

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOUGHBUILT INDUSTRIES, INC.,
Petitioner

v.

MERIDIAN INTERNATIONAL CO., LTD.,
Patent Owner

Case IPR2025-01462
U.S. Patent No. 11,192,689

**DECLARATION OF DR. J. MICHAEL MCCARTHY IN SUPPORT OF
PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE**

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ToughBuilt EX1044
ToughBuilt v. Meridian
IPR2025-01462

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I, Dr. J. Michael McCarthy, hereby declare as follows.

I. INTRODUCTION

1. I have been retained as an expert witness on behalf of ToughBuilt Industries, Inc. (“Petitioner”) for the above-captured IPR. I previously submitted a declaration in support of the Petition (EX1003) and in support of Petitioner’s Opposition to Patent Owner’s Contingent Motion to Amend (EX1035). This declaration is in support of Petitioner’s Reply to Patent Owner’s Response.

II. MATERIALS CONSIDERED

2. In forming my opinions, I have considered the documents listed in my original declaration (EX1003, ¶16), the documents listed in my Declaration in Support of Petitioner’s Opposition to Patent Owner’s Contingent Motion to Amend (EX1035, ¶2)), Patent Owner’s Response (“POR”), as well as the documents listed below and any other documents cited in this declaration.

Exhibit No.	Description
1045	Deposition Transcript of Dr. Glenn Vallee from IPR2025-01461 (July 16, 2026)
1046	Excerpts from J. Michael McCarthy & Gim Song Soh, <i>Geometric Design of Linkages</i> , 2nd Edition (Springer 2010) (“Geometric Design”)

III. DUVIGNEAU ANTICIPATES CLAIMS 1-4 AND 14-15 (GROUND 1A).

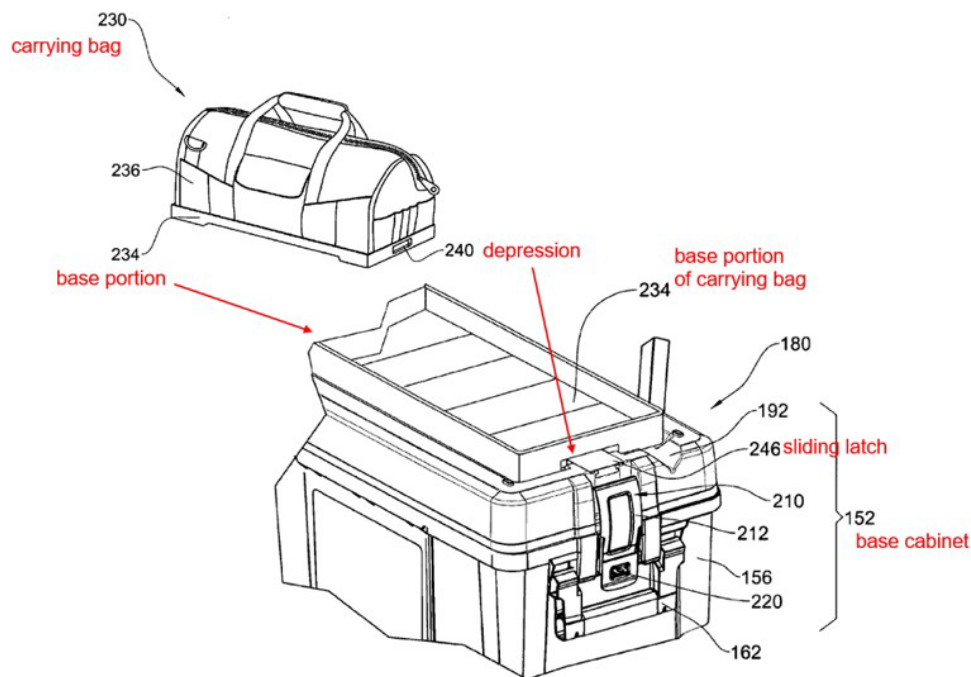
3. In my opinion, Duvigneau anticipates claims 1-4 and 14-15. EX1003,

¶¶144-178.

1. **Claims 1, 14: “*the second container comprises a sliding mechanism*”**

4. In my opinion, Duvigneau discloses “*the second container comprises a sliding mechanism*” recited in claims 1 and 14. EX1003, ¶¶150-155, 174. As I explained in my original declaration, base cabinet 152, including cover 180, is a second storage container and Duvigneau “discloses that base cabinet 152 includes cover 180 upon which ‘a sliding latch 246’ (sliding mechanism) is fitted.”

EX1003, ¶¶153-154 (citing EX1007, ¶52, 57, FIG. 6).



EX1007 (Duvigneau), FIGs. 4B (top), 6 (bottom) (cropped and annotated).

5. I understand that Dr. Vallee is of the opinion that Duvigneau does not

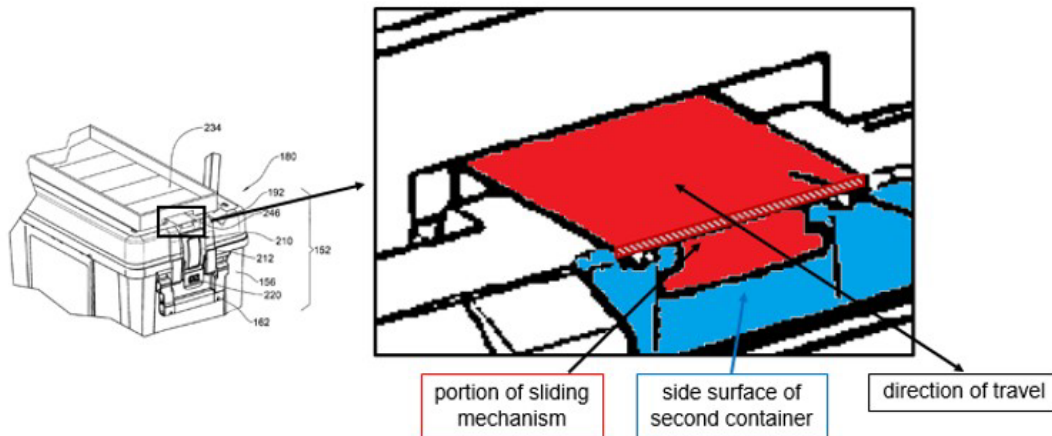
disclose “a second storage container that comprises a sliding mechanism” because sliding latch 246 resides on cover 180 and because the cover is a distinct component that is not part of cabinet assembly. EX2012, ¶¶62-65. I disagree. In my opinion, Dr. Vallee’s opinion is based on a narrow claim construction of “container” that excludes a lid, which is not consistent with the plain and ordinary meaning as would be understood by a person of ordinary skill in the art in the context of the ’689 disclosure. The ’689 patent itself discloses that a lid (or cover) is part of the second storage container and discloses the same arrangement as Duvigneau: a sliding mechanism located in a cover of the second storage container. *See, e.g.*, EX1001, 2:18-19, FIG. 8. It also claims the same arrangement. *See id.*, claims 13, 20 (reciting the slot, with which the slider engages, resides in a lid of the second storage container.) I agree with Dr. Vallee that “the container has the four sides, the bottom, and the lid.” EX1038, 178:8-11

6. Therefore, it is my opinion that like the ’689 patent, Duvigneau discloses a second container (its base cabinet 152 including cover 180) comprises a sliding mechanism.

2. Claims 1, 14: “*the portion of the sliding mechanism is coplanar with the side surface of the second container.*”

7. As I explained in my original declaration, Duvigneau discloses “*the portion of the sliding mechanism is coplanar with the side surface of the second container when the sliding mechanism is engaged with the locking groove*”

limitation, recited in claims 1 and 14. EX1003, ¶¶156-160, 175 (citing EX1007, FIG. 6).



EX1007 (Duvigneau), FIG. 6 (cropped and annotated).

8. I understand that Dr. Vallee is of the opinion that Duvigneau does not disclose this limitation because a person of ordinary skill in the art would understand that “a side surface of the second storage container” must be one of the four side walls of the storage container. EX2012, ¶¶66-73. I disagree. In my opinion, this argument is based on a narrow construction of “side surface” that is not consistent with the plain and ordinary meaning as would be understood by a person of ordinary skill in the art in the context of the ’689 disclosure. Claims 1 and 14 recite “*a side surface of the second container*”; they do not limit the side surface to be one of the four side walls of the container. The ’689 patent itself does not disclose a sliding mechanism coplanar with a body of the second storage container. Rather, as shown in Figure 4 below, the side wall / body of the container

is not a single plane, but has ridges and recessed portions, and the sliding mechanism is coplanar only with a raised portion on the lid, and not the surface of the entire side wall.

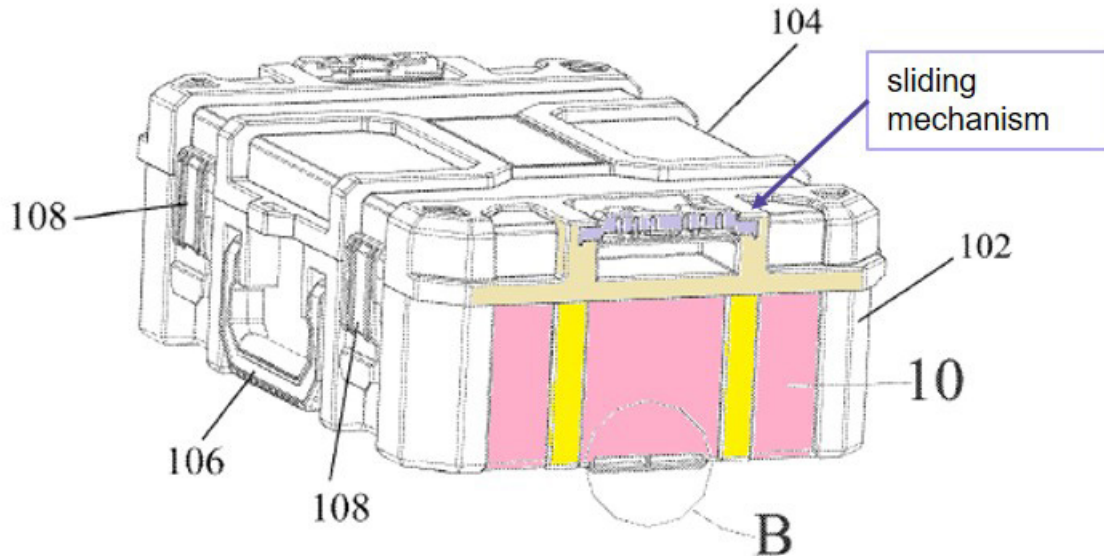


FIG. 4

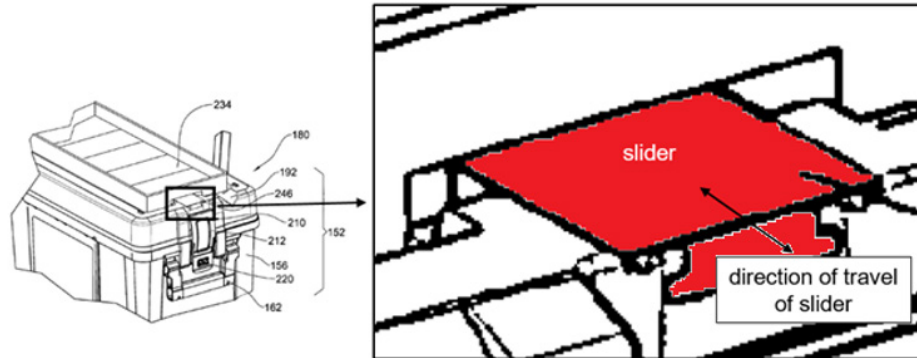
EX1001 ('689 patent), FIG. 4 (annotated).

9. Thus, in my opinion, Dr. Vallee's interpretation is inconsistent with the plain and ordinary meaning of "side surface." It is therefore my opinion that under the proper interpretation of "side surface," Duvigneau discloses its sliding mechanism is coplanar with the side surface when engaged with the locking groove. EX1003, ¶¶156-160, 175.

3. Claim 2

10. As I explained in my original declaration, the slider component of

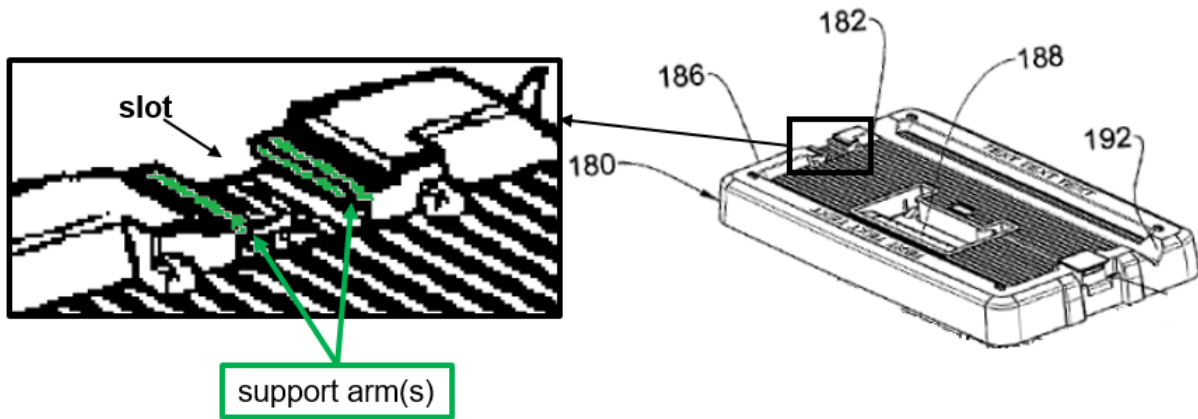
Duvigneau's sliding latch 246 discloses the "*slider*" limitation of claim 2. EX1003, ¶¶161-163, 176.



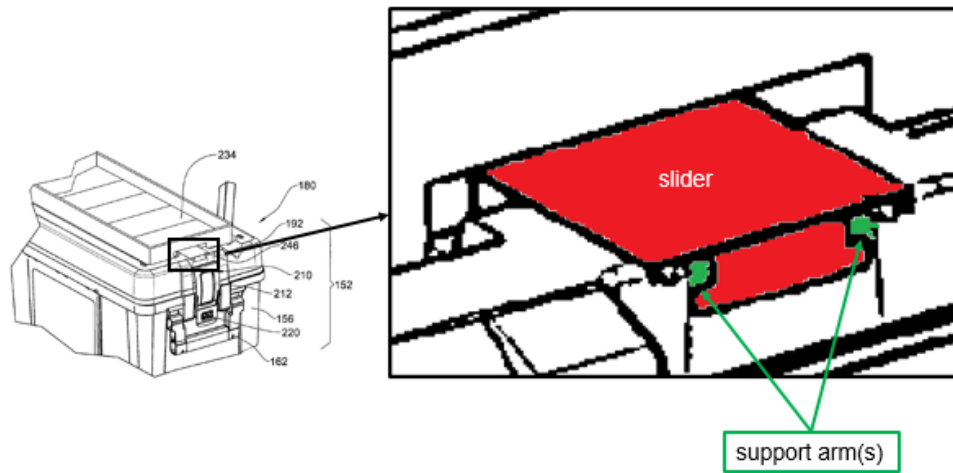
EX1007 (Duvigneau), FIG. 6 (cropped and annotated).

11. I understand that Dr. Vallee states that I expressed the opinion the “slider” is the entire sliding latch 246. That is incorrect.

12. My original declaration does not rely on Duvigneau's entire sliding latch 246 for the “*slider*,” but instead identifies on the “slider” component of sliding latch 246 that is shown in Figure 6. EX1003, ¶¶162-163. As I explained, “a POSA would have understood from Duvigneau's description and figures, and from the design of sliding latch mechanisms, that sliding latch 246 *includes components other [than] the slider illustrated in Figure 6.*” EX1003, ¶162 (emphasis added). For example, I explained that Figure 5 of Duvigneau “shows the location of a second sliding latch 246 in which *the slider* has been removed to show the underlying elements of cover 180” and shows additional components of the sliding latch mechanism, including support arm(s) and a slot. EX1003 ¶¶168-170.



EX1007 (Duvigneau), FIG. 5 (cropped to show top 180 and annotated).



EX1007 (Duvigneau), FIG. 6 (cropped and annotated).

13. In my opinion, this interpretation is consistent with the plain and ordinary meaning of sliding mechanism in view of the '689 patent and its claims, which broadly disclose the sliding mechanism as a multi-component structure, which includes elements such as a support arm, slot, and locking grooves. *See, e.g.,* EX1001, FIG. 2 (shown below).

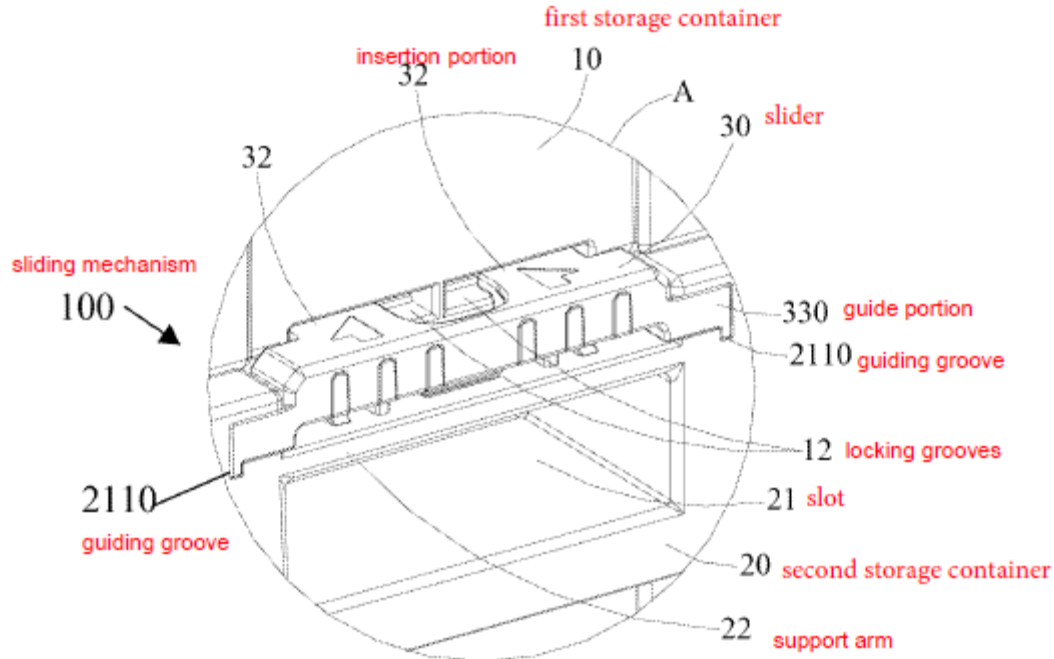


FIG. 2

EX1001 ('689 patent), FIG. 2 (annotated).

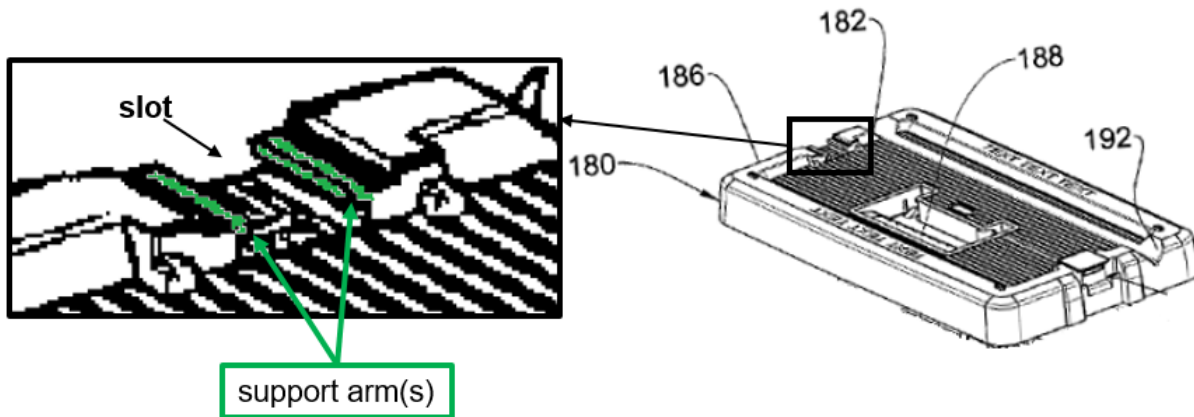
14. A person of ordinary skill in the art would have understood Duvigneau's support arm(s) to be part of its sliding latch mechanism 246 because the "slider rests on and is engaged with the support arm(s), and slides along the support arm(s) to move between the locked and unlocked positions." EX1007, FIGs. 5, 6; *see also* EX1003, ¶170 (explaining the support arm(s) engages with the slider and is necessary for the latch to secure the containers). In other words, from Duvigneau's description and figures, a person of ordinary skill in the art would have understood the support arm(s) are a part of Duvigneau's sliding latch mechanism 246 used to "detachably articulat[e] the carrying bag 230 over the base cabinet 152." EX1007; ¶57.

15. Additionally, as I explained in my original declaration, Duvigneau, in combination with other references, teaches additional components of the sliding mechanism, such as a “guiding rib” on the support arm that cooperates with a guiding slot on the slider to constrain lateral movement and “a block with a bevel” that prevents complete disengagement of the slider. *See, e.g.*, EX1003, ¶¶180, 210-211, 234. In my opinion, these components of the support arm further make clear that it is part of the overall sliding latch mechanism.

16. Accordingly, it is my opinion that Duvigneau discloses its sliding mechanism comprises “*a slider.*”

4. Claim 4: “*a support arm extending across the slot*”

17. As I explained in my original declaration, Duvigneau discloses the limitations of claim 4, including “*a slot in the side surface of the container with a support arm extending across the slot.*” EX1003, ¶¶167-171. Duvigneau’s Figure 5 shows the claimed support arm extending across a slot. EX1003, ¶¶169-171; EX1007, FIG. 5.



EX1007 (Duvigneau), FIG. 5 (cropped to show top 180 and annotated).

18. I understand that Dr. Vallee opines Duvigneau does not disclose the support arm because a person of ordinary skill in the art would understand the claim to require a support arm extending across the width of the slot in a direction perpendicular to the direction of the slider's travel. EX2012, ¶¶87-89. I disagree. In my opinion, Dr. Vallee relies on a narrow claim construction of "extending across" that is not consistent with the plain and ordinary meaning as would be understood by a person of ordinary skill in the art. A person of ordinary skill in the art would not have understood the claim to require the support arm to extend across the width of the slot.

19. As I testified, the plain and ordinary meaning of across is that it "goes from one side to the other." EX2014, 62:9-11. In Duvigneau, the support arm extends across the slot "from the front side to the back side." EX2014, 62:20-22.

20. Under the plain and ordinary meaning, Duvigneau discloses a support

arm that extends across the slot (from the “front side” to the “back side”). EX1003, ¶¶167-171.

5. Claims 3 and 15

21. The Petition and my original declaration establish that Duvigneau discloses the limitations recited in dependent claims 3 and 15. EX1003, ¶¶164-166, 175-176.

IV. DUVIGNEAU ALSO RENDERS OBVIOUS CLAIMS 1-4 AND 14-15 (GROUND 1B).

22. As I explained in my original declaration, claims 1-4 and 14-15 would also have been obvious over Duvigneau. EX1003, ¶¶179-197.

23. In my opinion, a person of ordinary skill in the art would have been motivated to modify Duvigneau for the reasons I explained in my original declaration. *See, e.g.*, EX1003, ¶¶184-186 (explaining why a person of ordinary skill in the art would have been motivated to have a portion of a sliding mechanism coplanar with a side surface of the second container), ¶¶192-193 (explaining why a person of ordinary skill in the art would have been motivated to include support arm(s) to retain the slider in place).

V. CLAIMS 5-7 AND 16 WERE OBVIOUS OVER DUVIGNEAU-NILES (GROUND 1C) AND DUVIGNEAU-MOREL (GROUND 1D).

24. As I explained in my original declaration, Duvigneau-Niles and Duvigneau-Morel render obvious claims 5-7 and 16. EX1003, ¶¶198-228.

25. I understand that a reference is analogous if it is either (1) from the

same field of endeavor or (2) reasonably pertinent to the problem with which the inventor is involved. In my opinion, Niles and Morel are both analogous art because they are in the same field of endeavor as the '689 patent and reasonably pertinent to the problems of the '689 patent. EX1003, ¶120.

26. In my opinion, the field of endeavor is not limited to a mechanism for attaching one stacked item to another as stated by Dr. Vallee. Niles and Morel are in the same field of endeavor as the '689 patent because they disclose “latching mechanisms for containers.” EX1003, ¶120. This definition is consistent with the technology claimed in the '689 patent, which generally concerns a container latching mechanism, rather than Dr. Vallee’s narrow definition. In particular, as explained in my original declaration, Niles discloses a latch assembly 12 that includes flexible slide 46 to latch together two separable container portions. EX1003, ¶¶125, 200 (citing EX1012, 4:31-35, FIGS. 1-2). Morel discloses a locking device used to hold a sliding partition of a storage container in place. EX1003, ¶¶126-128; EX1008, ¶¶49, 52, FIG. 1B.

27. In my opinion, Niles and Morel are both also reasonably pertinent to the problems of the '689 patent. They each would have logically commended itself to an inventor looking to solve the problem of securing a sliding latching mechanism in locked and unlocked positions. *See* EX1003, ¶¶199-203, 214-218. I agree with Dr. Vallee that all latches share a common purpose to limit “relative

motion of two bodies in particular degrees of freedom” and that latches used in other applications are relevant to the ’689 patent. EX1038, 58:12-21, 77:17-78:5, 99:16-100:12, 108:9-109:1. I also agree with Dr. Vallee that one of the problems the inventors of the ’689 patent were trying to solve was to provide an attachment/detachment method “that would have positive stops when engaged and disengaged.” EX1038, 142:10-15, 143:14-17. Niles and Morel both disclose such a mechanism. *See* EX1003, ¶¶199-211, 214-225.

28. As I explained, Morel’s locking device is a latch for a container because it immobilizes the sliding partition member relative to the receptacle in the sliding direction. EX1003, ¶¶127, 215 (citing EX1009, ¶¶49, 52).

29. Additionally, in my opinion, the claims do not require the latch to be designed for heavy storage cases that must resist larger stresses. Even if there was a requirement for the latching mechanism to resist a particular level of stress, there is no reason why the proposed combinations of Duvigneau-Niles or Duvigneau-Morel cannot withstand such stress because the combinations are not to incorporate Niles’ entire latch into Duvigneau or the entirety of Morel’s locking mechanism into Duvigneau. Rather, the combinations rely on Niles and Morel for their teaching of engaging grooves and protrusions. *See* EX1003, ¶¶199-211, 214-225.

30. A person of ordinary skill would have known how to modify latching mechanisms, sliding mechanisms, or components for different applications (e.g.,

locking two stacked containers together). Additionally, a person of ordinary skill in the art would have known how to modify materials for strength and adjust size.

1. Duvigneau-Niles

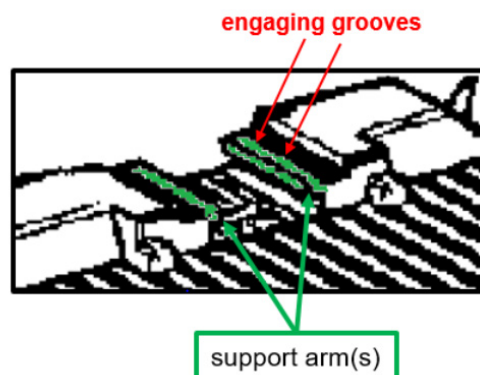
31. As I explained in my original declaration, Duvigneau-Niles teaches the claimed engaging grooves for holding the slider in the unlocked/locked positions recited in claim 5. EX1003, ¶¶198-203. In my opinion, because Duvigneau does not expressly disclose how its sliding mechanism remains locked in place, a person of ordinary skill in the art would have been motivated to look for a suitable solution. EX1003, ¶201. Niles suggests such a solution through its simple mechanism that uses engaging grooves to hold the slider in locked/unlocked positions. EX1003, ¶¶200-202. As I explained in my original declaration, the proposed modification is not to incorporate the entirety of the Niles mechanism, but rather the use of engaging grooves (as taught by Niles) on Duvigneau's support arm. EX1003, ¶¶200-202. I further explained why a person of ordinary skill in the art would have been motivated to make the proposed combination, including to hold the slider in a locked position to ensure the containers stay attached and to keep the slider in a fixed unlocked position to prevent unwanted sliding. EX1003, ¶¶200-211.

32. I disagree with Dr. Vallee that Niles cannot be implemented in Duvigneau. The proposed modification does not bodily incorporate Niles' latch bar

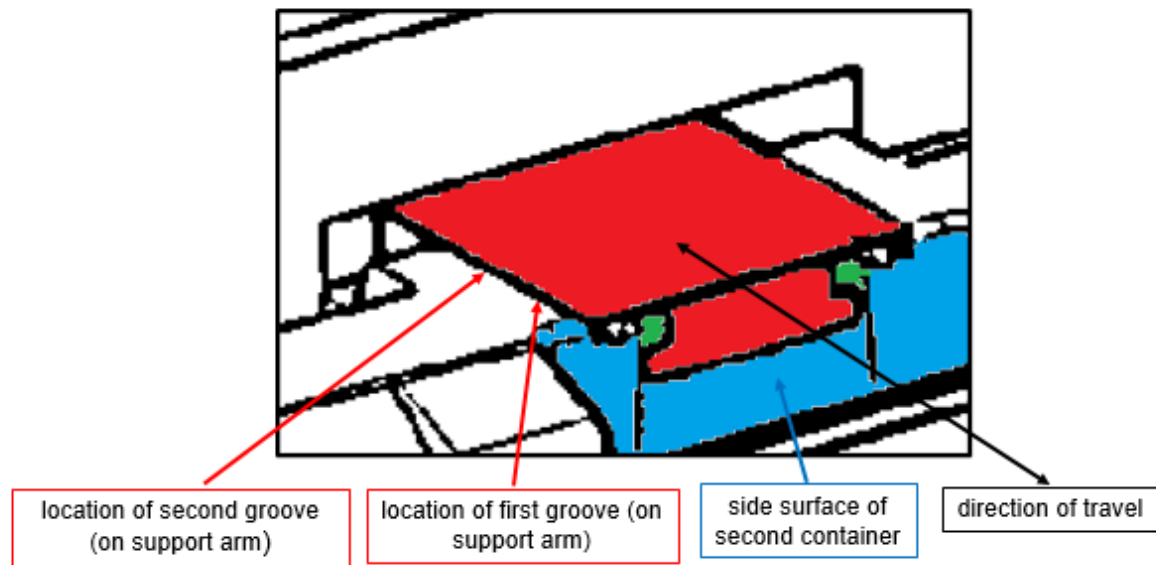
88. Rather, as I explained in my original declaration in the proposed Duvigneau-Niles combination, Duvigneau is modified to include engaging grooves on the support arm, and then further modified, for claim 7 to incorporate an elastic with an engaging protrusion on an underside of the slider to engage the grooves.

EX1003, ¶¶201-211. As I explained, the elastic arm permits selective engagement and a POSA would have been readily able to incorporate Niles's teachings of engaging grooves and protrusion. EX1003, ¶¶201-211. Further, as shown in Figure 5 below, the slider is accessible to the user to depress/disengage the protrusion.

EX1003, ¶¶201-202.



EX1007 (Duvigneau), FIG. 5 (cropped and edited to show example engaging grooves).



EX1007 (Duvigneau), FIG. 6 (cropped and annotated).

2. Duvigneau-Morel

33. As I explained in my original declaration, Duvigneau-Morel teaches the claimed engaging grooves for holding the slider in the unlocked/locked positions, recited in claim 5, and I explain why a person of ordinary skill in the art would have modified Duvigneau to include the engaging grooves taught by Morel on Duvigneau's support arm. EX1003, ¶¶213-218. As I explained, implementing the two engaging grooves (as taught by Morel) on Duvigneau's support arm were routine design considerations well within the skills of a person of ordinary skill in the art. EX1003, ¶217.

34. I disagree with Dr. Vallee that the Duvigneau-Niles combination does not teach the engaging grooves. The proposed combination implements two

engaging grooves (as taught by Morel) on Duvigneau's support arm to hold the slider in locked/unlocked positions and does not incorporate the entirety of Morel's locking mechanism into Duvigneau. EX1003, ¶¶215-217. I explained in my original declaration why a person of ordinary skill in the art would have made the proposed modification. EX1003, ¶¶214-217.

35. Furthermore, the intent of my deposition testimony was to explain the unpatentability analysis I performed to demonstrate the known features and benefits of a mechanism to hold a latch can be obtained by combining it with Duvigneau. *See* EX2014, 101:10-17. I am not a patent attorney. I understand that I needed to explain that all elements of claims 5-7, which build on claims 1-4, are present in the prior art. I continue to hold the opinions set forth in my original declaration regarding why a person of ordinary skill in the art would have been motivated to make the proposed combination. *See* EX1003, ¶¶214-218.

VI. CLAIMS 8 AND 17 WERE OBVIOUS OVER DUVIGNEAU-MOREL-WENG (GROUND 1E).

36. As I explained in my original declaration, Duvigneau-Morel-Weng renders obvious claims 8 and 17. EX1003, ¶¶229-242.

37. First, as I explained in my original declaration, Weng is at least reasonably pertinent to the problems of the '689 patent to prevent its slider from detaching from the storage container. EX1003, ¶¶120, 233-240. "Weng's arrangement used to stop a sliding mechanism (a drawer) from being inadvertently

removed is reasonably pertinent to the problem faced in the Duvigneau-Morel combination to prevent its slider from detaching from cover 180 of the storage device.” EX1003, ¶233. I agree with Dr. Vallee that preventing the slider from being detached from the storage container was one of the problems addressed by the ’689 patent. EX1038, 147:7-11. I also explained in my original declaration that a “POSA would have sought to find a way to secure sliding latch 246 on cover 180, and would have looked to teachings related to other sliding components that are protected from inadvertent removal from a supporting structure.” EX1003, ¶233.

38. Further, it is my opinion that Weng does not teach away from the intent of the ’689 patent. Weng expressly discloses a mechanism “which can truly stop the drawer when drawn out” (i.e., *prevent* a slider from inadvertently being pulled out). EX1009, 2:1-5. Based upon my review of Weng, nothing in Weng criticizes, discredits, or discourages reliance on that teaching in the proposed combination with Duvigneau-Morel.

39. Second, I explained that a person of ordinary skill in the art would have modified Duvigneau-Morel to incorporate Weng’s “*block comprising a bevel*” on Duvigneau’s support arm and to modify Duvigneau’s slider to “*comprise a recess with a sloped entry and a stopping surface*” that would “*arrest[] outward movement of the slider.*” EX1003, ¶¶231-239. I further explained in detail how a

person of ordinary skill in the art would have implemented that modification.

EX1003, ¶¶234-239; EX2014, 81:2-82:2.

40. Third, the intent of my deposition testimony was to explain the invalidity analysis I performed to demonstrate all limitations of claim 8 were known in the prior art. *See* EX2014, 79:20-81:1. I am not a patent attorney. I understand that I needed to explain that all elements of claim 8, which builds on claims 1-7, are present in the prior art. I continue to hold the opinions set forth in my original declaration regarding why a person of ordinary skill in the art would have been motivated to make the proposed combination. *See* EX1003, ¶¶231-239. I also explained that Weng solves a problem not addressed by Duvigneau to prevent the slider from being removed. EX2014, 97:3-13. Dr. Vallee agrees with me that Duvigneau does not describe how its slider is retained and that this lack of detail does not mean that there is something wrong with Duvigneau's design, only that Duvigneau's focus was not on those details. EX1038, 198:14-199:17.

41. My original declaration provides detailed, evidence-based reasons why a person of ordinary skill in the art would have modified Duvigneau-Morel to incorporate Weng's teachings. EX1003, ¶¶231-239.

VII. CLAIMS 9-11 WERE OBVIOUS OVER DUVIGNEAU-FRYDENBERG (GROUND 1F).

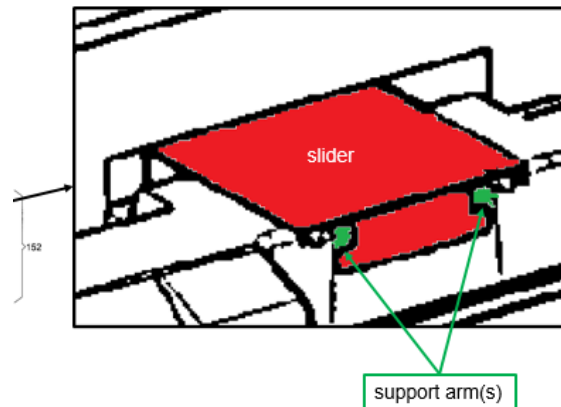
42. As I explained in my original declaration, claims 9-11 are rendered obvious by Duvigneau-Frydenberg. EX1003, ¶¶243-254.

43. I disagree with Dr. Vallee that a person of ordinary skill in the art would have had no motivation to incorporate Frydenberg's teachings because there is no indication Duvigneau's slider is capable of lateral displacement and Duvigneau is already inherently capable of preventing such displacement. EX2012, ¶¶166-167.

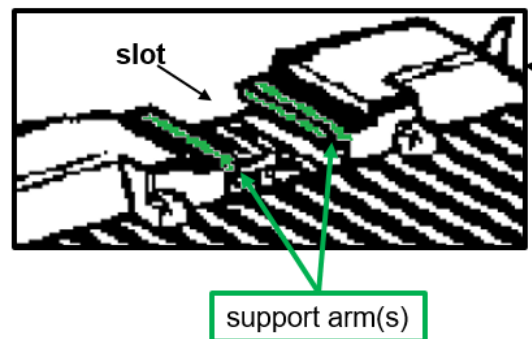
44. As I explained, a person of ordinary skill in the art would have found it obvious for Duvigneau's slider and support arm to have components to engage with each other to constrain lateral movement to ensure the slider performs its intended function. EX1003, ¶¶245-250. Without such components, the slider may become laterally displaced, particularly under rough construction conditions, which would inhibit engagement with the locking groove. EX1003, ¶245. I explained Frydenberg's well-known rail/cavity (guiding rib/corresponding slot) arrangement, which Frydenberg states can be attached to "most any kind of structure," would constrain lateral movement and ensure Duvigneau's intended movement of the slider along the support arm. EX1003, ¶¶247-250; EX1011, 7:28-313. I also explained that Frydenberg's arrangement is similar to Dur, which specifically describes its components as lateral guidance. EX1003 ¶248 (citing EX1027, ¶33, FIG. 6).

45. I disagree with Dr. Vallee that there is no indication the sliding latch 246 of Duvigneau is capable of lateral displacement. As shown in the annotated

figures of Duvigneau, Duvigneau does not disclose any structure that constrains lateral movement, nor does it illustrate that the slider is necessarily constrained within its underlying slot.



EX1007 (Duvigneau), FIG. 6 cropped/annotated)



EX1007 (Duvigneau), FIG. 5 (cropped/annotated).

46. In my deposition, I testified that I do not know if Duvigneau's container system "has an issue" with lateral displacement. That is because Duvigneau does not describe any mechanism to prevent lateral displacement. EX1003, ¶245. Because Duvigneau does not disclose how lateral movement is

constrained, a person of ordinary skill in the art would have found obvious to incorporate Frydenberg's well-known guiding-rib and slot arrangement to ensure the slider performs its function. EX1003, ¶¶245-248.

47. Additionally, a person of ordinary skill in the art would have understood that a common material used to make sliding latches, such as Duvigneau's sliding latch 246, is molded plastic or another similar material. For example, Baker discloses that "slide member 27 ... is preferably molded from plastic." EX1021, ¶57. Further, Duvigneau is assigned on its face to Keter Plastic Ltd., a company that manufactures molded plastic components. EX1007, face page (item 73). A person of ordinary skill in the art would have further understood that a molded plastic component can flex when a force is applied to it. For example, a person of ordinary skill in the art would have understood that if a lateral force is applied to Duvigneau's slider when it is not attached to the depression 240 of the second container, the slider would become laterally displaced without a mechanism to prevent such displacement. Nothing in Duvigneau's disclosure or figures indicates the mechanism used to prevent such displacement. Accordingly, a mechanism like Frydenberg's rail 18 on Duvigneau's support arm(s) to constrain lateral movement enhances the overall security of sliding latch 246.

48. The intent of my deposition testimony was to explain that the goal of

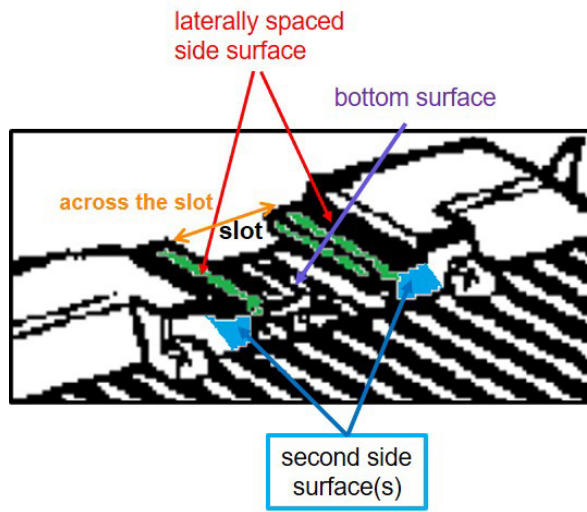
my unpatentability analysis was to show the references have the features of the '689 patent. *See* EX2014, 103:4-12. I understand that I needed to explain all elements of claims 9-11, which build on claims 1-4, must be present in the prior art. I continue to hold the opinions set forth in my declaration regarding why a person of ordinary skill in the art would have modified Duvigneau to add a guiding rib and groove, as taught by Frydenberg. EX1003, ¶¶245-254.

VIII. CLAIMS 12-13 AND 19-20 WERE OBVIOUS OVER DUVIGNEAU-BRUNNER (GROUND 1G).

49. As I explain in my original declaration, it is my opinion that Duvigneau-Brunner renders obvious claims 12-13 and 19-20. EX1003, ¶¶255-269.

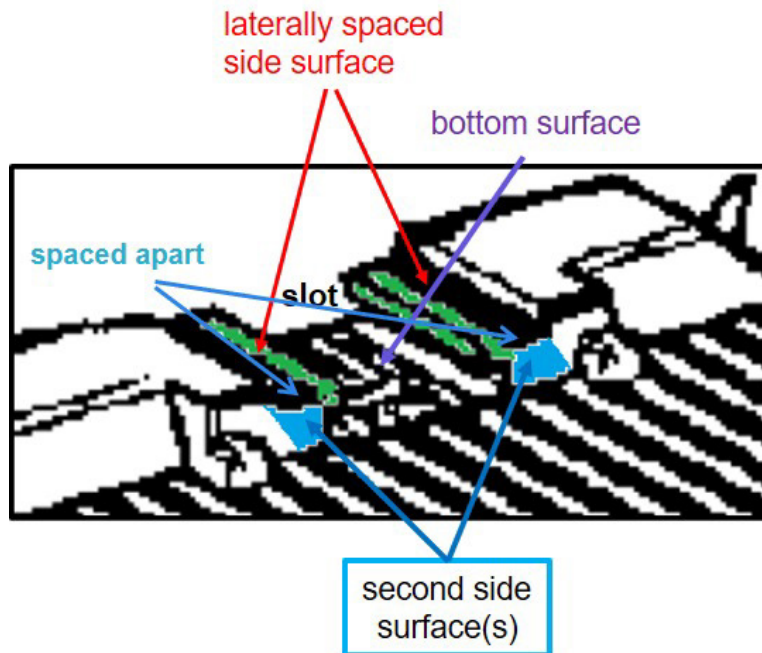
50. I disagree with Dr. Vallee that claims 12 and 19 require the support arm to extend “across the width of the slot, spanning the distance between the two laterally spaced side surfaces,” and not just be located at a position between the two side surfaces. EX2012, ¶174. I disagree because, in my opinion, Dr. Vallee’s narrow construction is inconsistent with the plain and ordinary meaning as would be understood by a person of ordinary skill in the art. Claims 12 and 19 recite “*the support arm is located across the slot between the two laterally spaced apart side surfaces.*” In my opinion, the claims do not require that the support arm “extends across” the slot, but rather that the support arm “is located across” the slot. In my opinion, Duvigneau’s support arm(s) teaches this limitation. EX1003, ¶¶256-258. As shown below, in annotated Figure 5, Duvigneau’s support arm(s) are located

across the slot between the two side surfaces. EX1007, FIG. 5.



EX1007 (Duvigneau), FIG. 5 (cropped and annotated).

51. It is also my opinion that Duvigneau teaches a support arm that is spaced apart from a second side surface. As my original declaration explained, and as illustrated in Duvigneau's Figure 5, the support arm(s) are spaced apart from the identified second side surface and do not abut the second side surface. EX1003, ¶¶257-258; EX1007, FIG. 5.



EX1007 (Duvigneau), FIG. 5 (cropped and annotated).

52. I do not agree with Dr. Vallee that claims 12 and 19 require that the space between the support arm and the second side surface be used for gripping the container. Rather, the claims recite the location of the support arm and that location provides for gripping and carrying the storage container. This is consistent with Figure 9 of the '689 patent, which illustrates that the support arm can be used for gripping and carrying the container because it is located above the bottom surface.

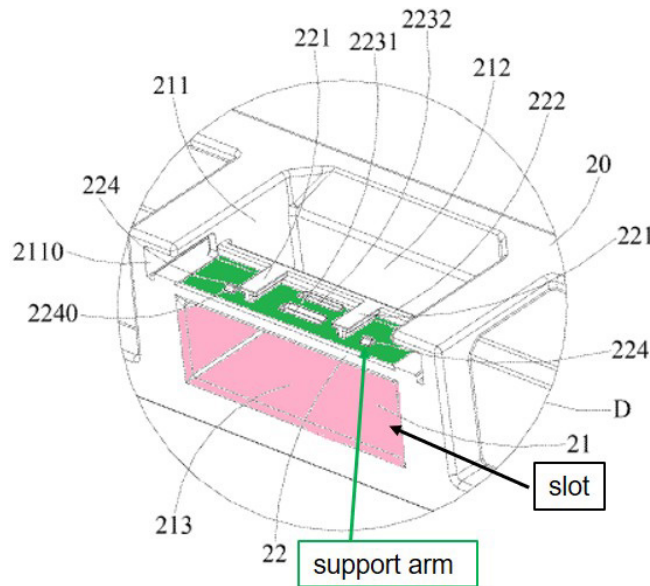


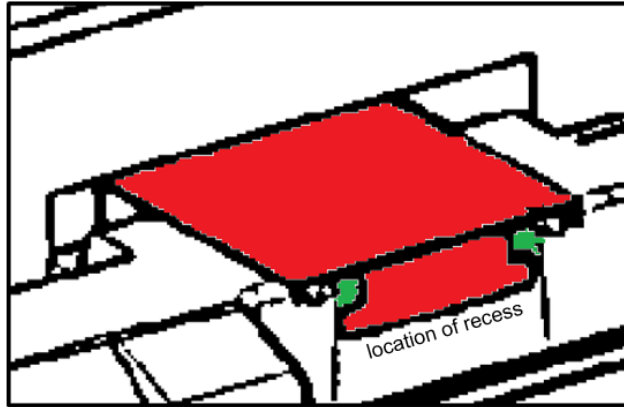
FIG. 9

EX1001 ('689 patent), FIG. 9 (annotated).

53. As the Petition and my original declaration explain, Duvigneau-Brunner renders obvious the support arm “*for gripping and carrying the second storage container.*” EX1003, ¶¶259-263. After incorporating a recess for a handle (as taught by Brunner) into Duvigneau, as explained, a user could grip the lower protrusions (green support arm(s)) and carry the second storage container.

EX1003, ¶¶261-262; EX1007, FIG. 6.

54. Additionally, it is my opinion that a person of ordinary skill would have understood the limitation “*for gripping and carrying the second storage container*” to be an intended use of the storage system.



EX1007 (Duvigneau), FIG. 6 (cropped and annotated to show recess after modified).

IX. CLAIM 18 WAS OBVIOUS OVER DUVIGNEAU-MOREL-WENG-FRYDENBERG (GROUND 1H).

55. My original declaration explained that, in my opinion, Duvigneau-Morel-Weng renders obvious claim 18. EX1003, ¶¶270-273.

56. I continue to hold the opinions set forth in my original declaration regarding why a person of ordinary skill in the art would have been motivated to make the proposed modifications. *See* EX1003, ¶¶270-273. The intent of my deposition testimony was to explain how I conducted my invalidity analysis. I understand that claim 18 builds on claims 14-17 and all elements of the claim must be present in the prior art.

X. CLAIMS 1-4 AND 14-15 WERE OBVIOUS OVER BROCKET-HEINRICHS (GROUND 2A).

57. As I explained in my original declaration, Brocket-Heinrichs renders obvious claims 1-4 and 14-15. EX1003, ¶¶274-303.

58. In my opinion, Heinrichs is analogous art because it is both in the same field of endeavor and reasonably pertinent to the problems of the '689 patent. EX1003, ¶120. Heinrichs discloses a stackable storage container system with “*a sliding mechanism for selectively engaging [a] locking groove to connect and hold*’ a first container to a pallet.” EX1003, ¶279 (citing EX1006, ¶¶51-62, FIGs. 2-4, 6). It is in the same field because it discloses a latching mechanism for containers. It is also reasonably pertinent to a problem faced by the inventors of the '689 patent to—in Dr. Vallee’s words—“have a robust, straightforward, linear attachment/detachment method.” EX1038, 142:12-14. As I explain in my original declaration, Heinrichs discloses the sliding mechanism limitation in the independent claims, and the additional limitations of dependent claims 2-4 and 15. *See* EX1003, ¶¶279-303.

59. In my opinion, Dr. Vallee’s argument that Heinrichs is not in the same field uses an unduly narrow definition. Further, as I explained, Heinrichs discloses, in combination with Brocket, all of the limitations of claims 1-4 and 14-15. *See* EX1003, ¶¶274-303.

60. Accordingly, Heinrichs is analogous art.

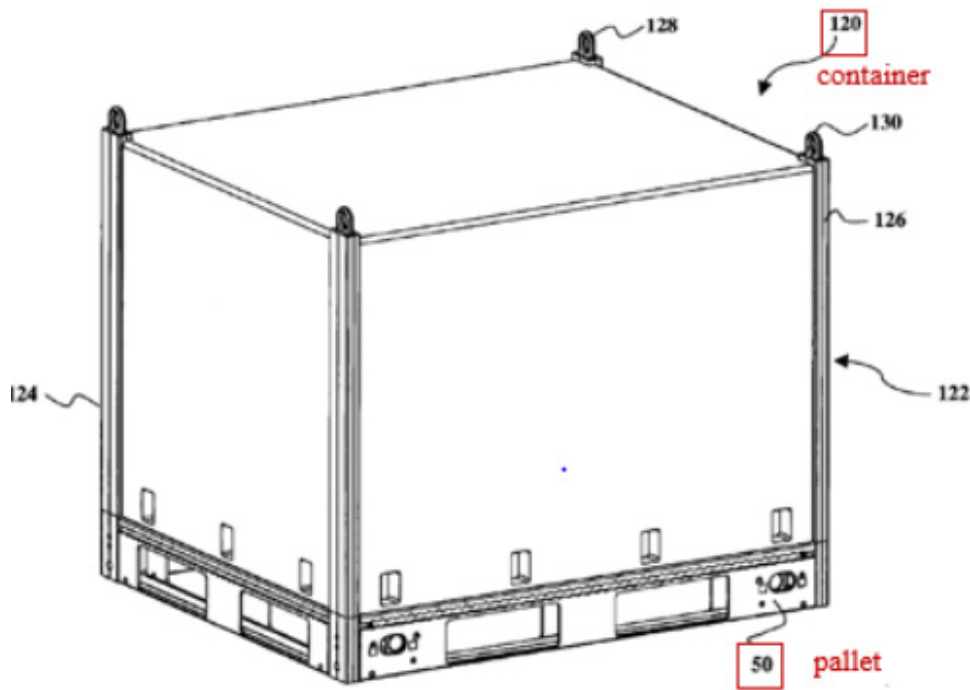
1. Motivation to Combine Brocket and Heinrichs (Ground 2A).

61. In my original declaration, I provided multiple reasons for why a person of ordinary skill in the art would have modified Brocket to replace its

locking mechanism with the locking mechanism taught by Heinrichs. EX1003, ¶¶278-283. These reasons include: (1) design choice; (2) simple substitution to replace Brocket's known locking mechanism with Heinrichs' mechanism to achieve predictable results; and (3) Heinrichs more compact design and ability to lock its mechanism in place. EX1003, ¶¶281-283.

62. In my deposition, I explained that the "familiar elements to persons of ordinary skill in the art ... can be constructed in at least one way using Brocket and Heinrichs." EX2014, 88:6-11. I continue to hold the opinions set forth in my original declaration regarding why a person of ordinary skill in the art would have been motivated to make the proposed combination. EX1003, ¶¶281-283.

63. I disagree with Dr. Vallee that the combination would render Heinrichs' inoperable. As I explained in my original declaration, and as shown in Figure 6 below, Heinrichs' locking mechanism is used to secure a container to a pallet. *See* EX1003, ¶¶279-280; EX1006, ¶56, FIG. 6. A person of ordinary skill in the art would have understood that the same locking mechanism would and could readily be used to connect the containers disclosed by Brocket. EX1003, ¶¶281-282.



EX1006 (Heinrichs), FIG. 6 (annotated).

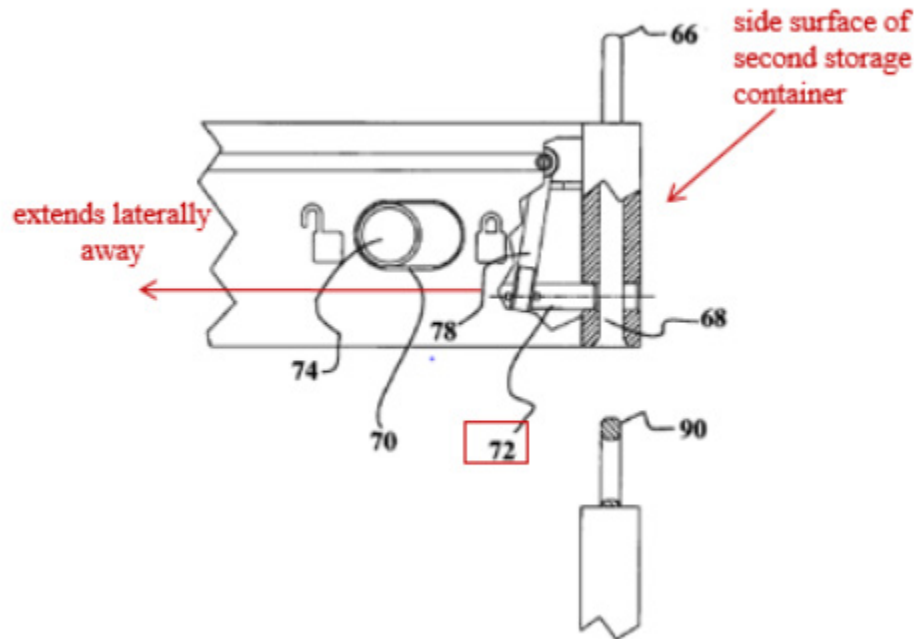
64. Indeed, Heinrichs specifically discusses stacked storage containers. Heinrichs discloses that “another storage container having a second pallet which is substantially identical to pallet 50 may be stacked on container 120. Openings and associated cavities 68 in the bottom of the upper second pallet receive interface fittings 130 from below. The upper second pallet features locking mechanisms substantially identical to those locking mechanisms of pallet 50 for selectively engaging and disengaging interface fittings 130 of panels 122, 124.” EX1006, ¶62. Accordingly, Heinrichs explicitly discloses locking together stacked containers using Heinrichs’ locking mechanism.

2. Claims 1, 14: “locking groove”

65. As my original declaration explains, Heinrichs’ interface fitting 90 teaches the claimed locking groove. EX1003, ¶¶279-280.

3. Claims 1, 14: “sliding mechanism extends laterally away”

66. As I explain in my original declaration, Heinrichs teaches locking bolt 72 (“a portion of the sliding mechanism”) extends laterally away from a side surface of the second container when the mechanism is disengaged. EX1003, ¶¶285-286; EX1005, FIG. 3. Figure 3 of Heinrichs illustrates this claimed arrangement.



EX1006 (Heinrichs), FIG. 3 (annotated).

67. I disagree with Dr. Vallee that the claims require the sliding

mechanism to extend away from the midline of the storage box. In my opinion, that narrow construction is not consistent with the plain and ordinary meaning as would be understood by a person of ordinary skill in the art.

4. Claim 2

68. As I explain in my original declaration, Brocket-Heinrichs renders obvious claim 2. EX1003, ¶¶291-294. Heinrichs lock slider 70 and locking bolt 72 components teach the claimed “*sliding mechanism*” and the locking bolt 72 component of the mechanism teaches the “*slider*” of claim 2. EX1003, ¶¶143, 280, 284, 292-294, 297. As I discussed for the Duvigneau ground, this is consistent with the plain and ordinary meaning, in light of the broad description in the ’689 patent of its sliding mechanism.

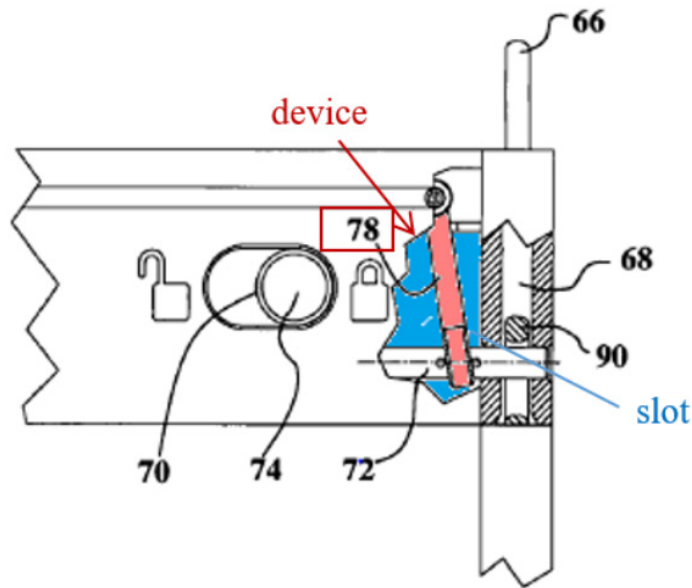
5. Claim 4

69. As I explain in my original declaration, Brocket-Heinrichs renders obvious claim 4. EX1003, ¶¶296-301. Heinrichs’ device 78 teaches the claimed support arm that extends across a slot. EX1005, FIG. 4; EX1003, ¶¶300-301.

70. I disagree with Dr. Vallee that device 78 is not a support arm. In my opinion, Dr. Vallee’s narrow construction is inconsistent with the plain and ordinary meaning, as would be understood by a person of ordinary skill in the art. Claim 4 does not require the support arm to be stationary, but only requires that the slider is engaged with it to move between locked and unlocked positions. Heinrichs

teaches this limitation. EX1003, ¶¶300-301.

71. I understand that Dr. Vallee admits that device 78 is disposed within beam 60 (a cavity). EX2012, ¶122. In my opinion, a person of ordinary skill in the art would have understood Heinrichs' cavity to be a slot. And, as shown in Figure 4, device 78 extends across the slot from locking bolt 72 to its anchor point.

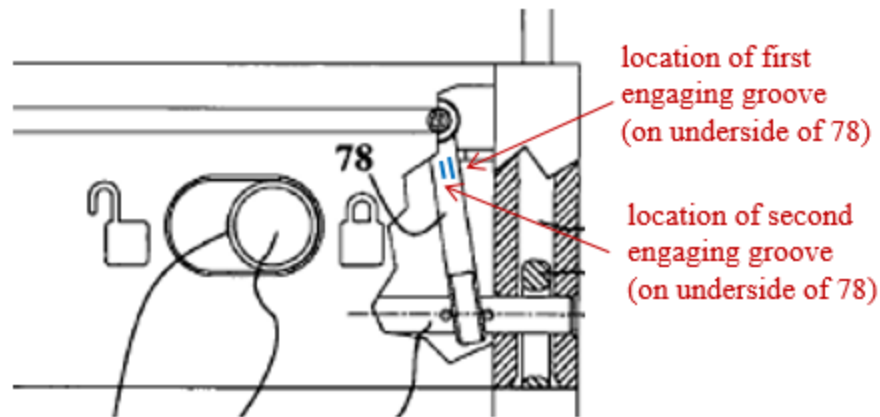


EX1006 (Heinrichs), FIG. 4.

XI. CLAIMS 5 AND 6 WERE OBVIOUS OVER BROCKET-HEINRICHS-MOREL (GROUND 2B).

72. As I explained in my original declaration, Brocket-Heinrichs-Morel renders obvious claims 5 and 6. EX1003, ¶¶304-314.

73. As I explained, the proposed modification is to modify Brocket-Heinrichs to add engaging grooves, as taught by Morel, on support arm (device 78) to hold slider (locking bolt 72) in locked/unlocked positions. EX1003, ¶¶305-311.



EX1006 (Heinrichs), FIG. 4 (cropped and annotated).

74. I also explained why a person of ordinary skill in the art would have been motivated to incorporate engaging grooves (as taught by Morel) into Bracket-Heinrichs. EX1003, ¶¶307-314.

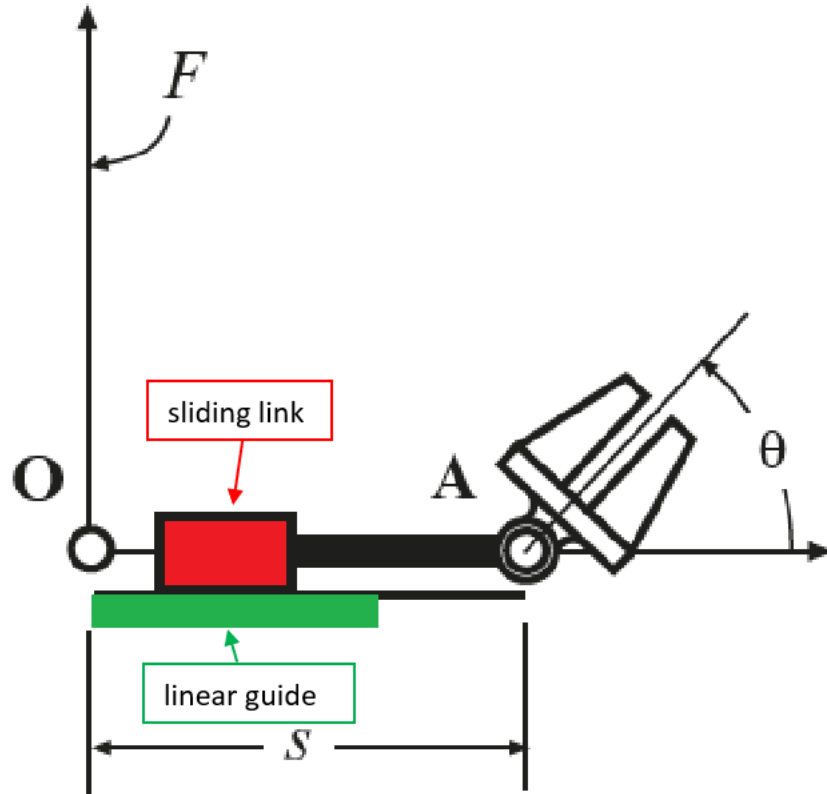
XII. I EXCEED THE QUALIFICATION FOR A PERSON OF ORDINARY SKILL IN THE ART.

75. For the reasons explained in my original declaration, EX1003, ¶¶4-14, my education, work, and teaching demonstrate that I am a person of ordinary skill in the art of “connecting technologies or similar mechanisms.” My education, work, teaching and research demonstrate that I have a broad base of knowledge regarding machine design and the design of mechanical systems. This field of technology encompasses mechanical products, in general, and their structural members and components, including connecting technologies. EX1003, ¶14.

76. Connecting technologies, particularly the '689 patent's sliding

mechanism, include and are built using articulated systems. In my textbook

Geometric Design of Linkages (2nd Edition), I explain that a “linkage is a collection of interconnected components, individually called links. The physical connection between two links is called a joint.” EX1046, 1. “In fact, the linkages that we study can be viewed as constructed from two elementary joints, the rotary hinge, called a revolute joint (denoted by R), *and the linear slider*, or prismatic joint (denoted by P).” EX1046, 2 (emphasis added). Indeed, I discuss a prismatic-revolute (PR) open chain that includes a link “that slides along the linear guide of a P-joint relative to the ground,” similar to the sliding mechanism of the ’689 patent. EX1046, 16.



EX1046 (Geometric Design, McCarthy), FIG. 2.1 (annotated).

77. Additionally, I “guided the teams that formed the mechanical design” of a commercial robotic system, and “a team that would do the fabrication and testing, and then a team that would do the installation.” EX2014, 28:20-30:3. In the course of this work, I regularly designed and implemented various joints of the robotic system that releasably connected different components.

78. I have explained that my “entire activity has been involved in articulated systems that appear in latches.” EX2014, 31:20-21. Latches “are articulated systems that are designed to move under the actuation of a person or machine to engage two components so that they’re connected together. That is the description of an articulated system.” EX2014, 32:3-22.

79. Additionally, I have well over two years of academic experience with connecting technologies, including teaching relevant courses that involve latch design and experience with articulated systems—which is experience with connecting technologies. My teaching experience includes a number of classes, for example, “Theory of Machines,” in which we discuss “the mechanical elements that are important to engineering.” EX1004, 41-42; EX2014, 33:6-13. I have taught this class on 19 separate occasions. EX1004, 41-42. As I explained, this class entails discussion of “examples in which [my students] will be asked to analyze various machine elements. And examples that are very common are articulated

systems that form latches.” EX2014, 33:6-13. I have also authored multiple books addressing connecting technologies and design, including *Geometric Design of Linkages* (EX1046) and other books. *See* EX1004, 13.

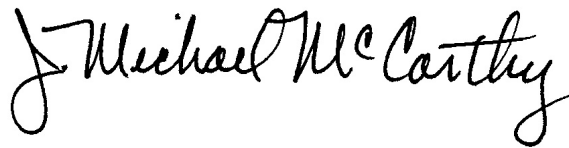
80. Accordingly, my experience is directly relevant to the technology of the '689 patent. I have over 40 years of academic and industry experience in how components in articulated systems interact and move relative to one another (including in sliding latches), the core technologies of the '689 patent's sliding mechanism. EX1004, 1-2. Linkages, which include various joints upon which sliding mechanisms like the '689 patent are built, are connecting technologies or similar mechanisms. And my experience also includes latch-specific implementations.

XIII. CONCLUSION

81. In signing this declaration, I recognize that the declaration will be filed as evidence in an *inter partes* review before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required, I will appear for cross-examination within the United States during the time allotted.

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

Executed on this 6th day of August, in Irvine, California.

A handwritten signature in black ink that reads "J. Michael McCarthy". The signature is written in a cursive, flowing style.

J. Michael McCarthy, Ph.D.