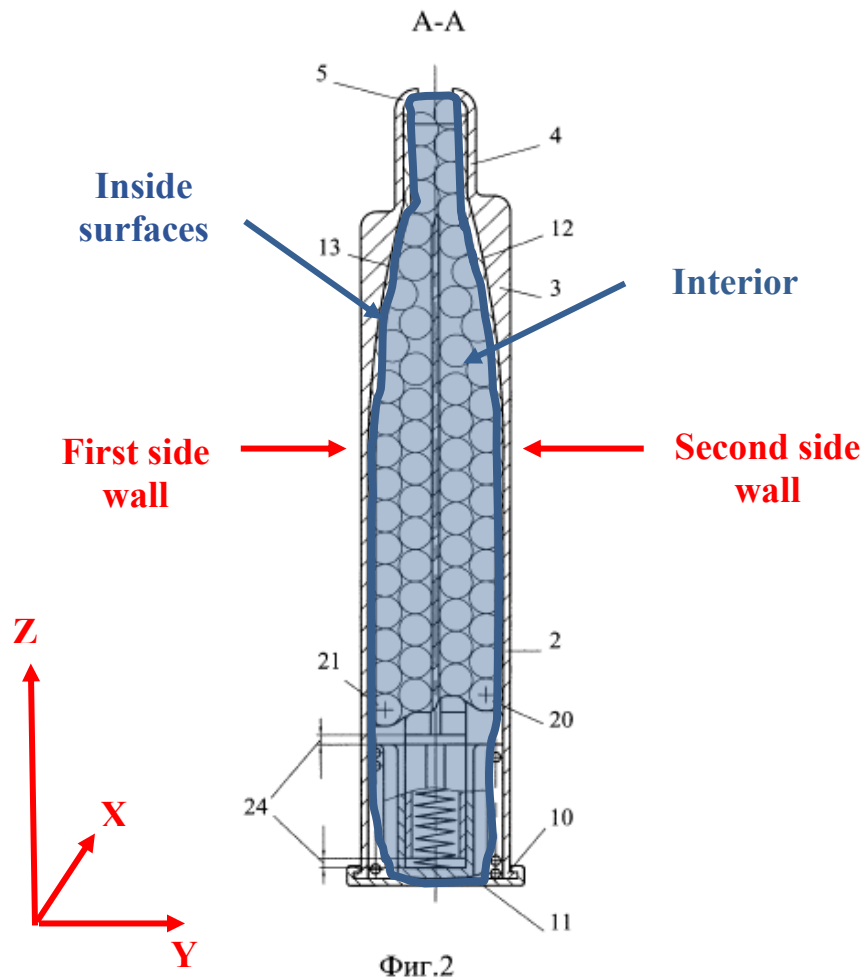
First, Gromov discloses *a second side wall.*



Ex.1005@Figure 2 (Annotated); Ex.1003@¶75.

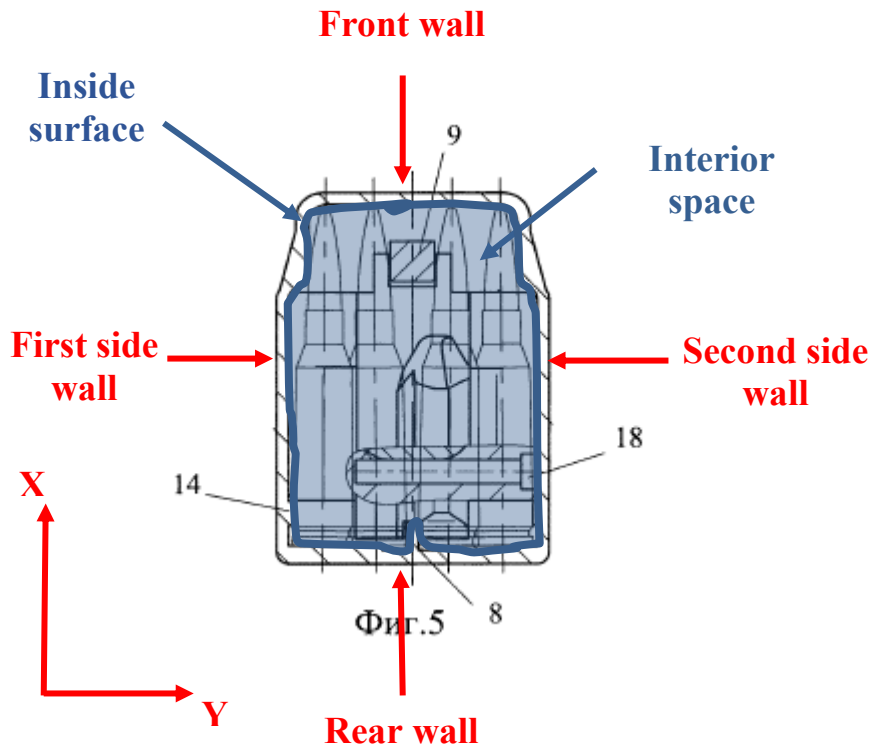
Second, as depicted in Figures 2 and 5, the inside front wall, rear wall, first side wall and a second side wall form an inside (*interior space*) of the housing.

Figure 2, below, depicts a longitudinal view of the *interior space* formed between the *inside surfaces* of the *first side wall* and the *second side wall*:



Ex.1005@Figure 2 (Annotated); Ex.1003@¶76.

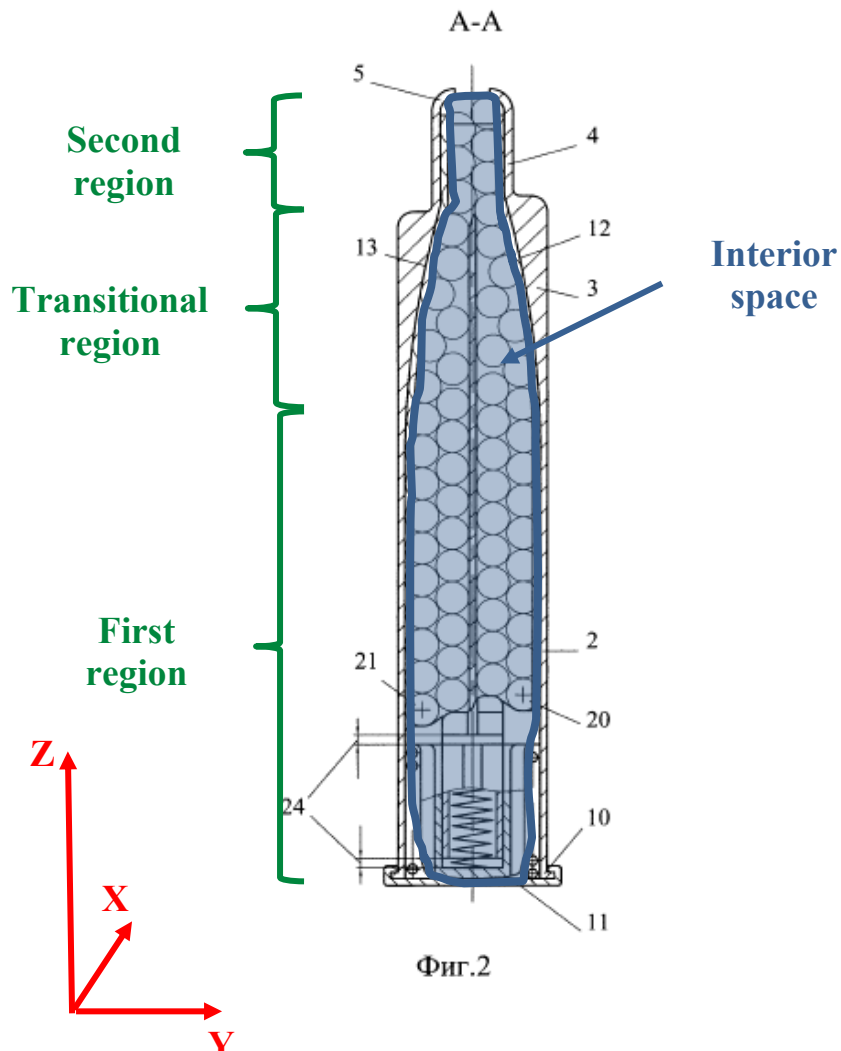
Figure 5, below, depicts a cross sectional representation of the interior space formed by the inside surfaces of the front wall, the rear wall, the first side wall and the second side wall:



Ex.1005@Figure 5 (Annotated); Ex.1003@¶77.

Third, the inside of the housing includes a multi-row portion 2 (*a first region*), a throat 4 (*a second region*), and rearrangement zone 3 (*a transition region*). Ex.1003@¶78; Ex.1006@5 (“[t]he magazine consists of a housing 1 of thin-walled box section, with a wide multiple-row portion 2, a rearrangement zone 3 and a throat 4.”).

As depicted in Figure 2, the rearrangement zone 3 (*transitional region*) connects the wide multi-row portion 2 (*first region*) and the throat 4 (*second region*):

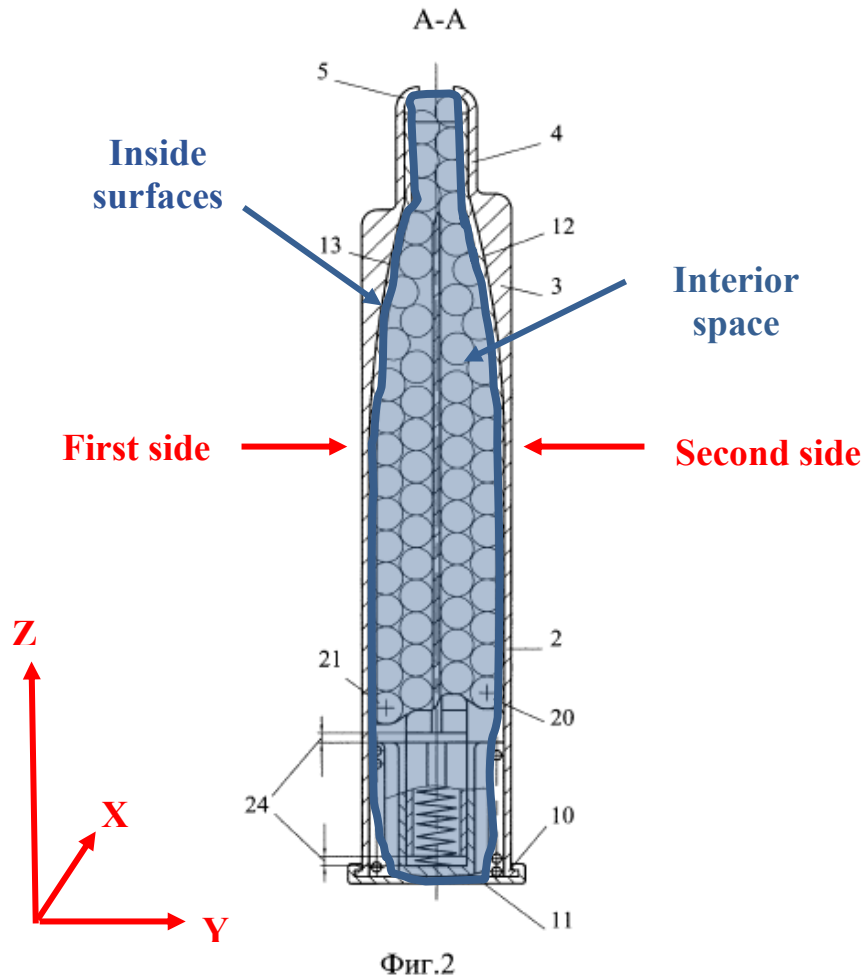


Ex.1005@Figure 2 (Annotated); Ex.1003@¶79.

Gromov discloses this limitation. Ex.1003@¶¶74-80.

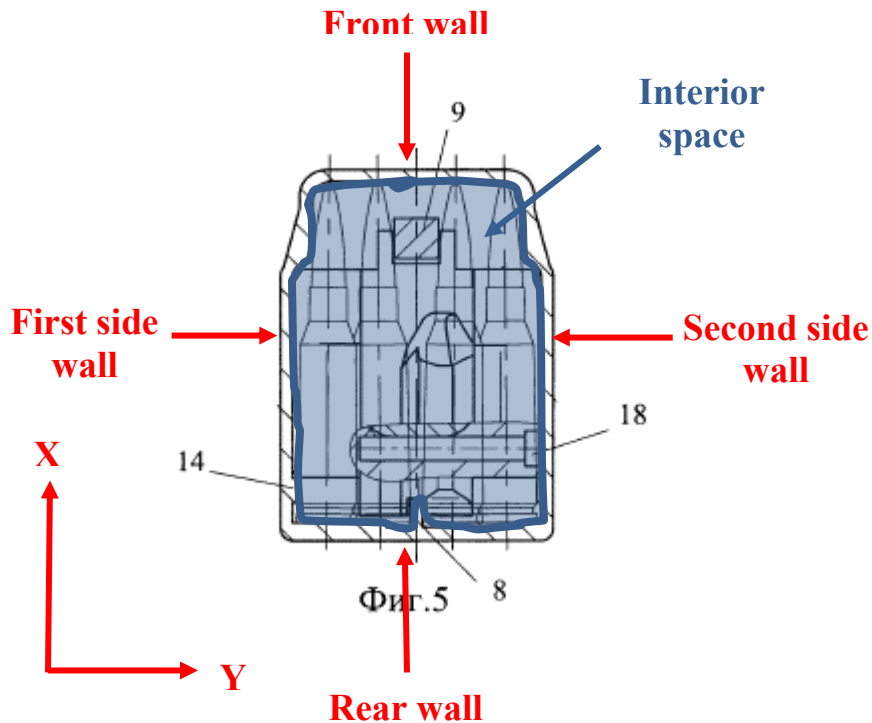
[1.5] wherein the interior space is limited by the inside surfaces of the front wall, the rear wall, the first side wall and the second side wall;

Gromov's Figure 2 depicts "a longitudinal cross section of a full multiple-row magazine." Ex.1006@5; Ex.1003@¶82. The longitudinal view illustrates the interior space of the housing and discloses that the *interior space is limited* by the *inside surfaces of the first side wall and the second side wall*.



Ex.1005@Figure 2 (Annotated) Ex.1003@¶82.

Figure 5 depicts “a transverse cross section of a full multiple-row magazine.” Ex.1006@5. The cross-section view illustrates that the interior space is limited by the front wall, the rear wall, the first side wall and the second side wall.



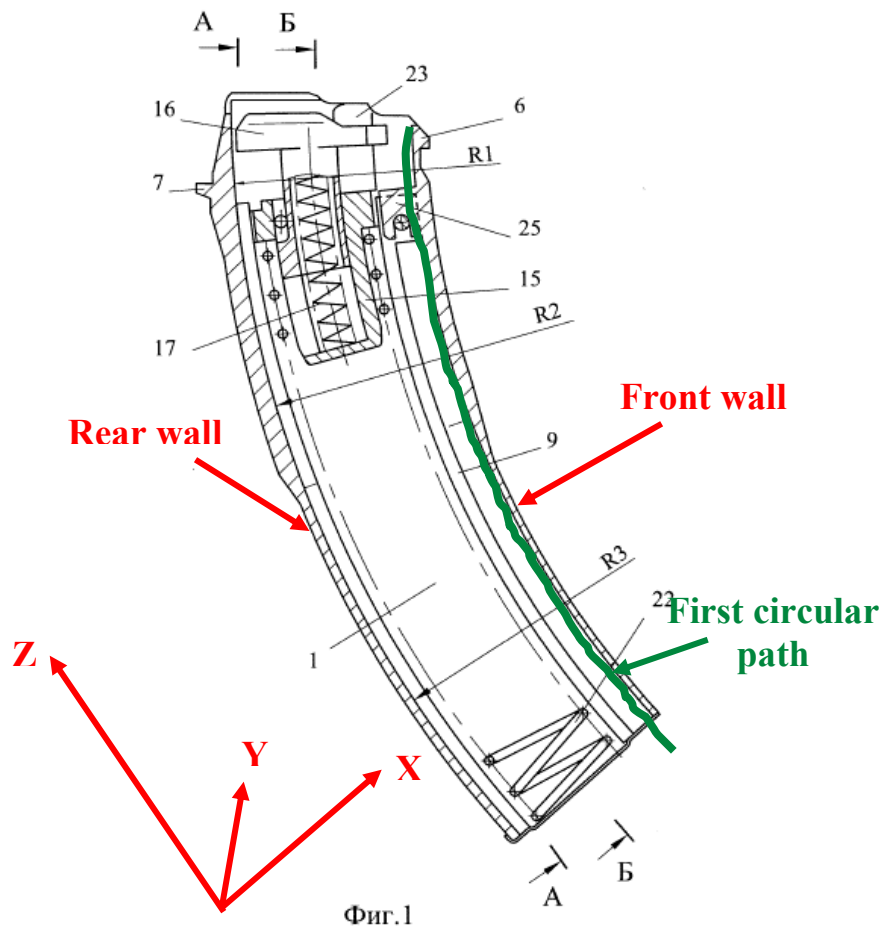
Ex.1005@Figure 5 (Annotated); Ex.1003@¶83.

Gromov discloses this limitation. Ex.1003@¶¶81-84.

[1.6] wherein the inside surface of the front wall extends in the direction of the Z-axis in at least one of the regions along a first circular path;

Gromov's Figure 1 depicts an *inside surface of the front wall* that is curved in the direction of the Z-axis from the bottom to the top of the magazine housing 1 in a *circular path*. Ex.1005@Figure 1; Ex.1003@¶86. A POSITA would have recognized that because the curve extends from the bottom to the top of the magazine housing 1, the curve extends through the multi-row portion 2, the rearrangement zone 3 and the throat 4 (the *at least one region*). Ex.1003@¶86. A

POSITA also understands that Gromov discloses an AK-type firearm magazine for tapered (*i.e.*, wider in the back than in the front) cartridges. *Id.* Stacking those cartridges one on top of another in a magazine naturally results in a magazine front wall with a circular curve or path. *Id.*; *see, e.g.*, Ex.1013@1:48-49 (“Of notable difference is that the AK-47 magazine has a relatively constant curvature...”).

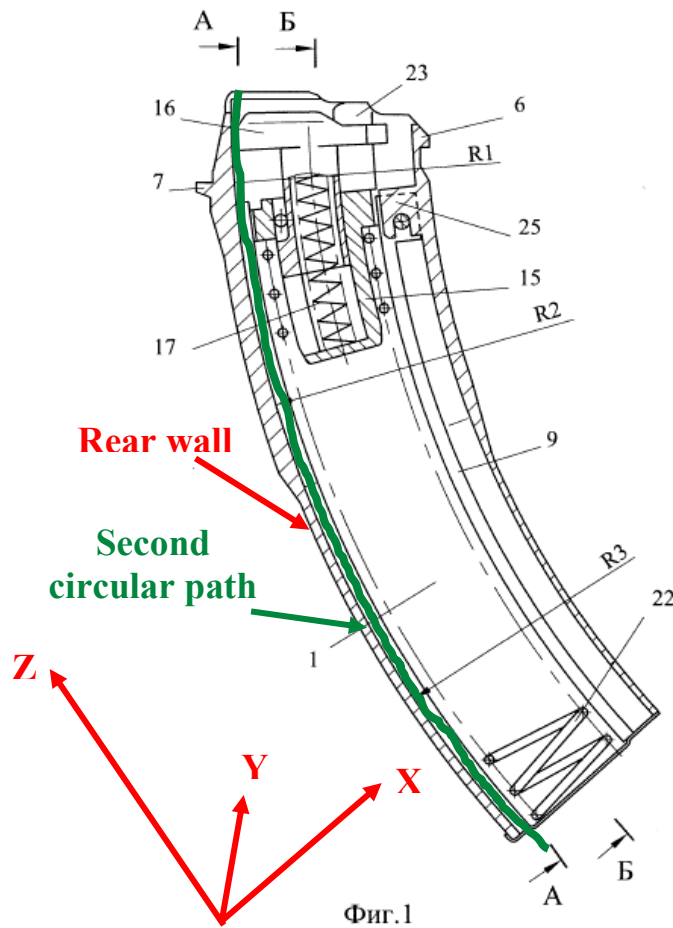


Ex.1005@Figure 1 (Annotated); Ex.1003@¶86.

Gromov renders obvious this limitation. Ex.1003@¶¶85-87.

[1.7] wherein the inside surface of the rear wall extends in at least one of the regions in the direction of the Z-axis along a second circular path;

Gromov's Figure 1 depicts a rear wall that is curved in the direction of the Z-axis from the bottom to the top of the magazine housing 1 in a *circular path*. Ex.1003@¶89. Figure 1 further depicts that the curve extends along the inside surface of the *rear wall*. *Id.* A POSITA would have recognized that because the curve extends from the bottom to the top of the magazine housing 1, the curve extends through the multi-row portion 2, the rearrangement zone 3 and the throat 4 (the *at least one region*). *Id.* A POSITA also understands that Gromov discloses an AK-type firearm magazine for tapered (*i.e.*, wider in the back than in the front) rifle cartridges. *Id.* Stacking those cartridges one on top of another in a magazine naturally results in a magazine rear wall with a circular curve or path with a center of curvature that is similar, if not identical, to that of the front wall. *Id.*;Ex.1013@1:48-49 (“Of notable difference is that the AK-47 magazine has a relatively constant curvature...”).

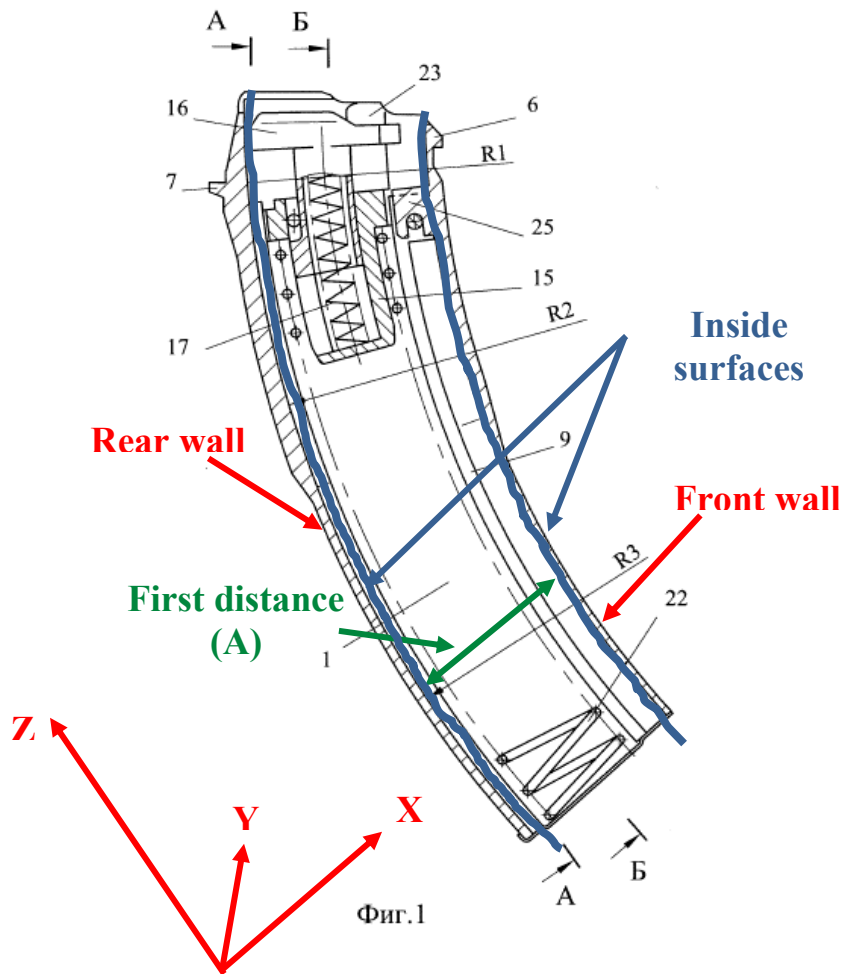


Ex.1005@Figure 1 (Annotated); Ex.1003@¶89.

Gromov discloses this limitation. Ex.1003@¶¶88-90.

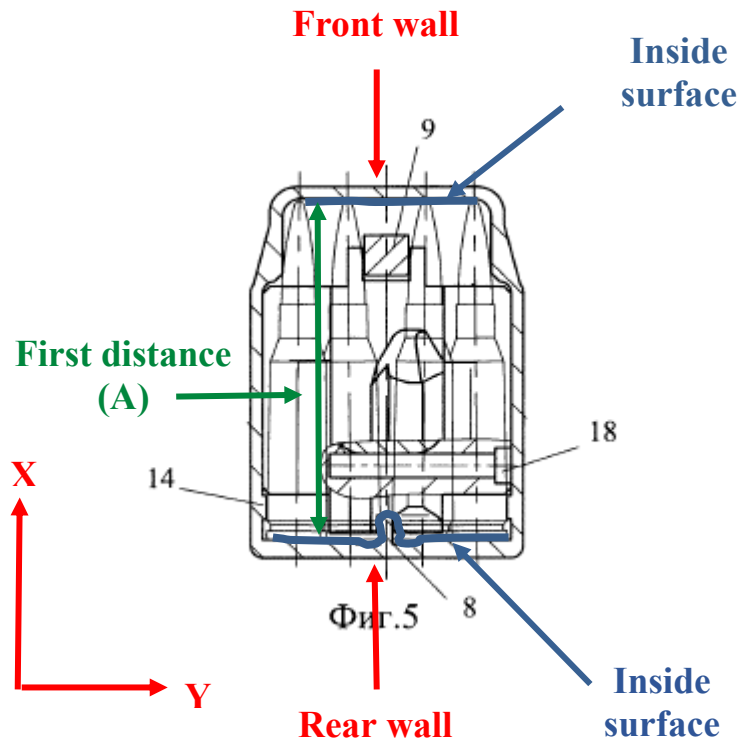
[1.8] wherein the inside surfaces of the front wall and the rear wall in at least one of the regions are located at a first distance (A) from one another.

As depicted in Figure 1, Gromov discloses housing 1 with a distance between the *inside surfaces* of the *front wall* and the *rear wall* in at least the multi-row portion 2. Ex.1003@¶92. The distance between the *front wall* and the *rear wall* in at least the multi-row portion 2 is a *first distance (A)*. *Id.*



Ex.1005@Figure 1 (Annotated); Ex.1003@¶92.

Figure 5 also depicts a traverse cross section (Ex.1006@5), which also depicts the *first distance (A)* between the *inside surfaces* of the *front wall* and the *rear wall* in at least the multi-row portion 2:

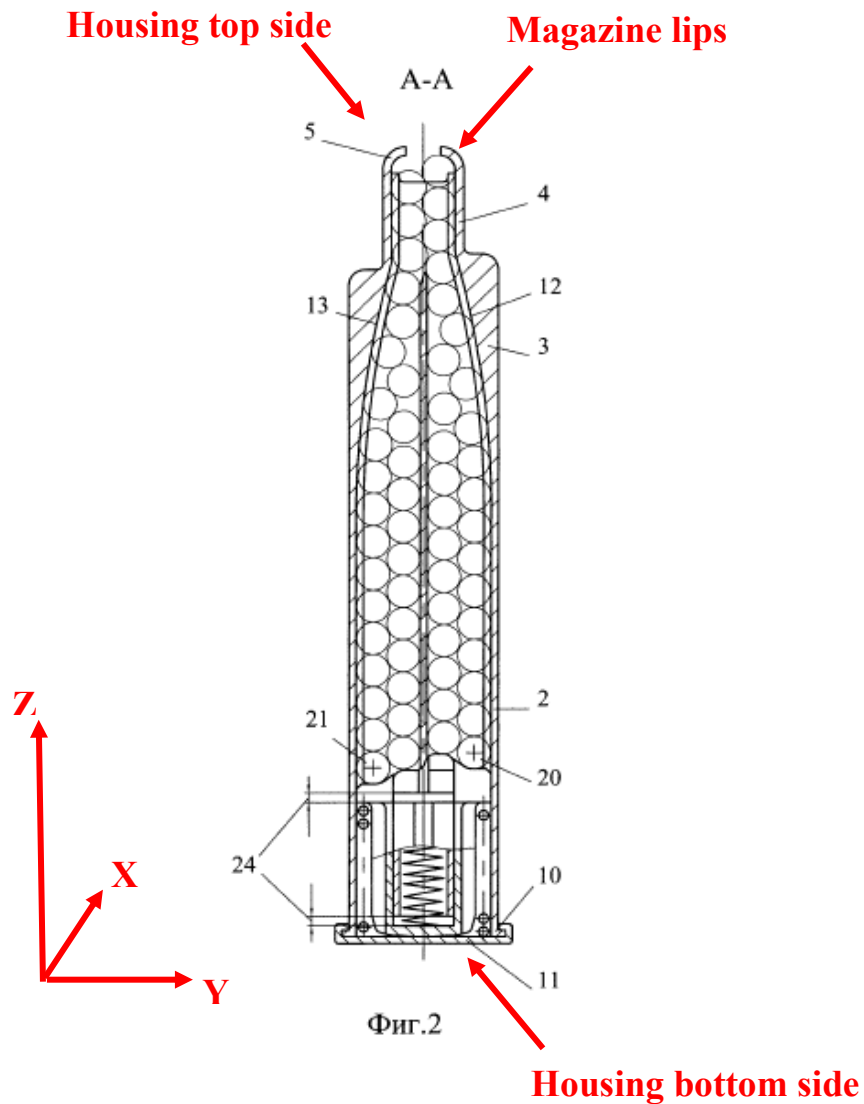


Ex.1005@Figure 5 (Annotated); Ex.1003@¶93.

Gromov renders obvious this limitation. Ex.1003@¶¶91-94.

[1.9.0] wherein the housing has a housing bottom side and a housing top side, magazine lips are formed on the housing topside, and the housing bottom side is designed to be at least partially open,

First, Gromov discloses a “**bottom** in the wide portion of the housing,” which is a *housing bottom side*. Ex.1006@5; Ex.1003@¶96.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶96.

Second, Gromov discloses that “[t]he throat is designed with lips 5.”

Ex.1006@5. Gromov’s Figure 2 above, depicts lips 5 (*magazine lips*) on top of the *housing topside*. Ex.1003@¶97.

Third, Gromov discloses “bends 10 for attaching the spring cover 11 at the bottom in the wide portion of the housing.” Ex.1003@¶98. A POSITA would have

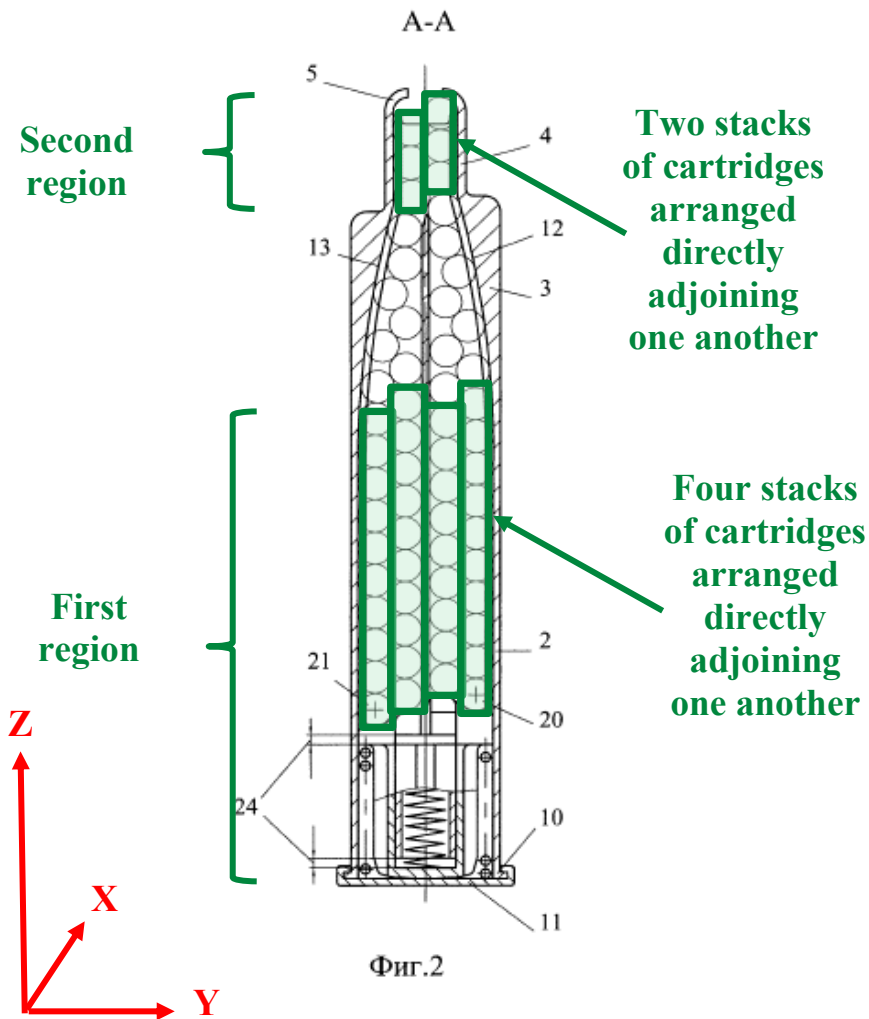
recognized that the spring cover is designed to be removable and without the spring cover 11, the *bottom side* of the *housing* would be *at least partially open* to facilitate maintenance, e.g. cleaning and lubrication of the magazine. *Id.*;
Ex.1009@23:42-45.

In summary, by disclosing the lips on the top of the housing and a removable spring cover on the bottom side of the housing, Gromov renders obvious this limitation. Ex.1003@¶¶95-100.

[1.9.1] *the first region being configured for accommodating four stacks of cartridges arranged directly adjoining one other and being offset in the Z-direction relative to one another, the second region being configured for accommodating two stacks of cartridges arranged directly adjoining one another and being offset in the Z-direction relative to one another,*

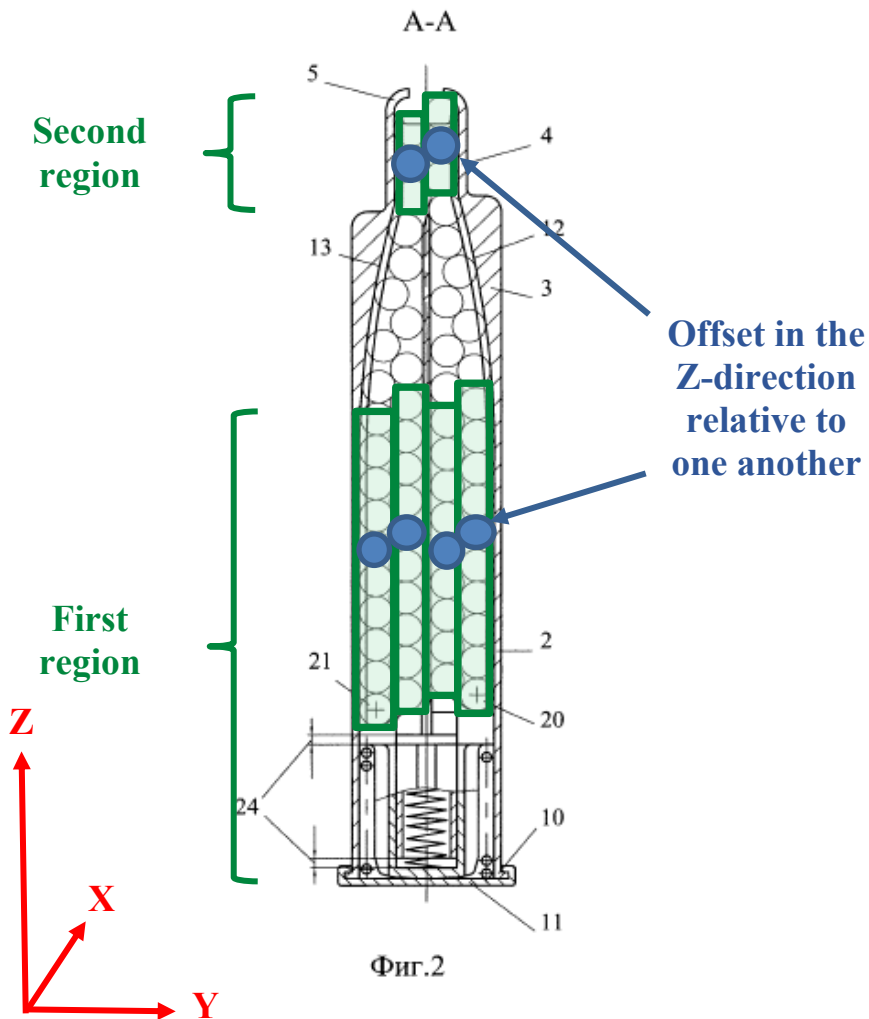
First, as discussed in [1.4], Gromov discloses a wide multi-row portion 2 (*first region*) and throat 4 (*second region*). Ex.1003@¶¶78, 102.

Second, the cartridges in Gromov's housing are "arranged in staggered fashion in the wide portion" into four stacks and in a "single double-row" staggered arrangement in the throat 4. Ex.1003@¶103; Ex.1006@5. Figure 2, below, depicts the wide portion (*first region*) having *four stacks of cartridges* and throat 4 (*second region*) having *two stacks of cartridges* that are *arranged directly adjoining one other*. Ex.1003@¶103.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶103.

Because Gromov discloses that the cartridges in the wide multi-row portion 2 are “staggered” pattern, Gromov discloses that the cartridges are *offset in the Z-direction relative to one another*. Ex.1003@¶104. Figure 2, below, depicts the cartridges *offset in the Z-direction relative to one another*. *Id.*



Ex.1005@Figure 2 (Annotated); Ex.1003@¶104.

In summary, by disclosing a four-stack wide cartridge arrangement in the wide multi-row portion 2 and a two-stack wide cartridge arrangement in throat, Gromov discloses this limitation. Ex.1003@¶¶101-105.

[1.10.1] wherein the inside surface of the front wall has a first protrusion which protrudes in direction of the X-axis into the interior space of the housing and extends along the Z-axis originating from the transitional region at least partially into the first region and also at least partially into the second region, and

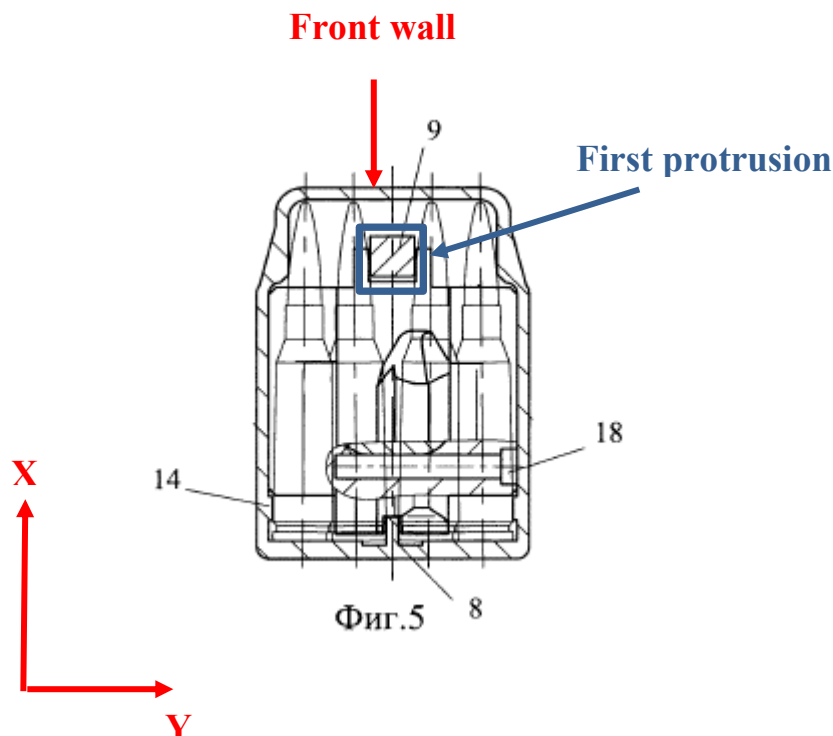
First, Gromov discloses a front inner surface (*inside surface of the front wall*) of the housing having a partition 9 (*first protrusion*). Ex.1003@¶107; see Ex.1006@4 (“The indicated technical result is achieved with a multiple-row box magazine with variable number of rows, comprising a housing of box-shaped variable cross section **with dividing partitions...**”); *Id.* (“The partitions 8 and 9 also serve for directing the movement of the magazine feeder.”); *Id.*@6 (“As the cartridges move into the rearrangement zone, **they are directed by the partitions 8 and 9**, and also by the helical surfaces 12 and 13, alternately into the right and left channels of the housing, arranging in zig zag fashion.”). Gromov teaches that the front partition 9 can be detachable or integrated with the front inner surface. Ex.1003@¶107; see Ex.1006@4 (“One of the partitions separating the streams of cartridges is detachable.”); *Id.* (“Making one of the partitions separating the streams of cartridges to be detachable allows a simpler design for the box housing of the magazine.”); *Id.*@6 (“A bracket 25 is formed on the internal front surface of the housing, designed to fasten the detachable partition 9.”).

Claim 1 of Gromov similarly discloses “A multiple-row box-shaped magazine with variable number of rows, **comprising a housing of box-shaped variable cross section with dividing partitions**” and so teaches a magazine housing with a front partition 9 (*first protrusion*) that may be removeable or integrated into the housing. Ex.1003@¶107;Ex.1006@7. This is confirmed by

Gromov claim 4 which discloses “The magazine according to claim 1, characterized in that *one of the partitions separating the streams of cartridges is detachable.*” Ex.1003@¶107; Ex.1006@7. In other words, the Gromov claims, consistent with the specification, teach that front partition 9 (*first protrusion*) can be **integrated** into the inside surface of the front wall of the magazine.

Ex.1003@¶107. Gromov Figure 2 (below) depicts an embodiment where front partition 9 is detachable from the inside surface of the front wall. *Id.*;

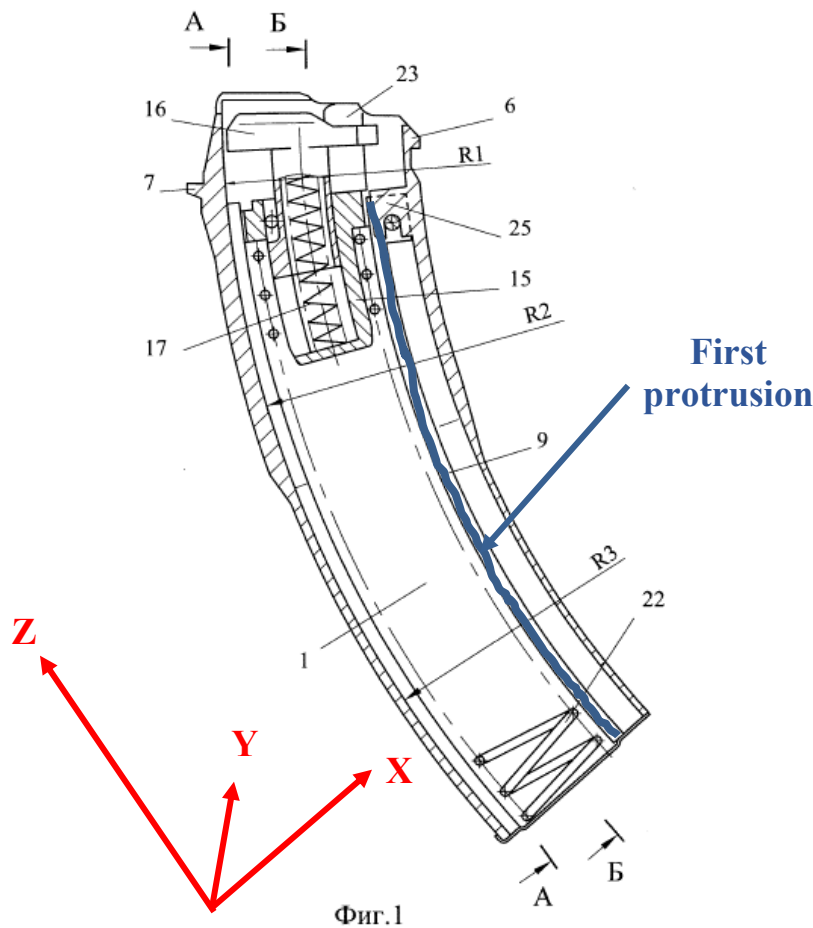
Ex.1005@Figure 5. As depicted in Figure 2, partition 9 (*first protrusion*) protrudes *in direction of the X-axis*:



Ex.1005@Figure 5 (Annotated); Ex.1003@¶107.

A POSITA would understand that the front partition 9 in integrated embodiments of Gromov would have the same general size, shape, location, and function as the detachable front partition 9 shown in Figure 2. Ex.1003@¶107.

Figure 1, below, also depicts that partition 9 (*first protrusion*) extends substantially along the length of the housing, which is *along the Z-axis*:



Ex.1005@Figure 1 (Annotated); Ex.1003@¶108.

As discussed in [1.4], Gromov discloses the rearrangement zone 3 (*transitional region*) that connects the wide multi-row portion 2 (*first region*).

Ex.1003@¶109. Gromov discloses that partition 9 forms two double row-channels in the multi-row portion 2 and a zigzag arrangement in the rearrangement zone 3. *Id.*; Ex.1006@5 (“On the rear internal surface of the **wide portion of the housing 1 and the rearrangement zone 3** there is a separating partition 8, which forms together with the walls of the housing 1 and a detachable separating **partition 9 two double-row channels, with the cartridges arranged in staggered fashion in the wide portion of the housing of the magazine and in zig zag fashion in the rearrangement zone.**”).

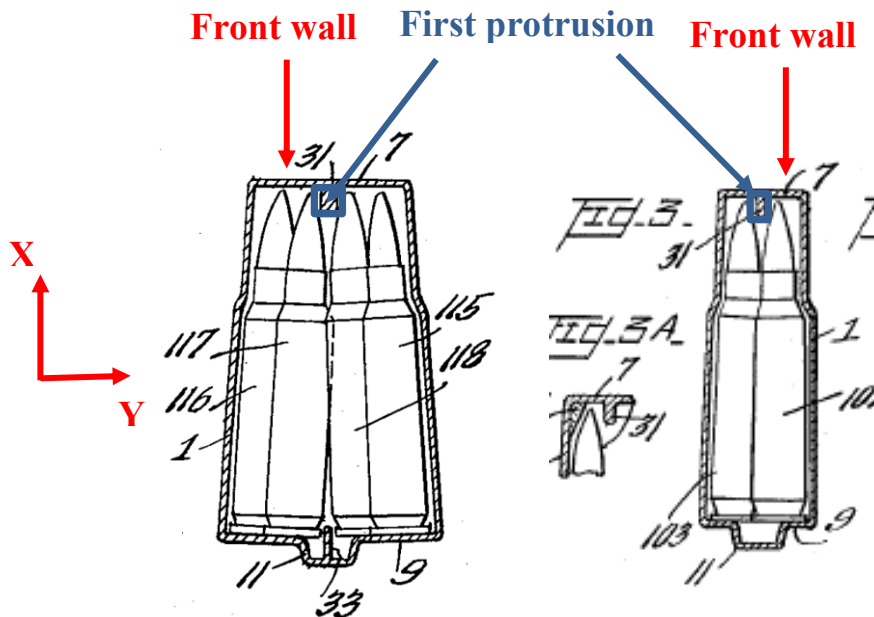
Second, a POSITA would have recognized that the transition zone is the *transitional region*, and for partition 9 to form the two-double row-channels in the multi-row portion 2 (*first region*) and a zig-zag arrangement in the transition zone (*transitional region*), partition 9 would *extend through the transitional region and at least partially into the first region*. Ex.1003@¶110.

Third, Gromov discloses that “[a] bracket 25 is formed on the internal front surface of the housing, designed to fasten the detachable partition 9.”

Ex.1003@¶111; Ex.1006@6. A POSITA would have understood that bracket 25 is located in the throat 4 (*the second region*) to secure the detachable partition 9. *See* Ex.1006@6. A POSITA would have understood that bracket 25 is located in the throat 4 (*the second region*) to secure the detachable partition 9. Ex.1003@¶111.

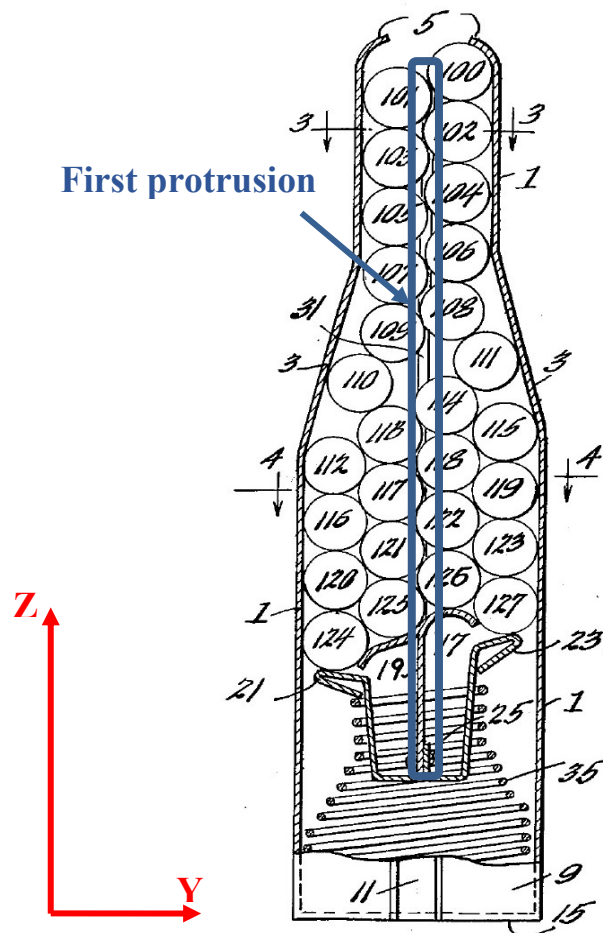
To the extent that Gromov is found not to disclose that partition 9 extends

“also at least partially into the second region,” Gromov combined with Musgrave renders this limitation obvious. Musgrave, like Gromov, discloses a front interior wall (inside surface of the front wall) of the housing that has a guide 31 (first protrusion). See Ex.1007@2:25-26; Ex.1003@¶112. Musgrave further discloses that “[g]uide 31 may extend substantially from top to bottom of front wall 7,” which includes the two-column region (second region). Ex.1007@2:26-27; Ex.1003@¶112. As depicted in Musgrave’s Figures 3 and 4, like Gromov’s partition 9, guide 31 (first protrusion) protrudes in direction of the X-axis into the interior space of the housing in the wide multi-row portion region (first region) and the narrow two-column region (second region):



Ex.1007@Figures 3 and 4 (Annotated); Ex.1003@¶113.

Further, as depicted in Musgrave Figure 2, guide 31 extends longitudinally through the two-column region, the transition region, and the four-column region of the magazine, which is *along the Z-axis*.



Ex.1007@Figure 2 (Annotated); Ex.1003@¶114.

As further explained in Sections IV.B and X.C.3 it would have been obvious to a POSITA to extend partition 9 to run substantially from top to bottom of the front wall, as taught by Musgrave. Ex.1003@¶115. Musgrave teaches a partition (guide 31) which extends “substantially from top to bottom of front wall 7.”

Ex.1007@2:27; Ex.1003@¶115. A POSITA would have been motivated to extend Gromov's partition 9 at least partially through the second, two-column region to center the feeder in the throat of the magazine and to reduce cartridge and feeder jamming. Ex.1003@¶115. As discussed in Section X.C.3, feeder tilt and roll are caused when the feeder pivots forward and backward or side-to-side within the housing of the firearm magazine, which causes friction and jamming. *Id.* A protrusion that runs along at least the front wall of the inside of the firearm magazine, including in the narrow double-row region, centers the feeder and prevents the feeder from jamming. *Id.*; Ex.1013@4:25-32. Thus, a protrusion that extends into the second region and guides the feeder makes the magazine more effective. Ex.1003@¶115.

Further, extending Gromov's partition 9 into the two-column region, as taught in Musgrave, would have been a modification well within the skill level of a POSITA. Ex.1003@¶116; Ex.1013@4:25-32. A POSITA would have experimented with extending protrusions into the two-column region of the magazine to minimize feeder and ammunition jamming. Ex.1003@¶116. Further, because the cartridges, such as the one in Gromov, are tapered in the front, a POSITA would have looked to extending the partition along the length of front wall of the magazine where the tapered cartridges create space between the two-columns of cartridges without needing to change dimensions of the magazine or

the width of the magazine's walls. *Id.* Adding the front protrusion to the two-column region would also require no more than minor changes to the mold or die used to make magazines. *Id.*; *see, e.g.*, Ex.1013@Abstract (with reference to a high-capacity magazine with a ridge 19 on the inside front wall, stating "The present invention is an ammunition magazine, preferably made of a reinforced polymer..."); Ex.1008@5:26-29 (referencing the disclosed quad-stack magazine with protrusions (flanges 4a and 5a) and stating "In the embodiment illustrated, the magazine may be formed entirely of cut, folded and pressed sheet metal. It is thus simple and economical to manufacture and very quick to assemble."). Further, because the modification relies on known components (protrusions) and attempts to solve a known problem (reduce jamming), a POSITA would have had a reasonable expectation of success in making the modification. no more than minor changes to the mold or die used to make magazines. Ex.1003@¶116.

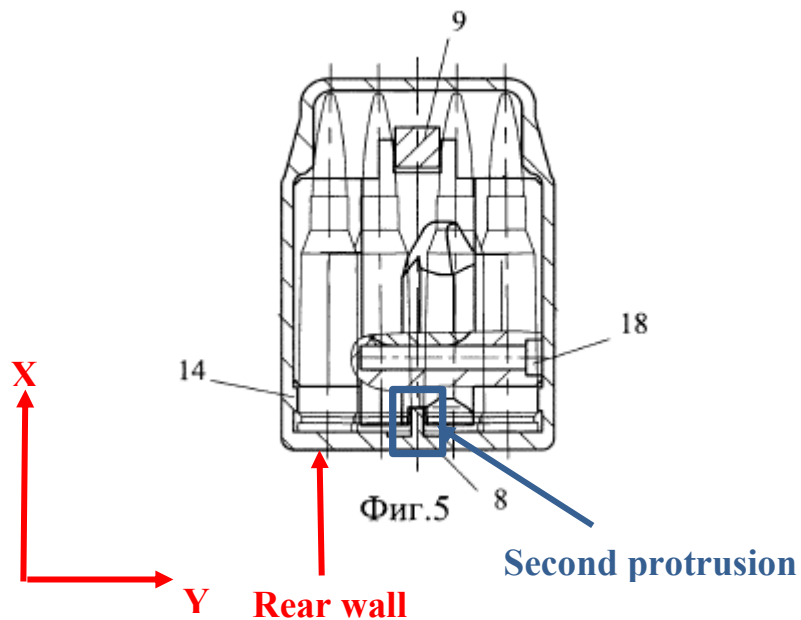
Gromov and Musgrave render this limitation obvious. Ex.1003@¶¶106-117.

[1.10.2] *the inside surface of the rear wall has a second protrusion which protrudes in direction of the X-axis into the interior space of the housing and which along the Z-axis features a start in the first region and an end in the transitional region or in the second region.*

Gromov discloses a rear inner surface (*inside surface of the rear wall*) of the housing that has a dividing partition (*second protrusion*) on a wide multi-row portion 2 (*first region*) and a rearrangement zone 3 (*transition region*).

Ex.1003@¶119; Ex.1006@5 (“On the rear internal surface of the wide portion of the housing 1 and the rearrangement zone 3 there is a separating partition 8.”).

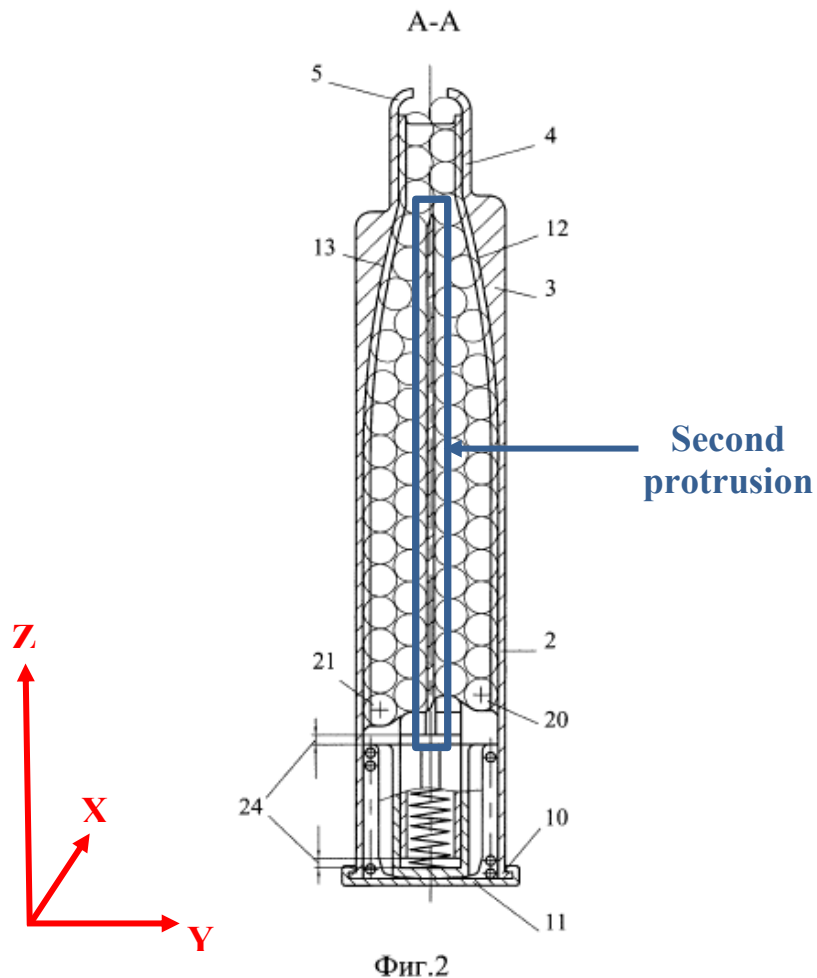
As depicted in Gromov Figure 2, the dividing partition 8 (*second protrusion*) is in direction of the X-axis:



Ex.1005@Figure 5 (Annotated); Ex.1003@¶120.

Because the dividing partition 8 (*second protrusion*) is on the rear inner surface of housing 1 in the wide multi-row portion 2 and the rearrangement zone 3, a POSITA would have recognized that partition 8 is *along the Z-axis*.

Ex.1003@¶121. This is also depicted in Figure 2:



Ex.1005@Figure 2 (Annotated); Ex.1003@¶121.

Gromov renders obvious this limitation. Ex.1003@¶¶118-122.

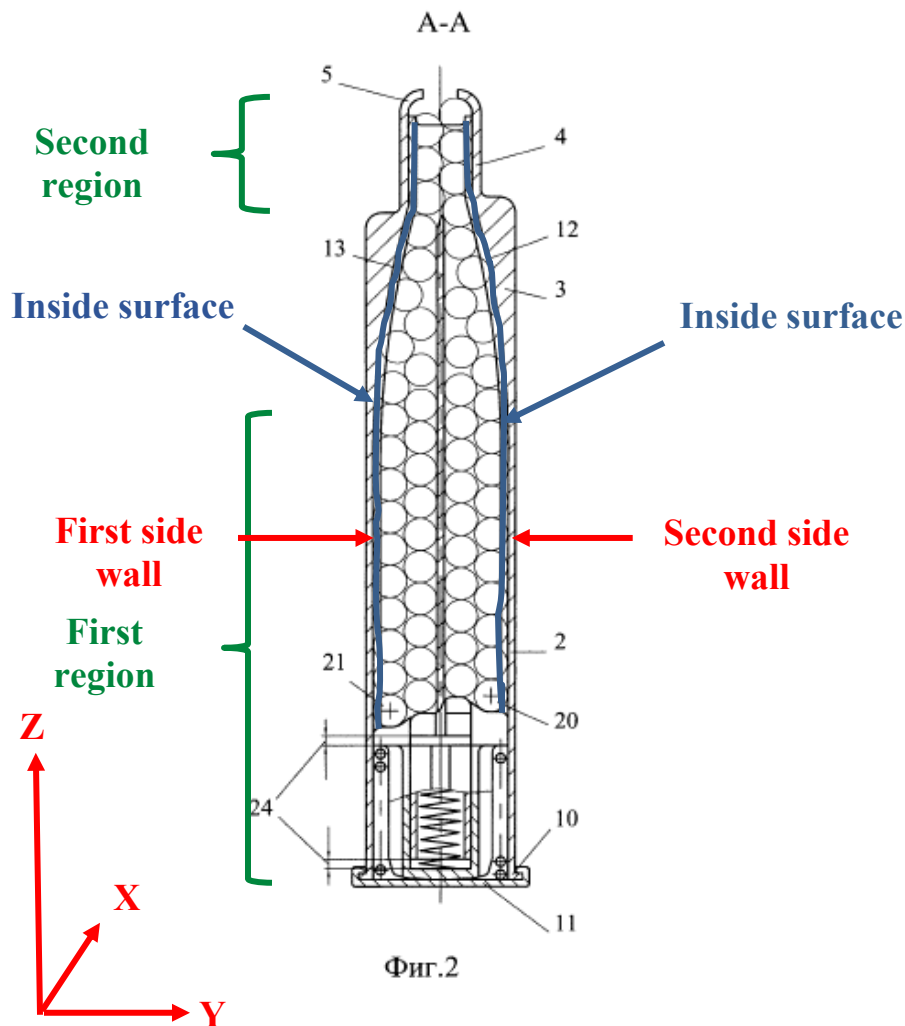
5. Claim 2

[2.0] The housing of claim 1, wherein the inside surfaces of the first side wall and the second side wall in the first region and in the second region are arranged substantially parallel relative to one another and between them in the Y-direction a virtual central plane is formed in the X- and the Z-directions.

As depicted in Figure 2, below, Gromov discloses the *inside surfaces* of the *first side wall* and the *second side wall* of the magazine housing 1, along with the

wide multi-row portion 2 (first region) and the throat 4 (second region).

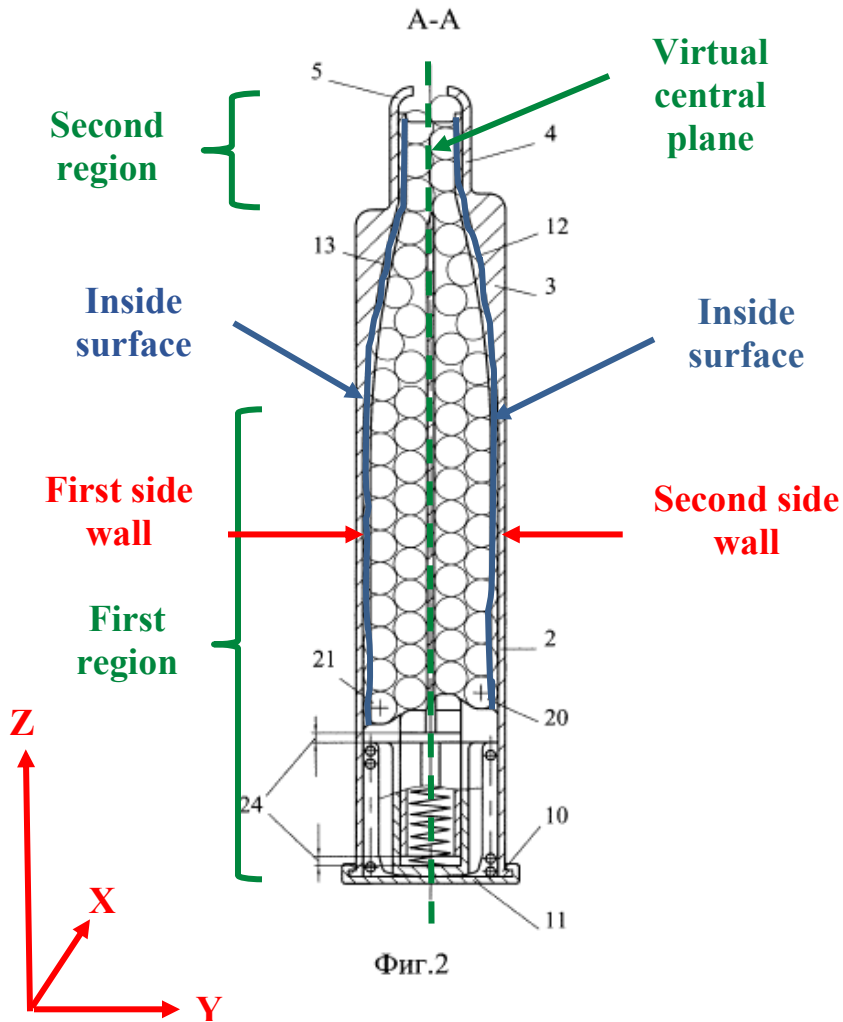
Ex.1003@¶224. As also depicted in Figure 2, the longitudinal view of the magazine, the *inner surfaces* are arranged substantially parallel relative to one another in the multi-row portion 2 and throat 4. Ex.1003@¶124.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶124.

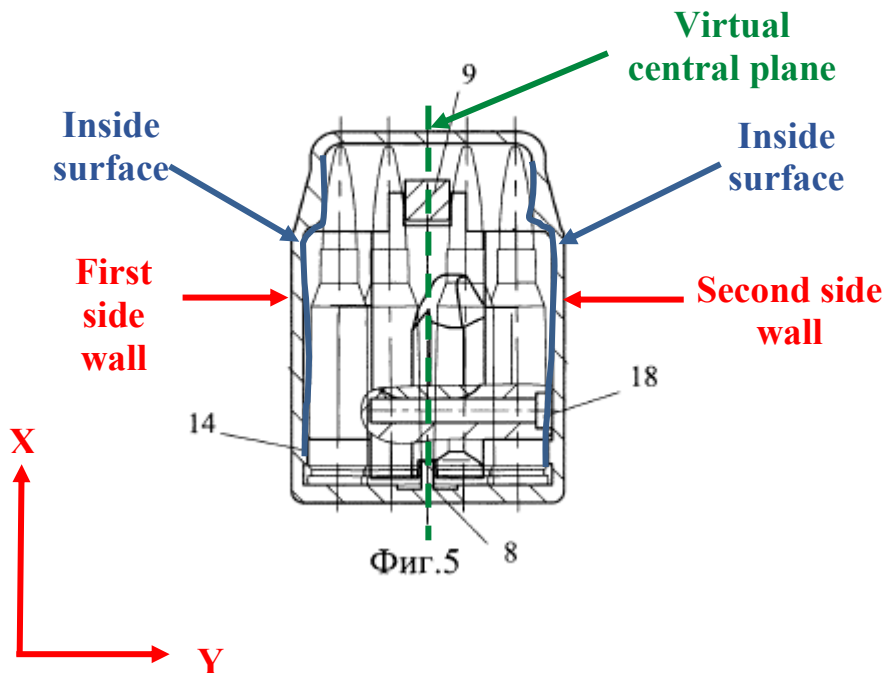
Gromov's Figure 2, the longitudinal view of the magazine, depicts a *virtual plane* that is formed between the *inner surfaces* of the *first side wall* and the

second side wall in the Z-direction. Ex.1003@¶125.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶125.

Gromov's Figure 5, a traverse cross section of the magazine in the wide portion 2, depicts a *virtual plane* that is formed between the *inner surfaces* of the *first side wall* and *second side wall* in the *X-direction*:



Ex.1005@Figure 5 (Annotated); Ex.1003@¶126.

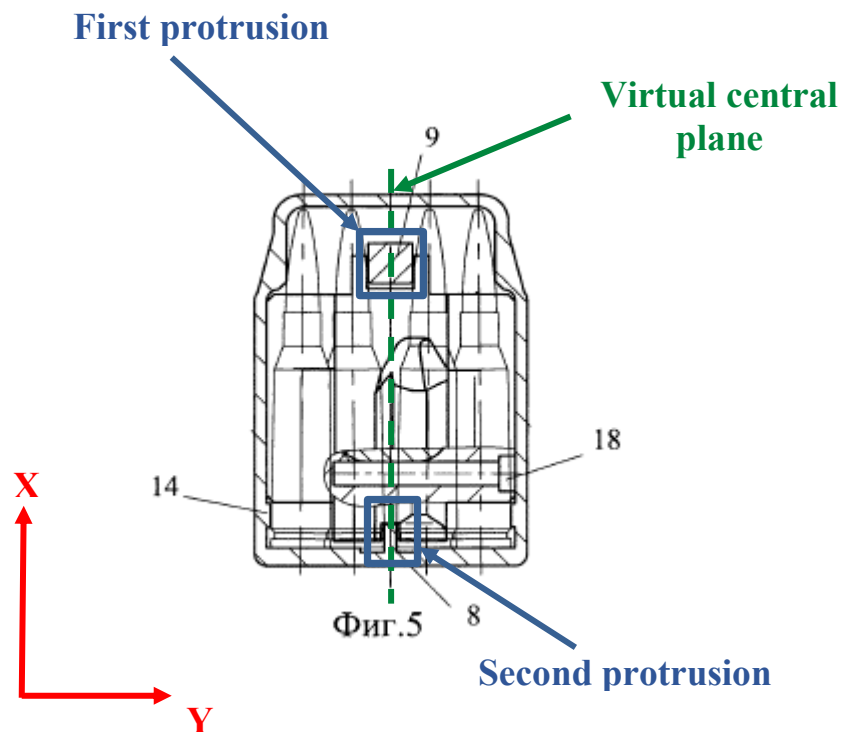
Gromov discloses this limitation. Ex.1003@¶¶123-127.

6. Claim 3

[3.0] The housing of claim 2, wherein a first protrusion is arranged at least in sections inside the central plane and/or a second protrusion is arranged at least in sections inside the central plane.

As discussed in [2.0], Gromov discloses the *central plane* and as discussed in [1.10.1] and [1.10.2], Gromov discloses partition 9 (*first protrusion*) and partition 8 (*second protrusion*). Ex.1003@¶129. Figure. 5 further depicts that partition 9 passes through the central plane, which discloses a *first protrusion is*

arranged at least in sections inside the central plane comprising a section of partition 9 on each side of the central plane. *Id.* Figure 5 also depicts that partition 8 passes through the central plane, which discloses a second protrusion is arranged at least in sections inside the central plane comprising a section of partition 8 on each side of the central plane. *Id.*



Ex.1005@Figure 5 (Annotated); Ex.1003@¶129.

Gromov discloses this limitation. Ex.1003@¶¶128-130.

7. Claim 4

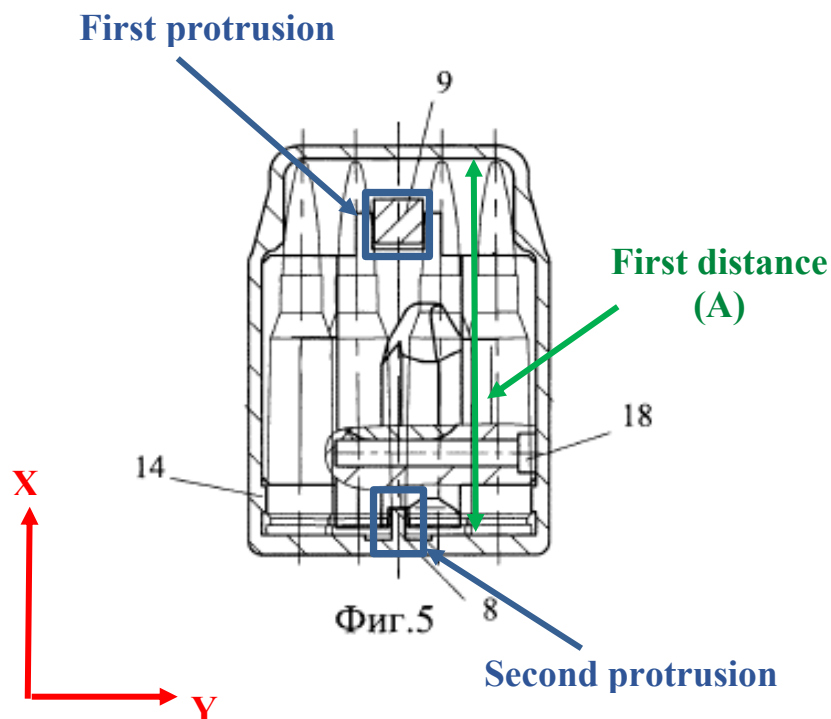
[4.0] *The housing of claim 3, wherein an extension of the first protrusion in the X-direction is between 5% of A and 30% of A, and/or an extension of the second*

protrusion in the X-direction is between 5% of A and 30% of A.

As discussed in [1.8], Gromov discloses the *first distance (A)*.

Ex.1003@¶132. As discussed in [1.10.1] and [1.10.2] and depicted in Gromov's Figure 5 below, Gromov discloses the *first protrusion* and the *second protrusion*.

Id. Gromov's Figure 5 also depicts the length of the *first distance (A)*, the *first protrusion*, and the *second protrusion*.



Ex.1005@Figure 5 (Annotated); Ex.1003@¶132.

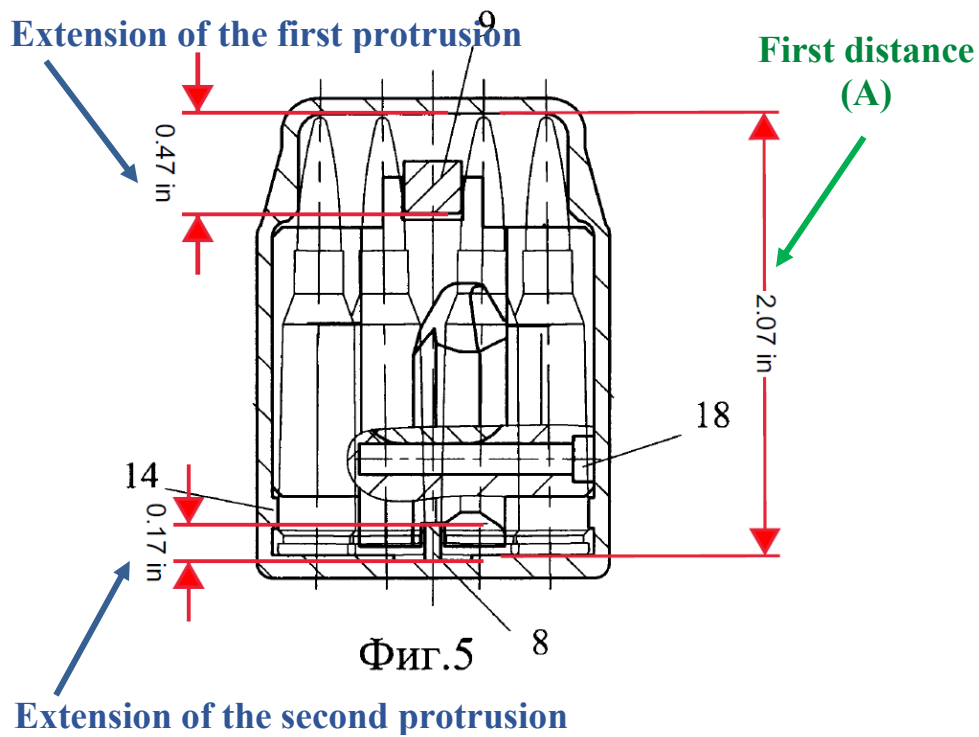
First, it would have been obvious to a POSITA that length of the *first distance (A)* would be approximately the dimensions of the cartridge.

Ex.1003@¶133. In other words, the *first distance (A)* would be different for the 5.45 x 39 mm cartridge that was initially used in the 1970's in the former Soviet Union's AK-74 rifles, the 7.62 x 51 mm NATO cartridge that was introduced in 1954, and the 5.56 x 45 mm cartridge was a U.S. standard in 1960s because these several cartridges have different lengths. *Id.* It would have also been obvious to a POSITA that the extension of the first and/or second protrusions would correspond to a variety of factors, including dimensions of the magazine, dimensions and shape of the cartridges, *e.g.*, the 5.45 x 39 mm cartridge, the 7.62 x 51 mm NATO cartridge, and the 5.56 x 45 mm cartridge, etc., and also the shape of the feeder.

Id. See Section IV.B illustrating different lengths of the front and back protrusions. As discussed in Section IV.B, the front- and back-wall protrusions reduce the likelihood of the jamming because they stabilize the feeder, divide the cartridges into two double-columns in the four-column regions, and allow the cartridges to move more easily up the magazine. See Ex. 1003@¶133. A POSITA would be concerned with the feeder and cartridge jamming and would have experimented with different lengths of the front- and back-wall protrusions, including lengths where the *first protrusion* or *second protrusion* is *between 5% of A and 30% of A* to stabilize cartridges of different lengths to minimize cartridge and/or feeder jamming as the feeder advances the cartridges through the magazine.

Id.

An evaluation of Figure 5 in Gromov supports that Gromov teaches *an extension of the first protrusion in the X-direction is between 5% of A and 30% of A* because measuring the figure itself shows the first protrusion is 22.7% of A, which is between 5% and 30%. Ex.1003@¶¶134-135.



Ex.1005@Figure 5 (Annotated); Ex.1003@¶134.

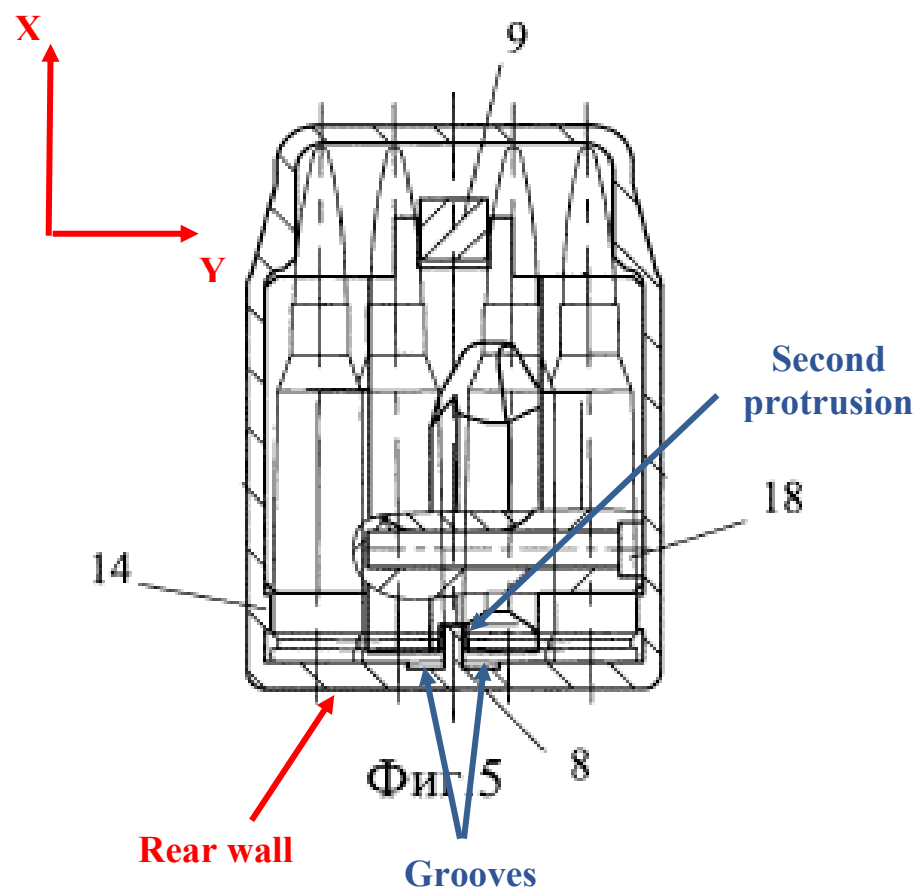
The same is true for *an extension of the second protrusion in the X-direction is between 5% of A and 30% of A* as the second protrusion in the figure is 8.21% of A in the figure, which is *between 5% of A and 30% of A*. Id.@¶136.

Gromov discloses and renders obvious this limitation. Ex.1003@¶¶131-137.

8. Claim 5

[5.0] *The housing of claim 3, wherein the inside surface of the rear wall has at least two grooves in at least one of the regions, each of the grooves progress laterally directly adjacent to the second protrusion.*

As discussed in [1.8] and [1.10.2], Gromov discloses the *inside surface* of the *rear wall* that includes a *second protrusion*. Ex.1003@¶139. As depicted in Figure 5, Gromov further discloses *two grooves* on the *inside surface of the rear wall* that are *directly adjacent* to the right and left of the *second protrusion*.



Ex.1005@Figure 5 (Annotated); Ex.1003@¶140.

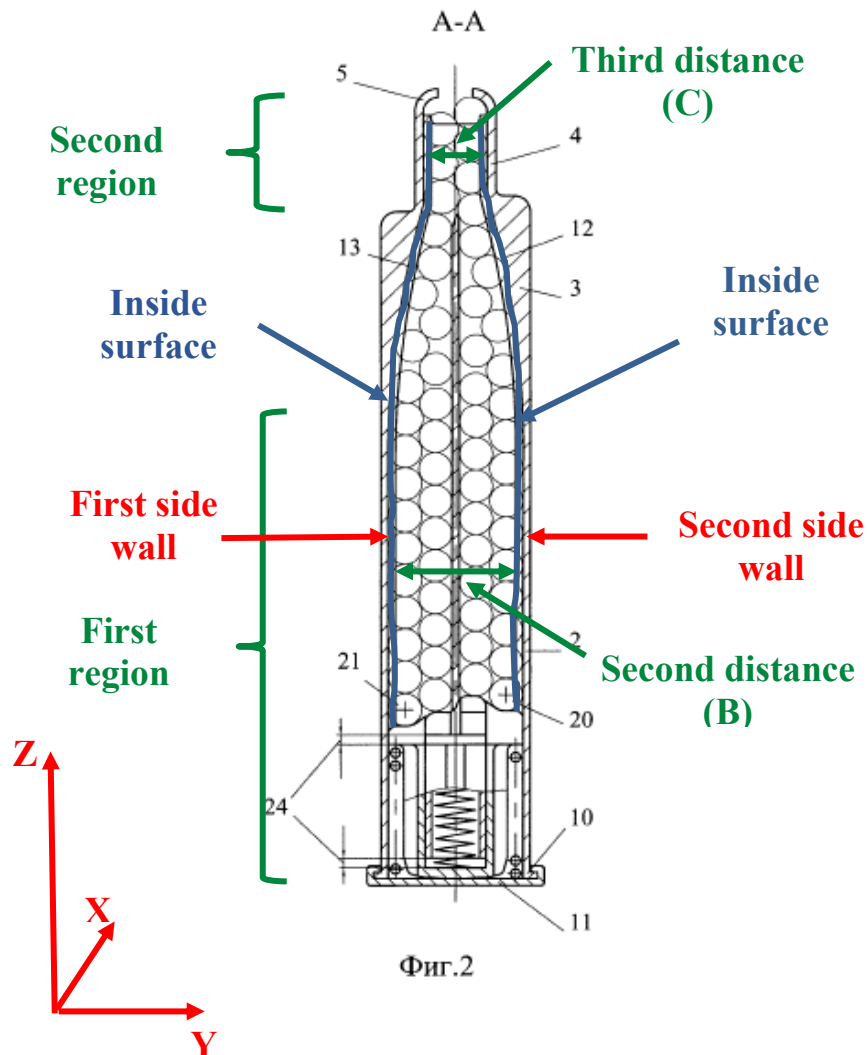
Gromov further discloses that Figure 5 “is a transverse cross section of a full multiple-row magazine with variable number of rows, looking at the wide portion.” Ex.1006@5; Ex.1003@¶141. Accordingly, Gromov discloses that the *two grooves* are in the wide multi-row portion 2 (*first region*), which is the *at least one of the regions*. *Id.* Because Gromov discloses that Figure 5 depicts a “cross section of a full multi-row store,” a POSITA would have recognized that the *two grooves* progress *laterally* in the at least the wide multi-row portion 2, the *first region*, which is *at least one of the regions*. Ex.1003@¶141.

Gromov discloses and renders obvious this limitation. Ex.1003@¶¶138-142.

9. Claim 6

[6.0] *The housing of claim 1, wherein the inside surfaces of the first side wall and the second side wall in the first region are located at a second distance (B) and in the second region at a third distance (C) from one another.*

As discussed in [1.4], Gromov discloses the *inside surfaces of the first side wall and the second side wall* that span the wide multi-row portion 2 (*first region*) and the throat 4 (*second region*). Ex.1003@¶144. Figure 2, below, depicts that the *inside surfaces of first side wall and the second side wall in the first region are located at a second distance (B) from one another and in the second region at a third distance (C) from one another*. *Id.*



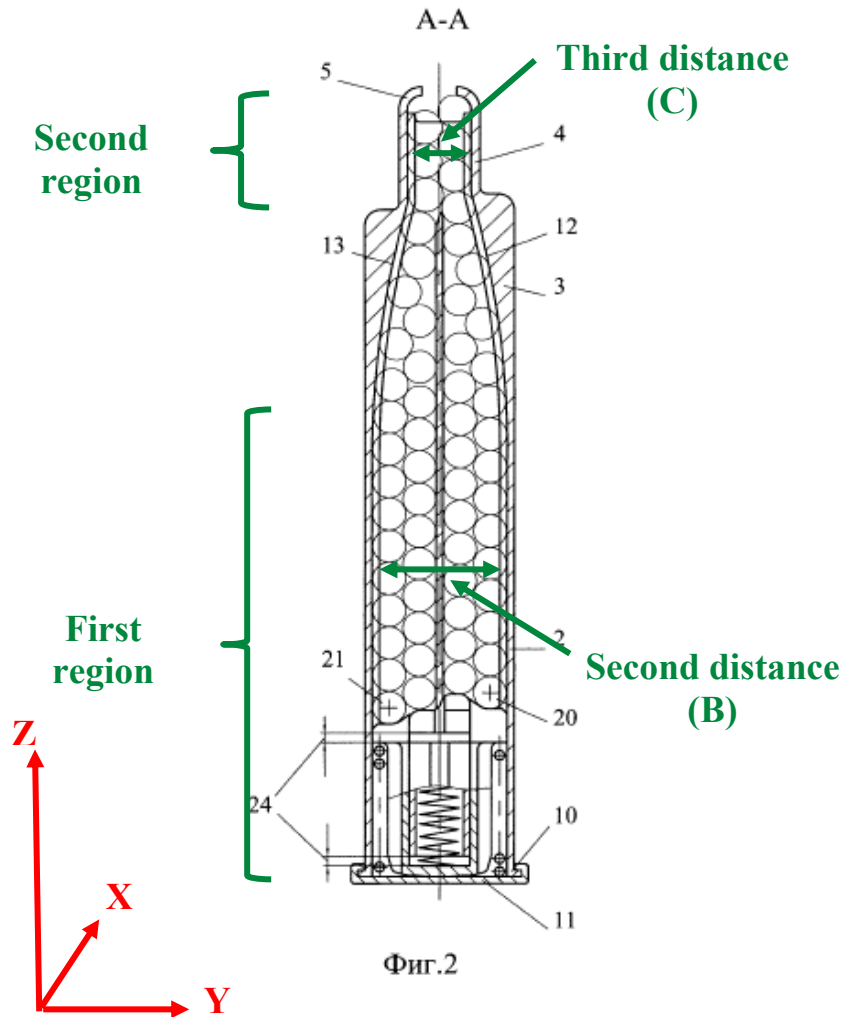
Ex.1005@Figure 2 (Annotated); Ex.1003@¶144.

Gromov renders obvious this limitation. Ex.1003@¶¶143-145.

10. Claim 7

[7.1] *The housing of claim 6, wherein the second distance (B) is 1.85 times to 2.15 times that of the third distance (C).*

As discussed in [6.0] and shown in Figure 2, Gromov discloses the *housing*, *second distance (B)* and *third distance (C)*. Ex.1003@¶147.

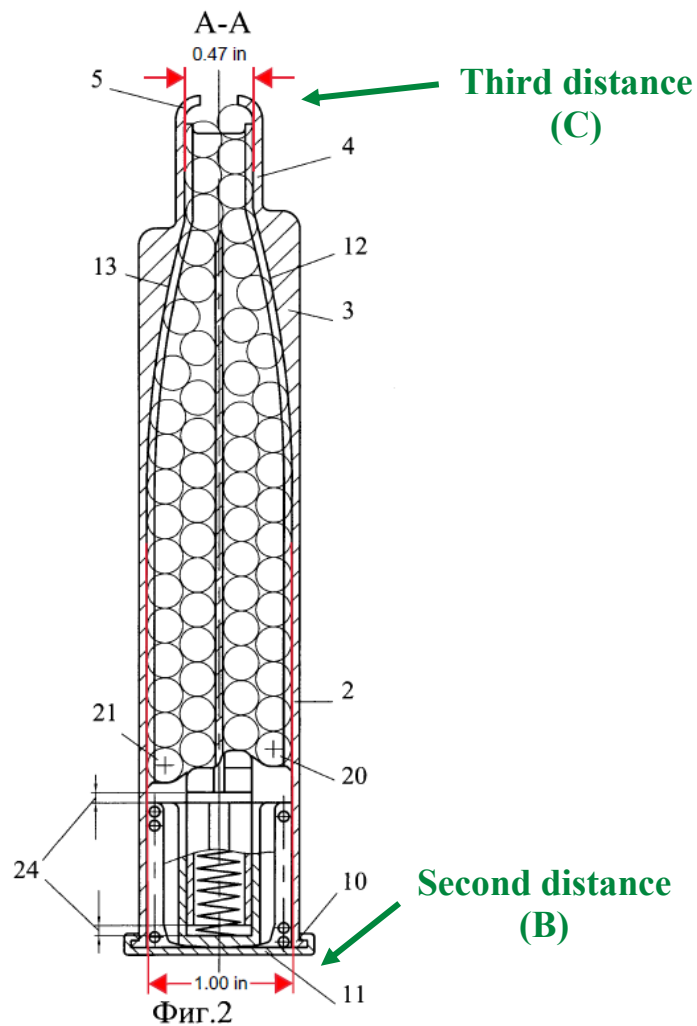


Ex.1005@Figure 2 (Annotated); Ex.1003@¶147.

It would have been obvious to a POSITA that the *second distance (B)* is 1.85 times to 2.15 times that of the *third distance (C)*. Ex.1003@¶148. As depicted in Gromov's Figure 2, above, the *second distance (B)* is the distance of the multi-row portion 2 of the magazine that includes the width of cartridges stacked in two double-rows (width of four cartridges) and the width of the front and/or back

protrusion. *Id.* The *third distance (C)*, on the other hand, is the distance of the throat 4 of the magazine that includes the width of the cartridges stacked in a single double row (width of two staggered cartridges). *Id.* Claim 7 recites possible ratios between the two regions. *Id.* It would have been obvious to a POSITA that the width of a region in the magazine that stores four rows of cartridges, e.g., the *second distance (B)*, would be approximately twice the width of the region that stores two rows of cartridges, e.g. the *third distance (C)*. *Id.*

Measuring Gromov's Figure 2, which is drawn to scale, also confirms this ratio and teaches that the ration between the *first distance (C)* and *second distance (B)* is $\left(\frac{1}{0.47}\right) = 2.12$ the *third distance (C)*. Ex.1003@¶¶150-151.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶150.

Gromov renders obvious this limitation. Ex.1003@¶¶146-152.

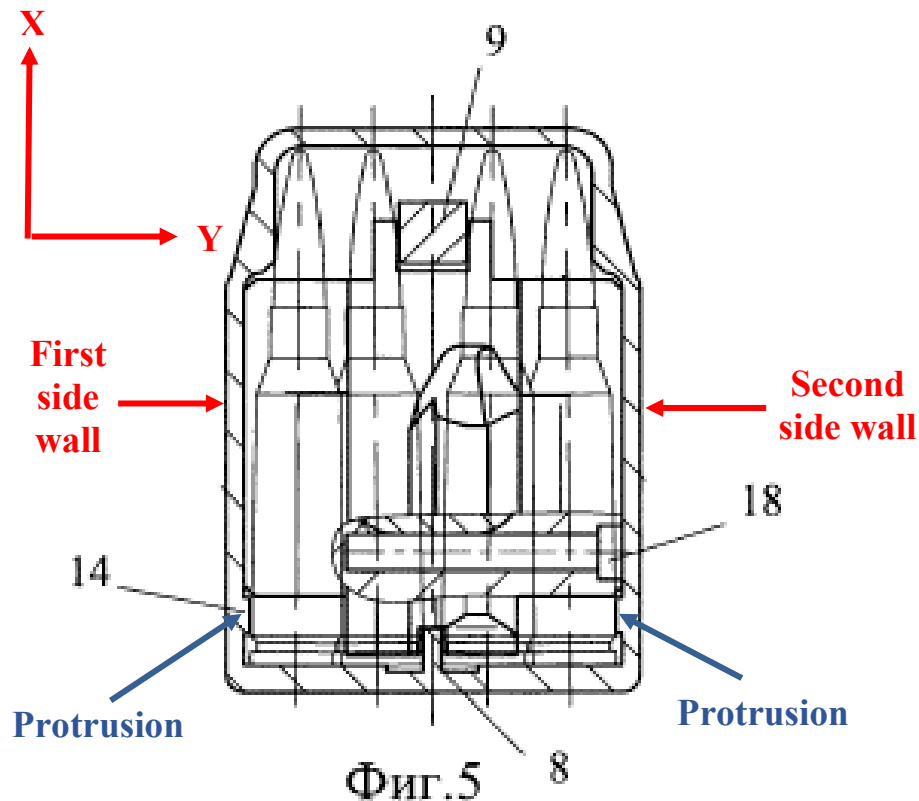
11. Claim 9

[9.0] *The housing of claim 1, wherein the inside surface of the first side wall has a protrusion which protrudes in direction of the Y-axis into the interior space of the housing and which along the Z-axis has a start in the first region and ends in the transitional region, and/or the inside surface of the second side wall has a protrusion which protrudes in direction of the Y-axis into the interior space of the housing and which along the Z-axis has a start in the first region and ends in*

the transitional region.

First, as discussed in [1.4], Gromov discloses *the inside surface of the first side wall and the inside surface of the second side wall*. Ex.1003@¶154.

Second, Gromov discloses cartridge tracks 14 (*protrusions*) that are formed on the internal lateral walls (*the inside surface of the first side wall and the inside surface of the second side wall*) of the housing. *Id.*@¶155; Ex.1006@4 (“[t]o reduce losses due to friction during the movement of the cartridges in the magazine, **cartridge tracks 14 are formed in the wide portion and in the rearrangement zone on the internal lateral surfaces of the housing.**”). As depicted in Figure 5, Gromov further depicts cartridge tracks 14 (*protrusions*) on *the inside surface of the first side wall and the inside surface of the second side wall*:



Ex.1005@Figure 5 (Annotated); Ex.1003@¶155.

Figure 5, above, depicts the cartridge tracks 14 (*protrusions*) that protrude into the interior space of, *e.g.*, toward the center, of the magazine, which is *in direction of the Y-axis into the interior space of the housing*. Ex.1003@¶156. Further, because “cartridge tracks 14 are formed in the wide portion and in the rearrangement zone on the internal lateral surfaces of the housing,” Gromov discloses that the protrusions run longitudinally in the wide multiple row portion 2 and rearrangement zone 3, which discloses that cartridge tracks 14 are *along the Z-axis has a start in the first region and ends in the transitional region*. *Id.* Finally, because Figure 5, above, depicts a cross-section of multi-row portion 2 in the X-Y

orientation, a POSITA would have recognized that Figure 5 depicts a cross-section of the cartridge tracks 14 that run longitudinally (*along the Z-axis*). *Id.*

Gromov discloses this limitation. Ex.1003@¶¶153-157.

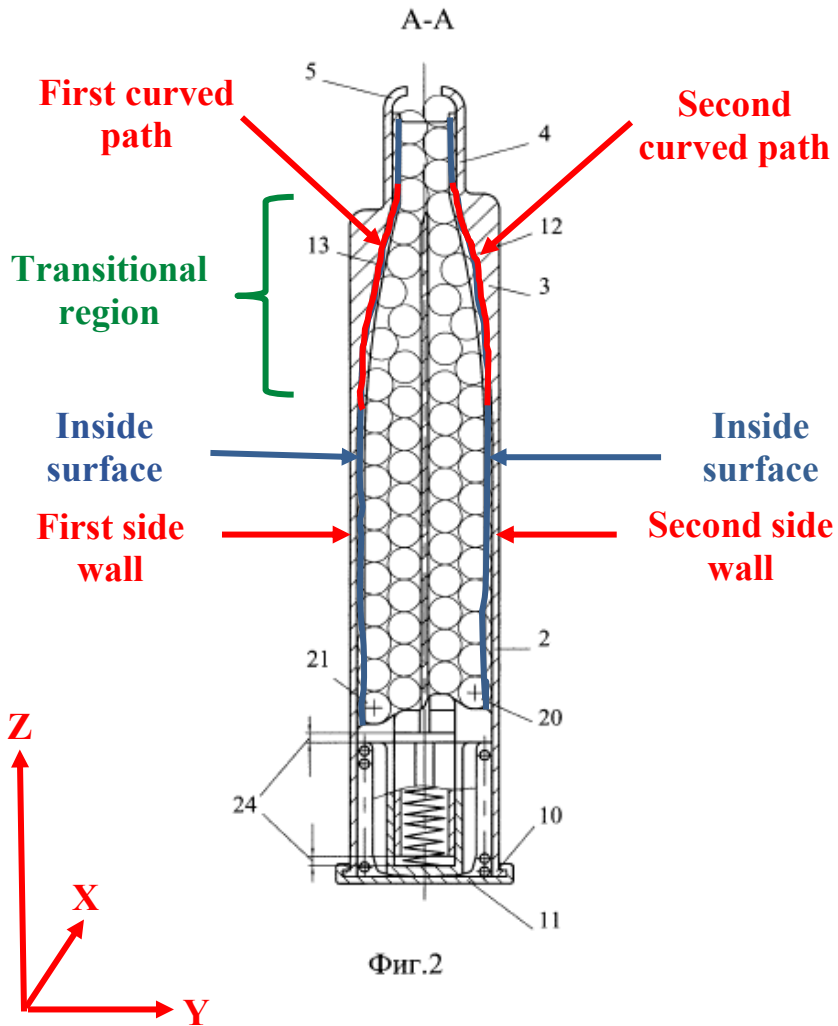
12. Claims 11

[11.0] *The housing of claim 1, wherein the inside surface of the first side wall in the transitional region is along a first curved path and the inside surface of the second side wall in the transitional region is along a second curved path, wherein the curved paths each have a respective turning point and extend from the bottom side of housing to the top side of the housing before the respective turning point in direction of a central plane, the curved paths, after their respective turning point, respectively fit against a first and a second parallel relative to the central plane.*

First, as discussed in [1.4], Gromov discloses the rearrangement zone 3 (*transitional region*) that includes the *first side wall* and the *second side wall* of the housing, and the *inner surface* along the *first side wall* and the *second side wall*.

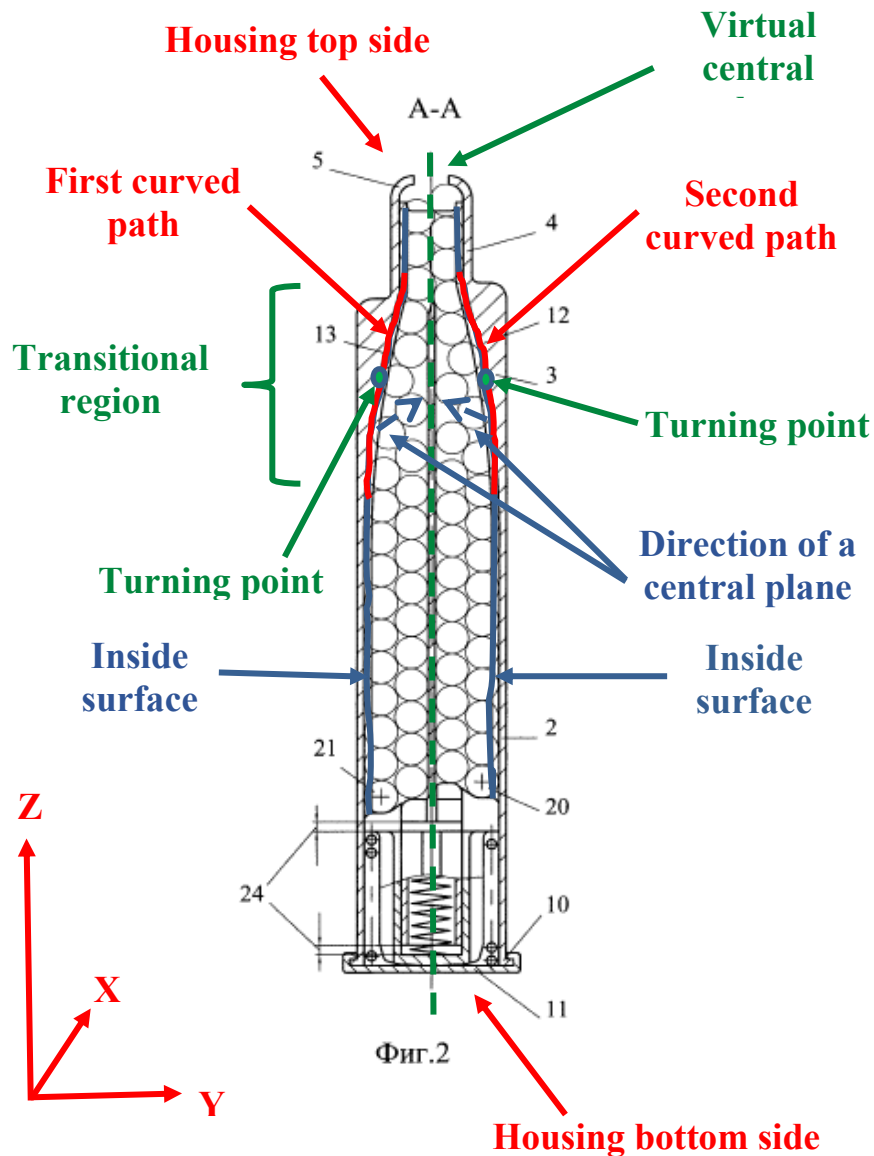
Ex.1003@¶159. Gromov's Figure 2 depicts the *inside surface of the first side wall in the transitional region is along a first curved path* and the *inside surface of the second side wall in the transitional region is along a second curved path*.

Ex.1003@¶159.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶159.

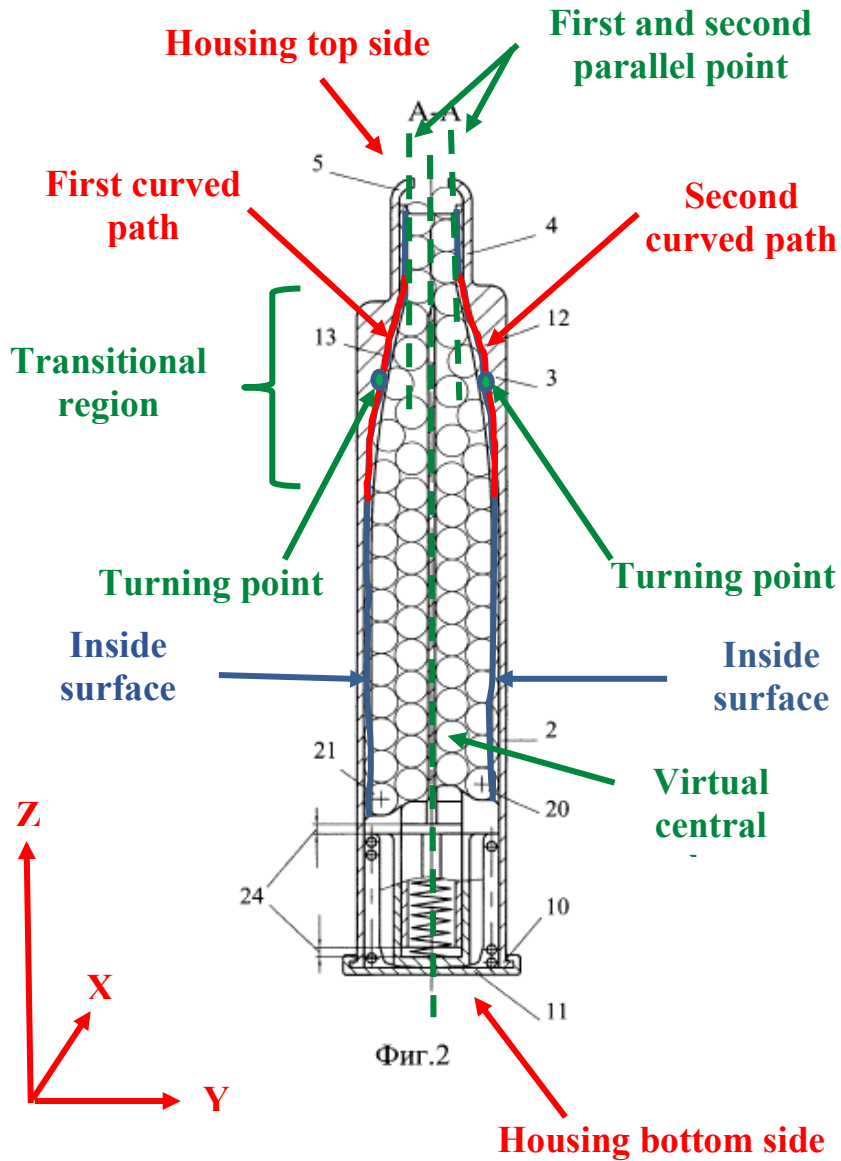
Second, Figure 2 discloses that these *curved paths each have a respective turning point*. Ex.1003@¶160.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶160.

Figure 2, above, depicts that the *curved surfaces extend from the bottom side of housing to the top side of the housing before the respective turning point in direction of a central plane*. In other words, Figure 2 shows that the *curved surfaces* (shown in red) converge toward the *central plane*. Ex.1003@¶161.

Third, Figure 2, below, depicts that *the curved paths, after their respective turning point, respectively fit against a first and a second parallel relative to the central plane:*



Ex.1005@Figure 2 (Annotated); Ex.1003@162.

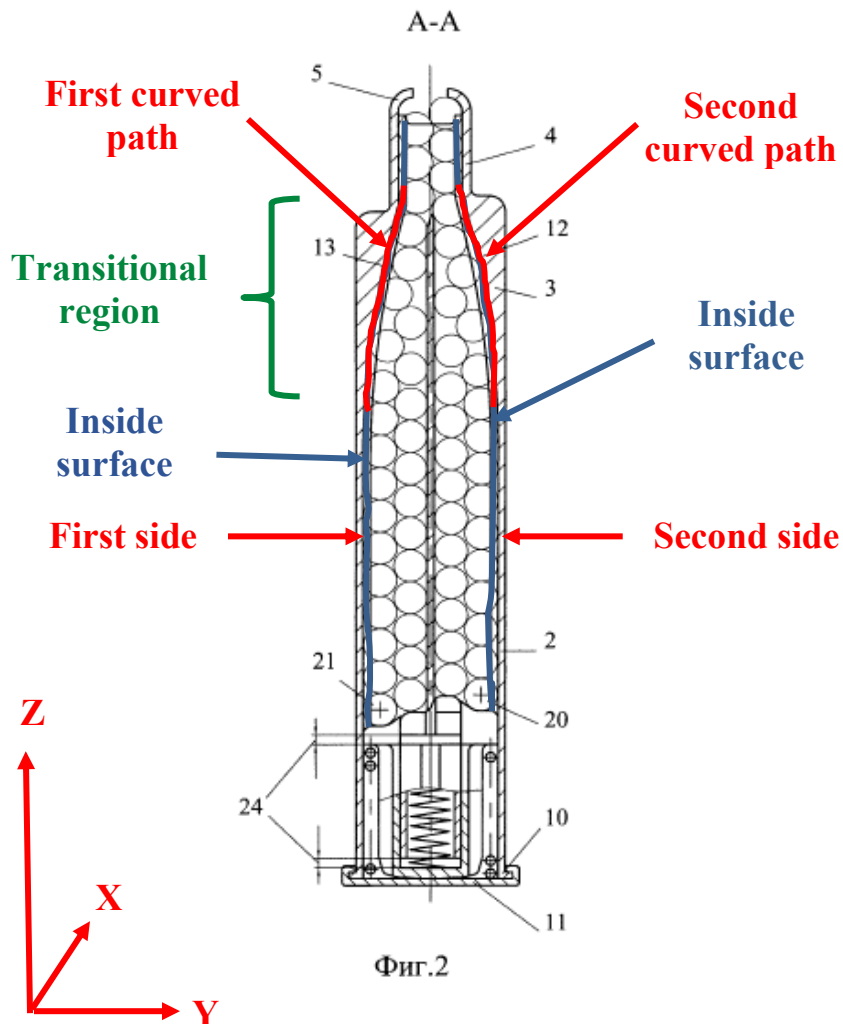
Gromov renders obvious this limitation. Ex.1003@¶¶158-163.

13. Claim 12

[12.0] *The housing of claim 11, wherein the curved paths are symmetrically identical.*

Gromov's Figure 2 depicts the *curved paths are symmetrically identical.*

Ex.1003@¶165.



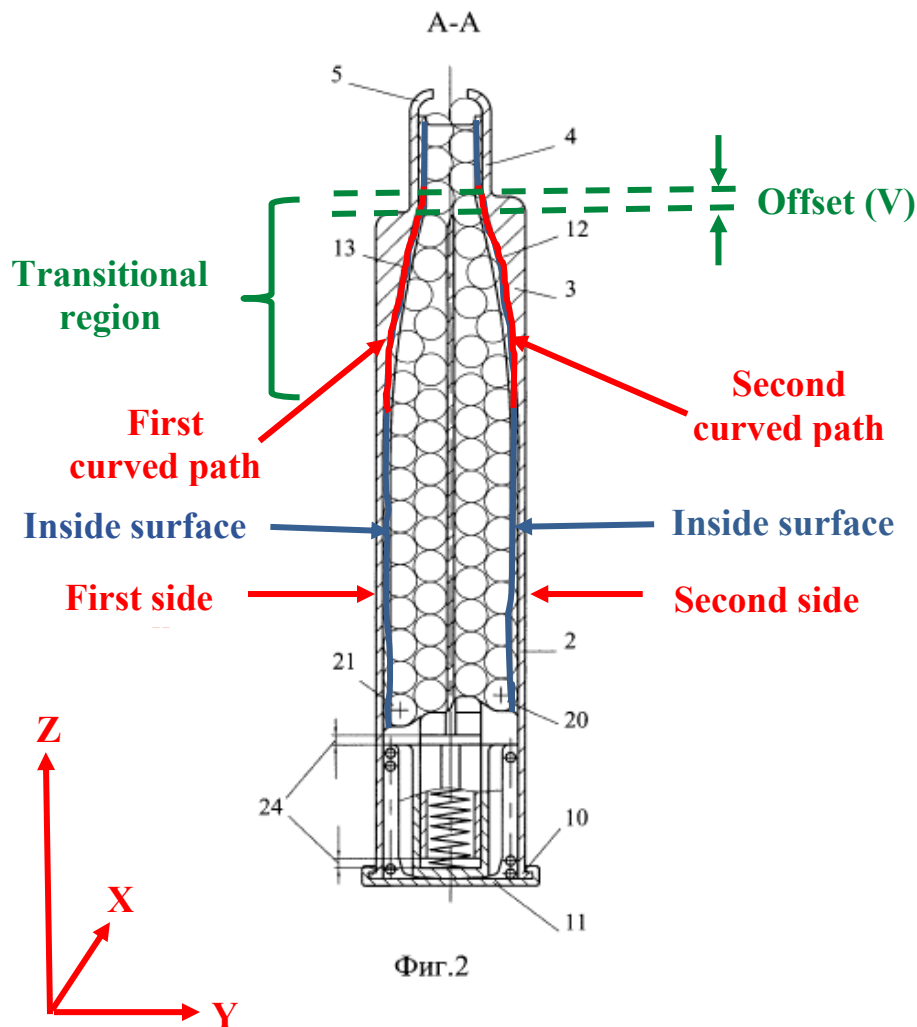
Ex.1005@Figure 2 (Annotated); Ex.1003@¶165.

14. Claim 13

[13.0] *The housing of claim 12, wherein the first and second curved paths are arranged in a Z-direction offset relative to one another by an offset (V).*

Gromov's Figure 2, below, depicts that the *first and second curved paths* are arranged in a *Z-direction offset relative to one another by an offset (V)*.

Ex.1003@¶168.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶168.

A POSITA would have recognized that a magazine would have offset (V)

because the cartridges are staggered in the rearrangement zone (*transitional region*) and the two-row region (*second region*). The curves are offset in the vertical direction by offset (*V*) to help ensure that the cartridges remain staggered as the cartridges pass from the rearrangement zone into the two-row region.

Ex.1003@¶169. In other words, POSITA understands designing the magazine without an offset could cause the cartridges to irregularly jam if the cartridges from the right side of the magazine and the left side do not feed sequentially as intended. which reduces *Id.*

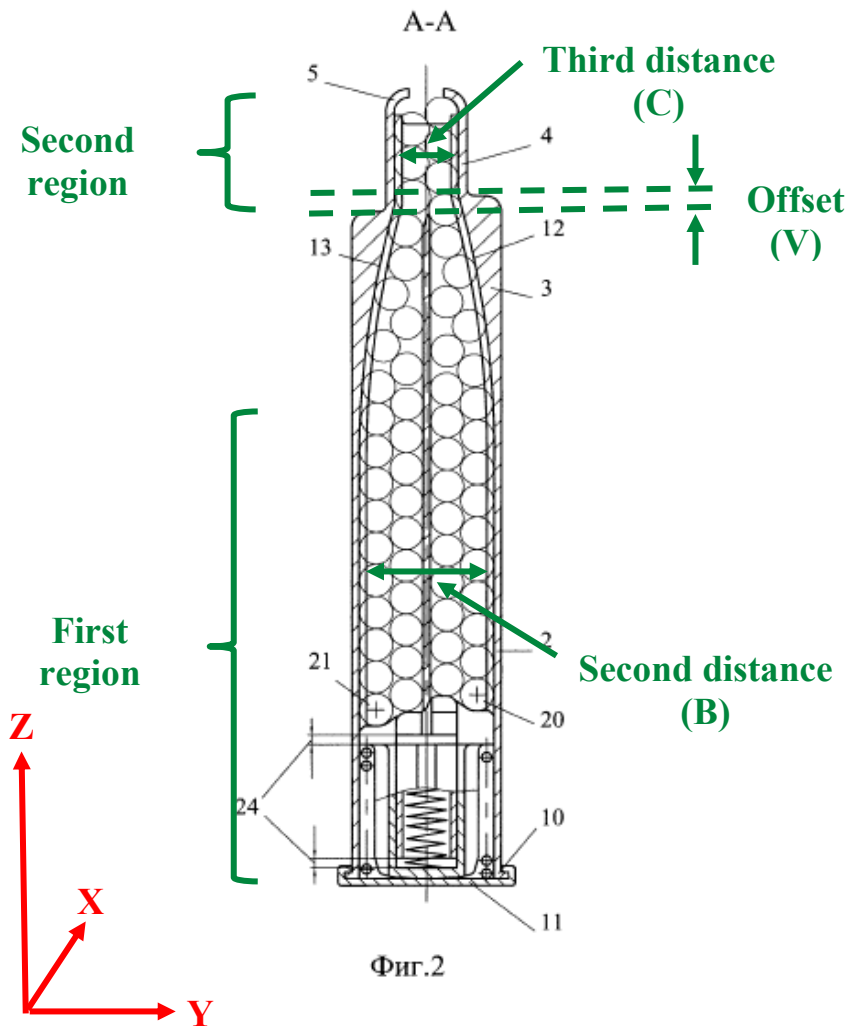
Gromov discloses this limitation. Ex.1003@¶¶167-170.

15. Claim 14

[14.0] *The housing of claim 13, wherein the inside surfaces of the first side wall and the second side wall in the first region are located at a second distance (B) and in the second region at a third distance (C) from one another, the offset (V) is between 7% and 35% of the difference between the second distance (B) and the third distance (C).*

As discussed in [6.0], Gromov discloses *the inside surfaces of the first side wall and the second side wall in the first region are located at a second distance (B) and in the second region at a third distance (C) from one another.*

Ex.1003@¶172. As discussed in [13.0], Gromov discloses the *offset (V)*. The *second distance (B)*, the *third distance (C)*, and the *offset (V)* are depicted below.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶172.

First, Gromov renders obvious that *offset (V)* is between 7% and 35% of the difference between the second distance (B) and the third distance (C).

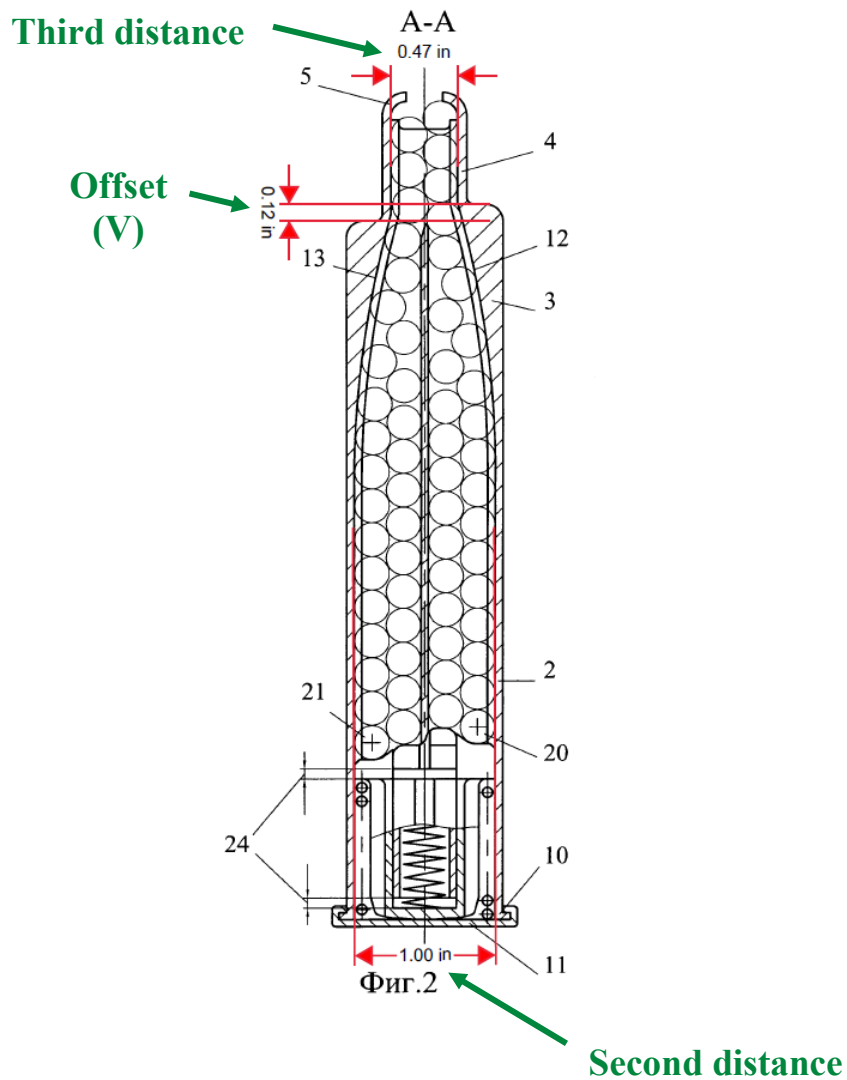
Ex.1003@¶173. Gromov's Figure 2 depicts a transition region where the magazines transition from a rearrangement zone (*transitional region*) to a single double-row region, which is throat 4 in Gromov. *Id.* This region includes *offset (V)*, which is a difference in heights of the side walls in the transitional region. *Id.*

As discussed in [13.0], the offset, such as *offset (V)*, ensures the cartridges remain staggered as they enter the single double-row region and do not reach the second region at the same time, which may cause a jam. Ex.1003@¶173. A POSITA would have recognized that the height of the *offset (V)*, would be proportional to the diameter or width of the cartridge base – the widest portion of the cartridge. *Id.* In other words, the *offset (V)* would be different for magazines that store the 5.45 x 39 mm cartridges, the 5.56 x 45 mm NATO cartridges, and the 7.62 x 51 mm NATO cartridges discussed above because those cartridges have different diameters. Ex.1003@¶173; *see also* Ex.1009@Figure 29, 20:1-7 (“[t]he wall **113C may be approximately 1/2 cartridge diameter lower than the opposed wall 113D.** In this manner, cartridges 301 from the two columns may be guided by the opposed walls 113C and 113D such that the cartridges 301 merge in the fashion of engaging gear teeth and thus may be substantially less likely to jam.”).

The difference between the heights of the two side walls in the transitional region is the *offset (V)* recited in claim 14. Ex.1003@¶174. In other words, *offset (V)* would be half of the width of the cartridge in Gromov’s magazine, which is approximately 25% of the width of two staggered cartridges. *Id.* Slight deviations from the 25% approximation may be due to the width of a front and/or back protrusion that is included in the *second distance (B)* as a discussed in [7.0]. *Id.* Accordingly, Gromov renders obvious *offset (V)* which is approximately 25% of

the difference between the second distance (B) and the third distance (C). *Id.*

Second, Gromov's Figure 2 is drawn to scale and also teaches the offset (V) that is between 7% and 35% of the difference between the second distance (B) and the third distance (C). Ex.1003@¶175.



Ex.1005@Figure 2 (Annotated); Ex.1003@¶175.

Gromov teaches that *second distance (B)* is 1.00 inch, *third distance (C)* is 0.47 inches, and *offset (V)* is approximately 0.12 inches, and is between seven

percent ($((1 - 0.47) \times \frac{7}{100}) = 0.0371$ inches) and *thirty-five percent*

($((1 - 0.47) \times \frac{35}{100}) = 0.1855$ inches) *of the difference between the second*

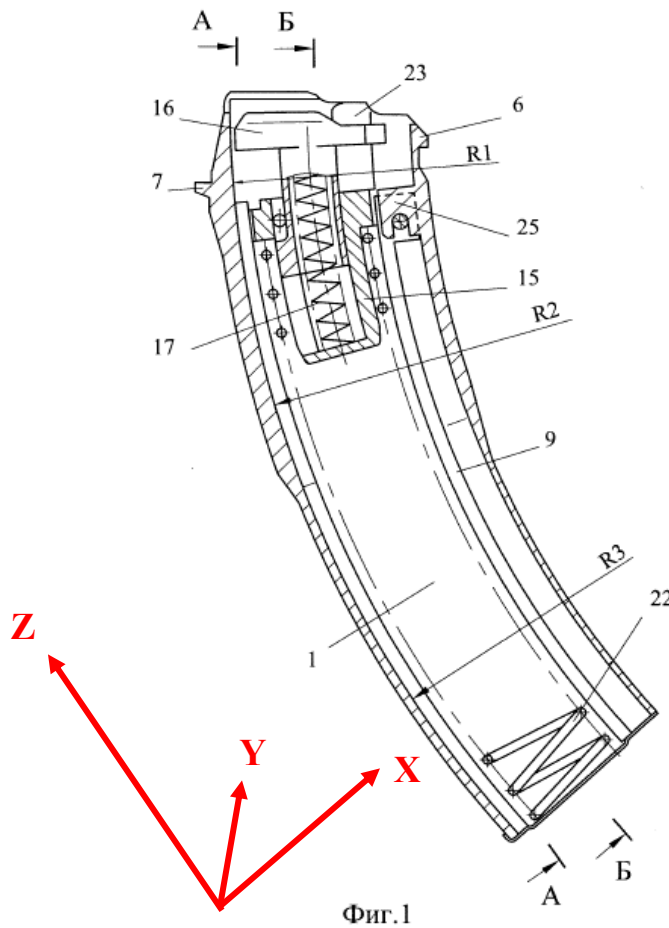
distance (B) and the third distance (C). Ex.1003@¶189.

Gromov renders obvious this limitation. Ex.1003@¶¶171-177.

16. Claim 15

[15.0] *The housing of claim 1, wherein the housing is a single component.*

As depicted in Figure 1, Gromov discloses that the housing 1 is a *single component*. Ex.1003@¶179. A POSITA would have understood that the housing of AK-type magazines were commonly made of a single sheet-metal stamping, forming a *single component*. *Id.* A POSITA would also have understood that a housing consisting of a single component is preferred because it eliminates the risk of losing a necessary part of the housing and removes additional failure points created by joining multiple components to make a housing. *Id.*



Ex.1005@Figure 1 (Annotated); Ex.1003@¶179.

Therefore, Gromov discloses and makes obvious this limitation.

Ex.1003@¶179.

17. Claim 18

[18.0] A method for operating a firearm, comprising the step of operating the firearm with a cartridge magazine with a housing of claim 1.

First, [1.0]- [1.10.2] disclose the *housing of claim 1*. Ex.1003@¶181.

Second, Gromov discloses “multiple-row high-capacity box *magazines to*

be used in automatic or semi-automatic firearms.” *Id.* ¶182; Ex.1006@3.

“When firing the weapon [*operating the firearm*] the cartridges are delivered one by one by the action part of the firearm from beneath the lips 5 of the magazine housing.” Ex.1006@6; Ex.1003@¶182.

Gromov discloses this limitation. Ex.1003@¶¶180-183.

18. Claim 19

[19.0] *A cartridge magazine for a firearm, the cartridge magazine comprising:*

See analysis in [1.0].

[19.1.0] *a housing for the cartridge magazine which extends along an X-axis, a Y-axis and a Z-axis and*

See analysis in [1.0].

[19.1.1] *which, in its inside forms an interior space consisting of a first region and a second region, wherein between the first region and the second region a transitional region is formed which connects the first and the second region with one another;*

See analysis in [1.4].

[19.2] *wherein the interior space is limited by inside surfaces of a front wall, a rear wall, a first side wall and a second side wall;*

See analysis in [1.1], [1.2], and [1.5].

[19.3] *wherein the inside surface of the front wall extends in the direction of the Z-axis in at least one of the regions along a first circular path;*

See analysis in [1.6].

[19.4] wherein the inside surface of the rear wall extends in at least one of the regions in the direction of the Z-axis along a second circular path;

See analysis in [1.7].

[19.5] wherein the inside surfaces of the front wall and the rear wall in at least one of the regions are located at a first distance (A) from one another

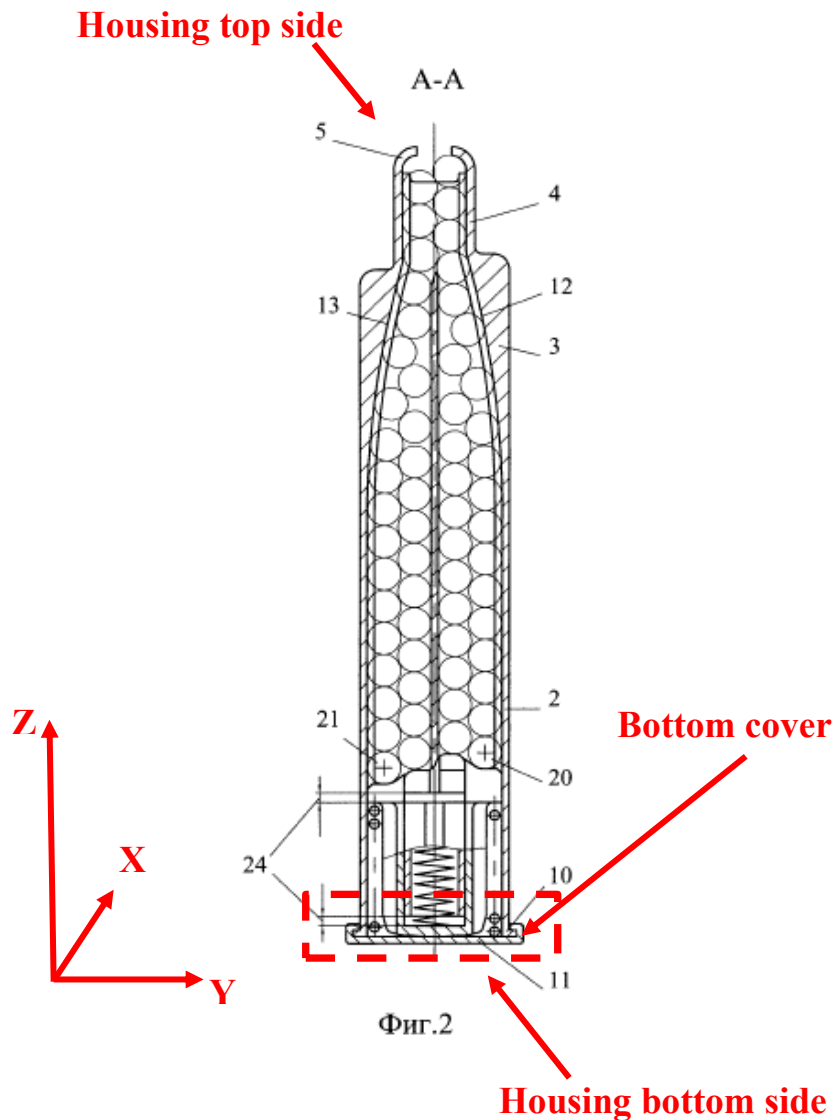
See analysis in [1.8].

[19.6] wherein the housing has a housing bottom side and a housing top side, magazine lips are formed on the housing topside and the housing bottom side is at least partially open;

See analysis in [1.9.0]

[19.7] wherein the cartridge magazine includes a bottom cover which is suitable to at least substantially close off the at least partially open bottom side of the housing;

Gromov discloses “bends 10 are made on a wide part of the housing to attach the **spring cover 11.**” Ex.1003@¶193; Ex.1006@5. As depicted in Figure 2, cover 11 is a *bottom cover* because it covers the bottom of the housing.



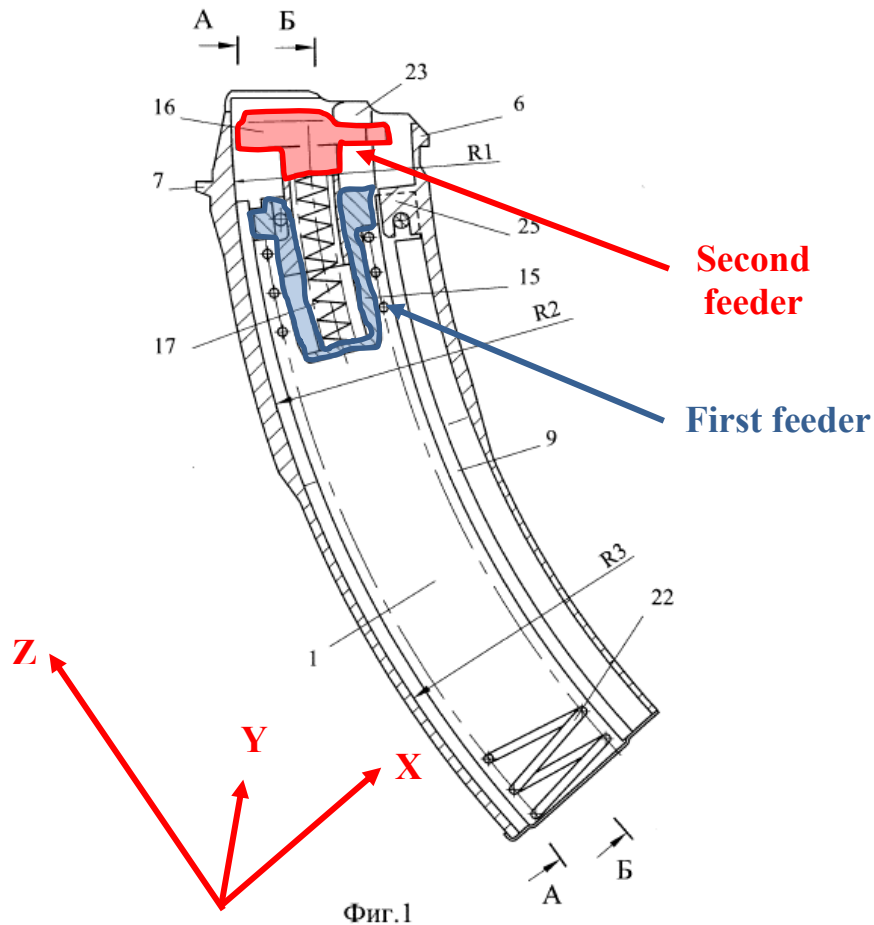
Ex.1005@Figure 2 (Annotated); Ex.1003@¶193.

Gromov discloses this limitation. Ex.1003@¶193.

[19.8] *a first feeder*; [19.9] *a second feeder*;

First, Gromov discloses a compound feeder consisting of “**a base 15**, a **central feeder 16**, and a spring 17.” Ex.1003@¶197; Ex.1006@5. Base 15 is a *first feeder* and central feeder 16 is a *second feeder*. Ex.1003@¶197-200. A

POSITA would have recognized that central feeder 16 is a *second feeder* because it performs a function that is separate from base 15. *Id.* @¶201. Specifically, central feeder 16 pushes the cartridges in the middle two rows through the four-row region and then through the two-column region in throat 4 (*first region* and *second region* of the magazine). *Id.* Base 15, on the other hand, pushes cartridges only through the four-column region, e.g. *first region*. *Id.*

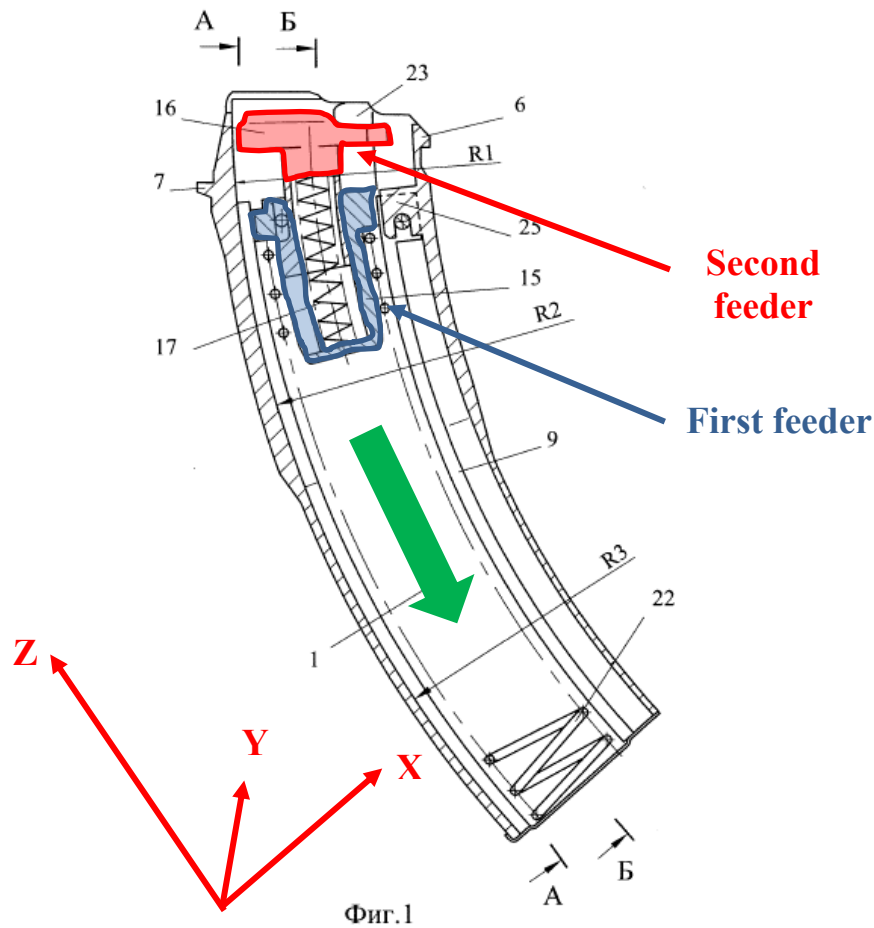


Ex.1005@Figure 1 (Annotated); Ex.1003@¶200.

Gromov discloses this limitation. Ex.1003@¶199-202.

[19.10] *the feeders allowing the second feeder to be movable at least partially into a space of the first feeder;*

First, as discussed in [19.8] and [19.9], Gromov renders obvious the *first feeder* and *second feeder*. Gromov further discloses that “[w]hen loading the magazine” the “the cartridges are pushing down the central feeder 16 against the boundary surface of the base 15 of the feeder.” Ex.1006@6; Ex.1003@¶205. After “filling the throat, and under the action of the next cartridges being inserted, the base 15 of the feeder and the central feeder 16 begin to move together” in a downward direction. *Id.* As depicted in Figure 1, as central feeder 16 and base 15 move down, the central feeder 16 moves, at least partially, into the same of the base 15. Ex.1003@¶205.



Ex.1005@Figure 1 (Annotated); Ex.1003@¶205.

Gromov renders obvious this limitation. Ex.1003@¶¶203-206.

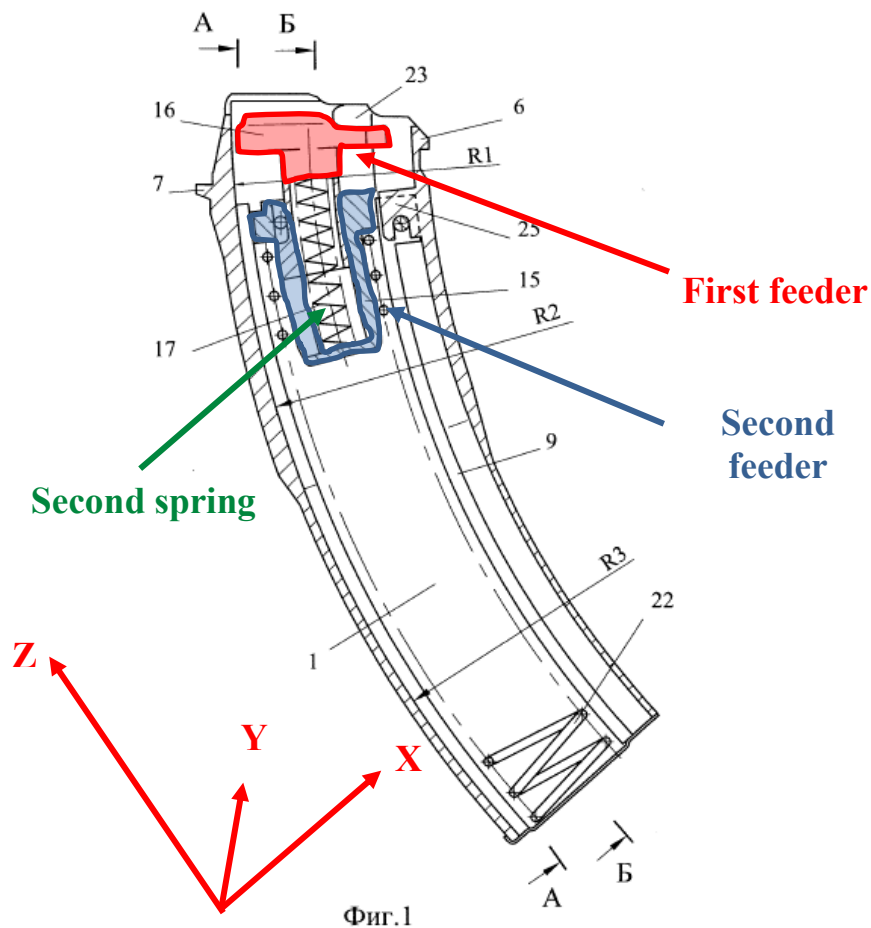
[19.11] *a first spring located between the first feeder and the bottom cover; and*

Gromov discloses “[a] **feeder spring of the magazine 22 is located between the spring cover 11 and the feeder.**” Ex.1006@5-6. By disclosing spring 22 (*a first spring*) that is located between the base 15 (*first feeder*) and spring cover 11 (*bottom cover*), Gromov discloses this limitation. Ex.1003@¶208.

[19.12.1] *a second spring located between the first feeder and the second feeder,*

As discussed in [19.8] and [19.9], Gromov discloses base 15 (*first feeder*) and central feeder 16 (*second feeder*). Ex.1003@¶211. Gromov further discloses that “the cartridges are pushing down **the central feeder 16 against the boundary surface of the base 15 of the feeder, pressing spring 17.**” *Id*; Ex.1006@6.

Spring 17 is a *second spring*. Ex.1003@¶211. As depicted in Figure 1, spring 17 is located between the central feeder 16 (*first feeder*) and base 15 (*second feeder*). *Id*.



Ex.1005@Figure 1 (Annotated); Ex.1003@¶211.

Therefore, Gromov discloses and renders this limitation obvious.

Ex.1003@¶210-212.

[19.12.2] *the first region accommodating four stacks of cartridges arranged directly adjoining one other and offset in a Z-direction relative to one another, and the second region accommodating two stacks of cartridges arranged directly adjoining one another and offset in the Z-direction to one another,*

See analysis in [1.9.1].

[19.13] *wherein the inside surface of the front wall has a first protrusion which protrudes in direction of the X-axis into the interior space of the housing and extends along the Z-axis originating from the transitional region at least partially into the first region and also at least partially into the second region, and*

See analysis in [1.10.1].

[19.14] *the inside surface of the rear wall has a second protrusion which protrudes in direction of the X-axis into the interior space of the housing and which along the Z-axis features a start in the first region and an end in the transitional region or in the second region.*

See analysis in [1.10.2].

D. Ground 2

1. Sullivan

Like the '045 patent, Gromov, and Musgrave, Sullivan teaches a high-capacity, quad-stack magazine for a firearm. Ex.1009@Abstract. The magazine housing can “be made of any desired combination of aluminum, steel, and/or titanium,” or “metal, plastic, carbon fiber, fiberglass, and/or epoxy resin.”

Ex.1009@10:45-54.

2. Reasons to combine Gromov, Musgrave, and Sullivan

As discussed above in Section X.C.3, a POSITA would have been motivated to combine Gromov and Musgrave to arrive at the Ground I Challenged Claims, which includes independent claim 1. Claims 16 and 17, the Ground II Challenged Claims, each depend directly from claim 1.

A POSITA recognized both a design need and a market demand for a durable high-capacity magazine. Ex.1003@¶218. Accordingly, a POSITA would have been motivated to add Sullivan to the Gromov and Musgrave combination and arrive at claims 16 and 17 for a number of reasons, including to make the Gromov magazine more durable using a homogenous and/or synthetic material, as taught by Sullivan. *Id.*; Ex.1009@10:45-54.

Gromov, Musgrave, and Sullivan are analogous art to the '045 patent. All disclose high-capacity, quad-stack magazines. Ex.1003@¶219. A POSITA understood that prior-art magazine housings were made from a single welded sheet-metal stamping or a molded synthetic polymer (*e.g.*, “Bakelite” for AK-type type magazine housings). *Id.*@220 (listing examples). Consistent with the prior art, Sullivan discloses various homogenous and synthetic materials for making a quad-stack magazine including “metal, plastic, carbon fiber, fiberglass, and/or epoxy resin,” and “aluminum, steel, and/or titanium.” Ex.1009@10:45-50. It would have been obvious to combine Gromov, Musgrave, and Sullivan to make

the Gromov magazine housing out of a homogenous and/or synthetic material, as taught by Sullivan and in view of the knowledge of a POSITA. *Id.*

A POSITA also recognized many of the advantageous characteristics of the well-known materials listed in Sullivan that matched to desirable characteristics of a housing: light weight, durability, lack of interface points where two different materials join together; and strength to resist high pressure forces. *Id.*@220-23.

It would have been obvious to a POSITA to try using known materials with desirable properties to build the Gromov magazine as slightly modified by Musgrave. Similarly, a POSITA would have had a reasonable expectation of success when making the Gromov magazine housing out of sheet metal or polymer because both materials have previously been used to make durable AK-type magazines, as well as many other types of magazines. *Id.* (listing prior art examples). Making Gromov's magazine housing out of welded sheet metal or polymer would require no more than ordinary skill.

3. Claim 16

[16.0] *The housing of claim 1, wherein the housing consists of a homogeneous material, and the structure of the material is substantially homogeneous over the entire housing.*

As discussed in [1.0], Gromov discloses a *housing*. Gromov, however, does not expressly disclose a material for the housing. Ex.1003@¶225. Nevertheless, a

POSITA had knowledge that AK-type magazines were conventionally made of polymer and that particularly on the variable cross section of the magazine shown in Gromov at Fig. 2 at the point of the offset (V), what is taught by Gromov is a polymer magazine housing. Ex.1003@¶225.

Claim 16 is also obvious in view of Gromov, Musgrave, and Sullivan. *Id.*@¶226. Sullivan, discloses housing 101 “**made of** any desired combination of **aluminum, steel, and/or titanium.**” Ex.1009@10:45-54. A POSITA would have recognized that aluminum, steel, or titanium is a *homogeneous material*.

Ex.1003@¶226. . Sullivan also discloses various techniques for “e.g., bending and stretching, and/or by machining, e.g., milling,” for making the housing, which would result in the aluminum, steel, or titanium, to be *substantially homogeneous over the entire housing*. Ex.1009@10:45-54; Ex.1003@¶226. A POSITA would have recognized that by bending, stretching or machining materials such as aluminum, steel, and titanium, the materials would be *substantially homogeneous over the entire housing*. Ex.1003@¶226.

It would have been obvious to make the Gromov housing using a homogenous material such as aluminum, steel, or titanium in view of Sullivan. Ex.1003@¶227. A POSITA understood that high-capacity magazines were routinely made from homogenous materials including polymers and metals. *Id.*; *see, e.g.* Ex.1013@5:22-39 (metal or polymer); Ex.1008@5:26-27 (metal).

Moreover, given that Gromov discloses an AK-type magazine with a housing that was conventionally made either of polymer (*e.g.*, homogenous polymer over the entire housing) or sheet metal (*e.g.*, homogenous metal over the entire housing), a POSITA would have had a reasonable expectation of success when making the Ground II Combination.

Gromov and Musgrave combined with Sullivan renders this limitation obvious. Ex.1003@¶228.

4. Claim 17

[17.0] *The housing of claim 1, wherein the housing consists of a synthetic material.*

As discussed in [1.0], Gromov discloses a *housing*. To a POSITA familiar with Russian and former Soviet Union magazines, it would have been apparent that Gromov's housing can consist of a polymer such as Bakelite, which is a synthetic material. Ex.1003@¶229. Gromov, however, does not expressly discuss materials that make up the housing. *Id.*

Sullivan discloses a housing made of “**epoxy resin.**” Ex.1009@10:45-54. A POSITA would have recognized that epoxy resin is *synthetic material*. As discussed in Section X.D.2, it would have been obvious to a POSITA to build the Gromov combination's housing using epoxy resin, which is known to be strong, resistant to damage, durable, and inexpensive. Ex.1003@¶230. Further, epoxy

resin is a polymer which has a brittle nature, which makes it easy to determine whether the magazine is serviceable or broken depending on the condition of the lips. *Id.* Finally, synthetic resin housings were also known and using resin to make a housing would have been obvious to try. *See* Ex.1011@5:21-39; Ex.1003@¶230.

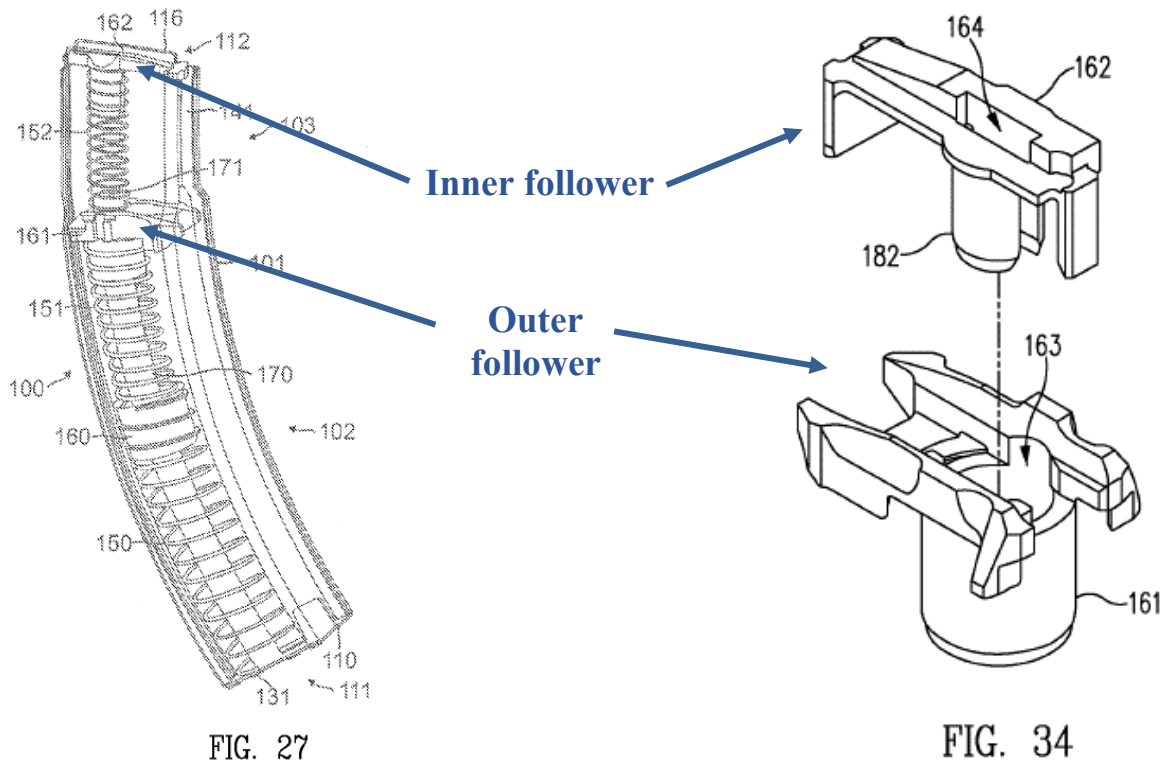
Gromov and Musgrave combined with Sullivan renders this limitation obvious. Ex.1003@¶231.

E. Ground 3

The combination of Gromov and Musgrave renders claim 19 obvious. To the extent that Patent Owner argues the combination of Gromov and Musgrave do not disclose limitations 19.8-19.12.1, Petitioner establishes that the combination of Gromov, Musgrave, and Sullivan renders claim 19 obvious.

1. Sullivan

As discussed above, Sullivan teaches a high-capacity, quad-stack magazine for a firearm, and Sullivan further teaches the use of a compound follower to convey cartridges through a quad-stack magazine. Ex.1003@¶232. Sullivan discloses a compound follower that includes an inner follower 162 that nests in an outer follower 161, with the two followers separated by a spring 152. *Id.*; *see, e.g.*, Ex.1009@11:11-14, Figures 27, 32, and 34.



Ex.1009@Figures 27 and 34 (annotated); Ex.1003@¶232.

2. Reasons to combine Gromov, Musgrave, and Sullivan

As discussed above in Section X.C.3, a POSITA would have been motivated to combine Gromov and Musgrave. A POSITA would have been further motivated to use the compound follower of Sullivan with Gromov and Musgrave and arrive at claim 19 (the “Ground III Combination”) for a number of reasons, including to reduce jamming and increase reliability. Ex.1003@¶233.

Combining Gromov, Musgrave, and Sullivan to arrive at claim 19 would have been well within a POSITA’s skillset and there would have been a reasonable

expectation of success when making the combination, as confirmed by the knowledge of a POSITA in view of the prior art. *Id.* Sullivan’s compound follower in the Ground III combination would be performing the same function and operating in the same way as it would in Sullivan, providing the predictable result of increased magazine reliability. *Id.*

A POSITA understood that a quad-stack magazine is prone to jamming due to the difficulty of feeding cartridges through all three regions. *Id.* ¶234; *see, e.g.*, Ex.1009@1:21-23; *Id.* at 24:12-14; Ex.1012@2 (“The rearrangement of cartridges from a larger number of rows to a smaller one...is associated also with jamming.”). Thus, a POSITA would recognize both a design need and a market demand for a reliable quad-stack magazine, including the need for a reliable quad-stack magazine follower. Ex.1003@¶234. Accordingly, a POSITA would be motivated to look for followers to convey cartridges efficiently and reliably through a quad-stack magazine. *Id.* A POSITA would have therefore been motivated to use Sullivan’s compound follower to increase magazine reliability, and would have had a reasonable expectation of success in doing so. *Id.*

First, Sullivan’s compound follower would efficiently and reliably convey cartridges within Gromov’s quad-stack magazine. *Id.* ¶235; *see, e.g.*, Ex.1009@Abstract (“A plurality of nested followers...facilitate the advancement of cartridges within the box magazine to a firearm.”). Sullivan discloses a

compound-follower mechanism that includes an inner follower 162 that nests in an outer follower 161, with the two followers separated by a spring 152. *Id.*@11:11-14, Figures 27, 32, and 34. A POSITA would have been motivated to use the compound follower from Sullivan in Gromov to reliably feed cartridges through the Gromov magazine. Ex.1003@¶235. In the resulting combination Sullivan's two-feeder mechanism would convey cartridges through the "wide multiple-row portion 2" (*first region*), the "rearrangement zone 3" (*transitional region*), and finally the "throat 4" (*second region*) of Gromov in the same manner it does in Sullivan. *Id.* It would also have been obvious to a POSITA to adapt Sullivan's compound follower to work with Gromov's extended front partition 8 (*first protrusion*) and rear partition 9 (*second protrusion*) by notching the Sullivan follower to fit Gromov's partitions and thereby reduce follower tilt and roll. *Id.*; *see, e.g.*, Ex.1009@1:35-38, Figure 6 ("Notch 27 on the main follower is so shaped as to engage guide 31 and, similarly, notch 29, also on the main follower is adapted to engage guide 33."); Ex.1008@3:15-19 ("In FIGS. 2 and 3, an elevator member of generally prismatic form is indicated 20 and, in a pair of opposing lateral faces, has two slits 21, 22 with depths corresponding to the extent of the web 4a of the section 4 and the web 5b of the section 5 respectively."); Ex.1012@Figure 6 (showing slits in follower 16 for partitions 8 and 9); Ex.1013@4:30-32 (ridge 19 "provide[s] an additional interface with the follower 30 to prevent forward linear

and axial tilt.”). Using Sullivan’s compound follower in Gromov would have the predictable result of making Gromov’s magazine reliable during weapon operation. Ex.1003@¶235.

Second, a POSITA would have been motivated to combine Sullivan with Gromov and Musgrave in view of the round coil spring in Sullivan’s compound follower. Ex.1003@¶236; *see, e.g.*, Ex.1009@5:14-27. Gromov’s follower includes a rectangular coil spring 17 between base 15 and central feeder 16. Ex.1005@Figures 1, 3-4. Rectangular coil springs are highly-stressed at their corner turns, and even “in 30 shot magazines it is common practice to load only 28 cartridges to ensure that the spring does not set and consequently fail to correctly feed the last cartridge.” Ex.1009@5:20-24. “Advantageously, round coils have less stress per load than any other coil shape because they are equally stressed throughout the length of the wire and thus tend to lack the concentrated high stress points of conventional elongated coil springs.” *Id.*@5:14-27. As a result, round coils “lack the concentrated high stress points of conventional elongated [rectangular] coil springs.” *Id.*@5:24-28. The nested spring in Sullivan is a round coil. *Id.*@Figure 32 (showing nested round coil spring 152 in the compound feeder). Sullivan’s compound follower would have the advantage of a nested round coil spring with less localized stress and thus tend to reduce spring plastic deformation and fatigue, which results in jamming. Ex.1003@¶236. Accordingly,

it would have been obvious to combine Sullivan with Gromov and Musgrave to create a more reliable magazine. Ex.1003@¶236. Using Sullivan's compound follower with Gromov would have the predictable result of making Gromov's magazine reliable during weapon operation. Ex.1003@¶236

Third, it would have been obvious to try Sullivan's compound follower with Gromov to increase magazine reliability. Ex.1003@¶237. As illustrated by the prior art using a compound follower is an identified, predictable solution for feeding cartridges through a quad-stack magazine. Ex.1003@¶237; *see, e.g.*, Ex.1005@Figure 1 (showing compound follower consisting of base 15, central feeder 16, and spring 17); Ex.1007@Figures 6 and 7 (showing compound follower platform 19 with auxiliary platforms 12 and 23); Ex.1009@Figure 32 (showing an inner follower 162 that nests in an outer follower 161, with the two followers separated by a spring 152). Using the compound follower from Sullivan with Gromov would have been obvious to try as Sullivan's compound follower is an identified, predictable solution for feeding cartridges in a quad-stack magazine. Ex.1003@¶237. A POSITA would have had a reasonable expectation of success using Sullivan's compound follower with Gromov because Sullivan's compound follower would be performing the same function, and in the same way, within the Gromov magazine as it was in Sullivan's magazine. Ex.1003@¶237. Making the

combination would require no more than ordinary skill, as confirmed by the prior art. Ex.1003@¶237.

A POSITA would have had a reasonable expectation of success using Sullivan's compound follower with Gromov in combination with Musgrave. Ex.1003@¶238. The modification integrates the compound follower of Sullivan into Gromov to perform the same function—conveying cartridges through a quad-stack magazine—but more reliably using Sullivan's follower which has (1) two nesting components to reliability convey cartridges through all three regions of a quad-stack magazine; and (2) a nested round coil spring, which further increases magazine reliability. Ex.1003@¶238. Using Sullivan's compound follower with Gromov would have the predictable result of making Gromov's magazine more reliable during weapon operation. *Id.*

3. Claim 19

The Gromov-Musgrave combination discussed in Ground I discloses limitations [19.0]-[19.7] and [19.12.2]-[19.14] for the reasons given above. Section X.C.18; Ex.1003@¶¶239-250, 274-276.

[19.8] a first feeder; [19.9] a second feeder;

Sullivan describes a two-feeder mechanism similar to Gromov's for conveying the cartridges through the magazine, but instead of a compound feeder that includes base 15 and central feeder 16, the feeder mechanism in Sullivan

include two followers: “**the outer follower 161**” (*first feeder*) and “**the inner follower 162**” (*second feeder*) separated by spring 152. Ex.1003@¶254. A POSITA would have recognized that a follower is another term for a feeder because terms feeder and follower are used interchangeably. *Id.*

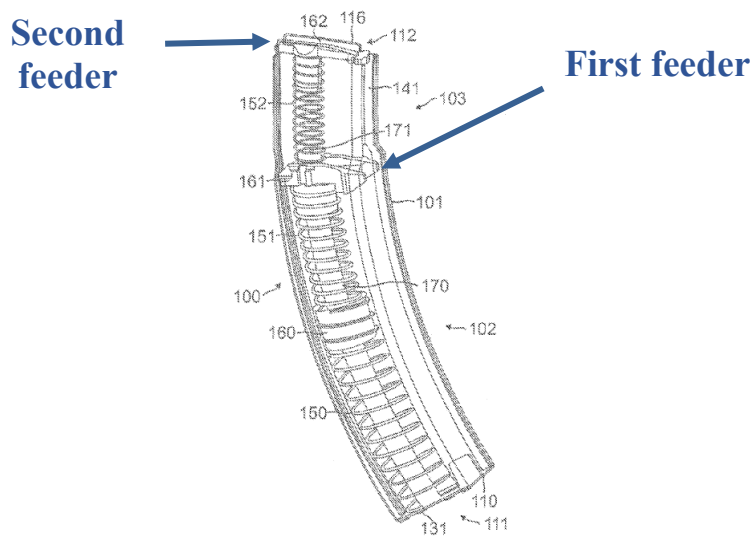


FIG. 27

Ex.1009@Figure 27 (Annotated); Ex.1003@¶259.

A POSITA would have been motivated to incorporate the two-follower mechanism taught in Sullivan into the Gromov combination’s quad-stack magazine to reduce jamming and efficiently move cartridges through all regions of the magazine. Ex.1003@¶255. In a high-capacity magazine, a feeder would need to convey the cartridges through the entire magazine, including a multi-column portion (*first region*) where the cartridges are arranged in four-columns, a rearrangement zone and a narrow region (*second region*) where the cartridges are

arranged in two-columns. *Id.* A POSITA would have recognized that because of the different widths of the narrow two-column and wide four-column regions, a single feeder may not be able to efficiently convey all cartridges through both regions because a single feeder may be too wide to traverse the entire two-column region. *Id.*;Ex.1009@2:23-26. When a feeder is unable to convey the cartridges through the entire housing, the last few cartridges in the two-column region may be left in the magazine, which reduces the magazine throughput. *Id.* Accordingly, a POSITA would look for feeders that are able to convey all cartridges through the entire magazine, including its four- and two-column regions. *Id.* In a resulting combination, the two-follower feeder mechanism would be able to convey the cartridges through both the two and four-column regions. *Id.* This is because the two feeders would convey the cartridges through the four-column region, while the inner feeder would propel the cartridges through the two-column region. *Id.* Doing so would make the magazine more efficient because it would ensure utilization of all cartridges within the magazine. *Id.* A POSITA would also have a reasonable expectation of the success in the modification. *Id.* The modification integrates the existing functionality of Sullivan into Gromov to perform the same function—conveying cartridges through the magazine—but more reliably. *Id.*

As discussed above, a POSITA would have been motivated to incorporate the two-feeder mechanism taught in Sullivan into the Gromov combination's quad-

stack magazine to reduce jamming and to efficiently propel cartridges through all regions of the magazine. *Id.* Therefore, Gromov and Musgrave in combination with Sullivan renders these limitations obvious. Ex.1003@¶254-56.

[19.10] the feeders allowing the second feeder to be movable at least partially into a space of the first feeder;

Sullivan discloses that the two feeders, “**outer follower 161 and the inner follower 162** may move or slide within the housing 101.” Sullivan at 11:65-67. The outer follower 161 (*first feeder*) and inner follower 162 (*second feeder*) are also depicted in Figure 27, replicated below.

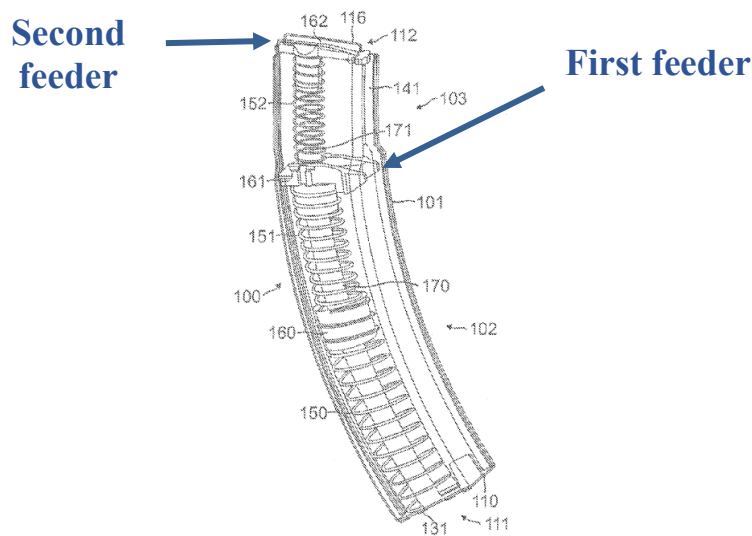


FIG. 27

Ex.1009@Figure 27 (Annotated); Ex.1003@¶259.

Sullivan further discloses that “inner follower 162 and the outer follower 161 [are] positioned such that the **inner follower 162 may move so as to nest at**

least partially within the outer follower 161.” Ex.1009@13:30-34. This is also depicted in Figure 34 below.

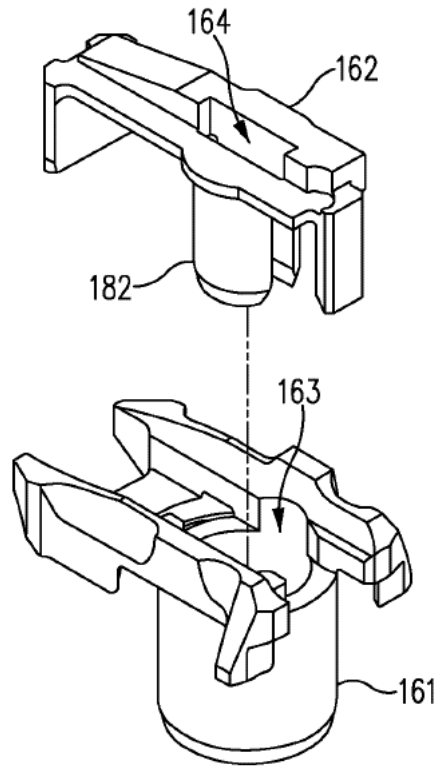


FIG. 34

Ex.1009@Figure 34; Ex.1003@¶260.

A POSITA would have recognized that as the inner and outer followers (*feeders*) slide through the housing, the followers would slide from the bottom to the top of the housing when the cartridges are conveyed through the magazine, and from the top to the bottom of the housing when the cartridges are loaded into the magazine. Ex.1003@¶261. Because the inner follower is partially nested within

the outer follower, the followers would not slide up and down the housing in parallel to each other. *Id.* Instead, the inner follower would slide down the housing and partially overlap the space of the outer follower, which renders obvious *the feeders allowing the second feeder to be movable at least partially into a space of the first feeder. Id.* It would have been obvious to a POSITA to modify the Gromov combination's compound feeder with Sullivan's two-feeder mechanism for the reasons discussed in X.E.2. *Id.*

[19.11] a first spring located between the first feeder and the bottom cover; and

First, Gromov discloses a “supply spring of the magazine” that is placed “[b]etween the spring cover 11 and the feeder,” such that “the base 15 of the feeder is pressed by spring 22.” Ex.1006@5. As discussed in [19.7], spring cover 11 is *the bottom cover*. Ex.1003@¶¶193, 248, 265.

Second, as discussed in [19.8], Sullivan discloses a two-feeder mechanism with an outer follower 161 (*first feeder*). Ex.1003@¶¶254, 266. Sullivan discloses “**the first spring 150 may be disposed substantially between the spring cup 160 and the bottom end 111 of the housing 101**” and “**second spring 151 may be disposed substantially between the spring cup 160 and the outer follower 161.**” Ex.1009@11:27-33. Either spring 150 or 151 discloses the *first spring*. Ex.1003@¶267. Springs 150 and 151 are included in Sullivan's two-feeder mechanism. *Id.*

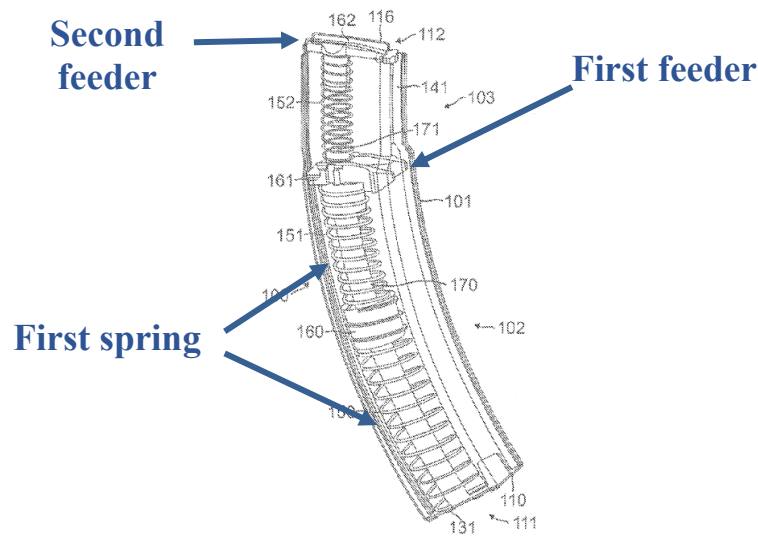


FIG. 27

Ex.1009@Figure 27 (Annotated); Ex.1003@¶271.

It would have been obvious to a POSITA to modify Gromov's compound feeder in Ground I with Sullivan's two feeder mechanism for the reasons discussed Sec. X.E.2. Ex.1003@¶267.

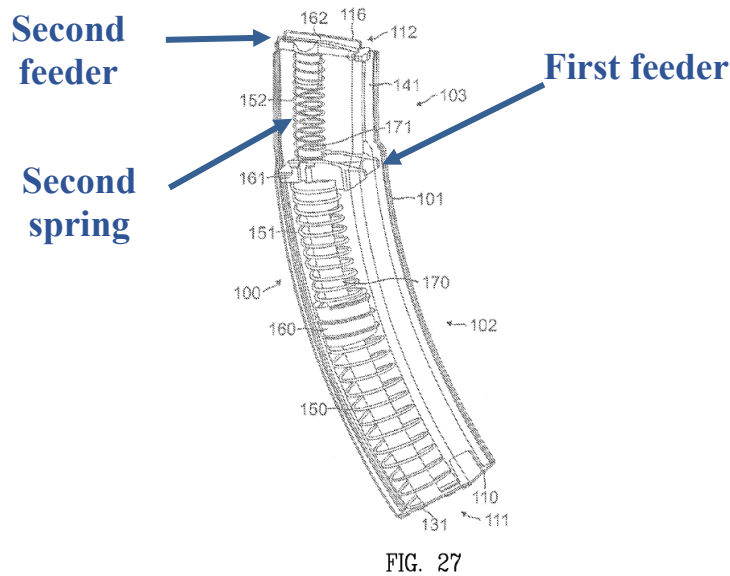
In summary, by disclosing a spring between the outer follower and a bottom of a magazine with a spring cover, Gromov and Musgrave with Sullivan render obvious this limitation. Ex.1003@¶268.

[19.12.1] a second spring located between the first feeder and the second feeder,

First, as discussed in [19.8]-19.10], Gromov and Musgrave render obvious a two-feeder cartridge mechanism that includes an outer follower (*first feeder*) and an inner follower (*second feeder*). Ex.1003@¶270.

Sullivan discloses “**the outer follower 161, the third spring 152, the inner**

follower 162.” Ex.1009@11:10-14. Figure 27 depicts that spring 152 is located between the outer follower 161 (*first feeder*) and the inner follower (*second feeder*) 162. Ex.1003@¶271.



Ex.1009@Figure 27 (Annotated); Ex.1003@¶271.

It would have been obvious to a POSITA to modify the Gromov combination’s compound feeder with Sullivan’s two feeder mechanism for the reasons discussed Sec. X.E.2. Ex.1003@¶272.

Therefore, by teaching a spring between the inner and outer follower, Gromov and Musgrave with Sullivan renders obvious this limitation.

Ex.1003@¶273.

XI. CONCLUSION

The Board should find the Challenged Claims unpatentable.

XII. MANDATORY NOTICES (37 C.F.R. § 42.8)

A. Real party-in-interest

The real parties-in-interest are Petitioner RTG Parts, LLC and AC-Unity,
d.o.o.

B. Related matters

Pursuant to 37 C.F.R. § 42.8(b)(2), the '045 patent is involved in the
following:

Case Heading	Number	Court	Filed
<i>Schmeisser GmbH v. AC-Unity d.o.o et al.</i>	0-21-cv-0024	DWY	Feb. 12, 2021

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner hereby certifies, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in fewer than 14,000. Pursuant to 37 C.F.R. § 42.24(d), this word count excludes the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing.

Dated: October 21, 2021

/s/ Jason S. Jackson

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Registration No. 56,733

CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105, service was made on Patent Owner as detailed below.

Date of service October 21, 2021

Manner of service USPS

Documents served Petition for *Inter Partes* Review for U.S. 10,866,045
Petitioner's Exhibit List
Petitioner's Power of Attorney
Exhibits 1001-1013

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