

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

THE HILLMAN GROUP, INC.
Petitioner,
v.
Hy-Ko Products Company LLC
Patent Owner.

Case IPR2022-00169
Patent No. 10,421,133 B2

**DECLARATION OF DR. WYATT NEWMAN IN SUPPORT OF
PATENT OWNER'S PRELIMINARY RESPONSE
UNDER 37 C.F.R. § 42.107(a)**

I, Wyatt Newman, declare as follows:

I. INTRODUCTION

1. My name is Wyatt S. Newman. I have been retained by the firm Squire Patton Boggs (US) LLP, counsel for Patent Owner Hy-Ko Products Company LLC, to consider the above-referenced Petition for *Inter Partes* Review (“Petition”) regarding United States Patent No. 10,421,133 (“’133 patent”). I am informed that the Petition seeks review of claims 1-6, 9-16, 18, 20, 21, 23, and 24 of the ‘133 patent (“Challenged Claims”).

2. I understand that the Petition provides a description of the education and work experience of a “person of ordinary skill in the art.” Petition at 2-3. I also understand that the “time of the invention” of the ’133 patent is January 23, 2006, its priority date.

3. For the purposes of this declaration, I have been asked to adopt the Petition’s description of a person of ordinary skill in the art at or around the time of the invention and to provide information and opinions about the background of the ’133 patent in the fields of mechanical engineering and automation in the context of key duplication, the knowledge of a person of ordinary skill in the art, what would or would not be understood by and/or “obvious” to such a person, and how such a person would have understood the references cited in the Petition as well as certain terms and concepts in the ’133 patent.

4. I have personal knowledge of the facts and opinions set forth in this declaration and, if called upon to do so, I would testify competently thereto.

5. If an *inter partes* review is instituted, I reserve the right to provide further background and opinions on the state of the art, the interpretation of claim terms, the references cited in the Petition, the anticipation and obviousness arguments presented in the Petition, the validity of the Challenged Claims in light of the references cited in the Petition, and any other issues arising in connection with the Petition and these proceedings.

II. QUALIFICATIONS AND BACKGROUND

6. My education and professional background is in robotics and automation, with crossover among mechanical design, electronics, signal processing, and software design.

7. I am currently a Professor in the Electrical, Computer, and Systems Engineering Department (“ECSE”) at Case Western Reserve University (“Case Western”) in Cleveland, Ohio where I have taught and engaged in research since 1988.

8. I hold a Ph.D. in Mechanical Engineering from the Massachusetts Institute of Technology (1988), a Master of Science in Electrical Engineering from Columbia University (1982), a Master of Science in Mechanical Engineering from

Massachusetts Institute of Technology (1980), and a Bachelor of Science in Engineering Science from Harvard College (1978).

9. I have over 40 years of experience in robotics and automation, including in academia (Case Western, University of Hong Kong, Princeton, and University of Edinburgh), federal research (Sandia National Laboratories and NASA Glenn Research Center, previously named NASA Lewis Research Center), and industrial research (N.V. Philips). I have published approximately 150 peer-reviewed technical articles, as well as a recent textbook on the Robot Operating System (ROS). I am a founder of two start-up companies in robotics and automation. I am the lead or sole named inventor on six patents (plus one currently pending patent application), and a named co-inventor on an additional six patents in the areas of mechatronics and automation.

10. I am a licensed Professional Engineer in Ohio, which involves examination in fundamentals of engineering, experience in an engineering field, and examination in a discipline-specific area. While my Ph.D. degree is in Mechanical Engineering, my research and teaching in robotics and automation crosses over disciplines. I teach in ECSE and, in 2005, I obtained the highest score in the State of Ohio on the Professional Engineering exam in Electrical Engineering.

11. I was a National Science Foundation Young Investigator, a Tau Beta Pi distinguished engineer, a senior member of IEEE, a Distinguished Visiting Fellow at the University of Edinburgh, Scotland, and a Hung Hing Ying Distinguished Visiting Professor in Science and Technology at the University of Hong Kong.

12. I am a technical advisor to ROBO Global LLC, an exchange-traded fund (ETF) specializing in robotics and artificial intelligence. I have been the team leader in two DARPA international competitions: the Urban Challenge (autonomous vehicles, 2007) and the Robotics Challenge (2015). My current research includes robot control for on-orbit servicing, assembly and manufacturing (under contract to NASA Goddard Spaceflight Center), and creation of an automated system for road painting (RoadPrintz, Inc., recently funded by the National Science Foundation).

13. At Case Western, I teach mobile robotics to both graduate and undergraduate students, and I teach graduate classes in robotics and in computational intelligence.

14. Just prior to January 2006, the priority date of the invention in question, I was engaged in heading TeamCase in the DARPA Urban Challenge, which involved development of autonomous vehicles capable of driving in the presence of human and robotic traffic. This involved extensive machine vision,

which is relevant to the patents in question, as well as working with undergraduate and graduate students in Mechanical Engineering. This predated the first distribution of the Robot Operating System, which I consider to be a significant development in the field of robotics and automation.

15. I consider myself qualified as an expert in the present context because my research and development efforts over the last 40 years has helped to advance all of the aspects of the technology related to the '133 patent and the prior art cited in the Petition, including mechanism design, automated grinding, image processing, and software design. I am also qualified to assess what a person of ordinary skill in the art in the mid-2000's would have understood, having taught engineering students for 34 years at both the undergraduate and graduate levels both in the United States and abroad (Scotland and Hong Kong).

16. I am being compensated for my work in connection with this matter at my standard hourly consulting rate. My compensation for my work in this matter is not dependent in any way on my conclusions and opinions, the contents of this declaration, the substance of any further opinions or testimony that I may provide, or the outcome of this matter or any matter involving the '133 patent.

17. My curriculum vitae, which includes a more detailed summary of my background, experience, and publications, is attached as Exhibit 2002 to Patent Owner's Preliminary Response.

III. MATERIALS CONSIDERED

18. The materials I have reviewed in forming the opinions in this declaration include the following:

- a. The Petition;
- b. The '133 patent (Ex. 1001) and its file history (Ex. 1002);
- c. U.S. Patent No. 6,064,747 (Ex. 1003, "Wills");
- d. July 2000 National Locksmith Publication (Ex. 1004, "SpeedyPik Article");
- e. U.S. Patent No. 4,899,391 (Ex. 1006, "Cimino");
- f. U.S. Patent No. 6,543,972 (Ex. 1007, "Cimino '972");
- g. U.S. Patent No. 4,666,351 (Ex. 1005, "Marchal"); and
- h. Declaration of George Heredia (Ex. 1017).

IV. RELEVANT LEGAL STANDARDS

19. I have been informed about certain legal concepts and standards that relate to the issues raised in the Petition, including anticipation and obviousness of claims, as well as the interpretation of patents according to the knowledge and understanding of a person of ordinary skill in the art. My understanding of these principles is summarized below.

20. I understand that a person is not entitled to a patent if the invention was described in a printed publication or patent in this or a foreign country

published more than one year prior to the earliest priority date of the application for the patent in the United States. I also understand that a person may not receive a patent for an invention if the invention was described in a patent application having an initial filing date before the date on which the applicant first conceived of the invention in sufficient detail to enable the applicant to implement the invention.

21. I understand that such a prior art publication or patent “anticipates” a patent claim, rendering the claim invalid, if the prior art publication or patent discloses each element of the claim, either explicitly or inherently.

22. I understand that a patent is “obvious” if the differences between the subject matter sought to be patented and the prior art are such that the subject matter, as a whole, would have been obvious, at the time of the invention was made, to a person having ordinary skill in the art.

23. I understand that a person of ordinary skill in the art provides a reference point from which the prior art and claimed invention should be viewed. This reference point prevents one from using his or her own insight or hindsight in deciding whether a claim is obvious. I understand that a person having ordinary skill in the art is a hypothetical person and the concept is used to analyze the relevant art without the benefit of hindsight. A person of ordinary skill in the art is presumed to be one who thinks along the lines of conventional wisdom in the art

and presumed to have knowledge of all references that are sufficiently related to one another and to the pertinent art, and to have knowledge of all arts reasonably pertinent to the particular problem that the claimed invention addresses.

24. I understand that factors such as the education level of those working in the field, the sophistication of the technology, the types of problems encountered in the art, prior art solutions to those problems, and the speed at which innovations are made, may help establish the level of skill in the art at the time of the invention.

25. I further understand that to determine whether an invention would have been obvious at the time it was made, the Board may consider four factors: (1) the scope and content of the prior art; (2) the differences between the prior art and the claimed invention; (3) the level of skill in the pertinent art; and (4) any secondary considerations of non-obviousness, such as commercial success of the claimed invention, long felt need, failure of others, and unexpected results or benefits.

26. I understand that one may consider whether a reason existed at the time of the invention that would have prompted a person of ordinary skill in the art in the relevant field to combine the known elements in the way the claimed invention does. The reason could come from the prior art, the background knowledge of one of ordinary skill in the art, the nature of the problem to be solved, market demand, or common sense.

27. I understand that in considering whether a claimed invention is obvious, one may but is not required to find obviousness if at the time of the claimed invention there was a reason that would have prompted a person having ordinary skill in the field of the invention to combine the known elements in a way the claimed invention does, taking into account such factors as: (1) whether the claimed invention was merely the predictable result of using prior art elements according to their known function(s); (2) whether the claimed invention provides an obvious solution to a known problem in the relevant field; (3) whether the prior art teaches or suggests the desirability of combining elements claimed in the invention; (4) whether the prior art teaches away from combining elements in the claimed invention; (5) whether it would have been obvious to try the combinations of elements, such as when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions; and (6) whether the change resulted more from design incentives or other market forces. To find it rendered the invention obvious, the prior art must provide a reasonable expectation of success. Being obvious to try is not sufficient in unpredictable technologies.

28. I understand that each claim must be evaluated separately for obviousness, and that it is improper to use hindsight. In other words, one must consider only what was known at the time of the invention.

29. I understand that, when present, objective indicia of non-obviousness must always be considered and can serve as an important check on hindsight bias. These factors may include (1) a long felt but unmet need in the prior art that was satisfied by the invention of the patent; (2) commercial success or lack of commercial success of processes covered by the patent; (3) unexpected results achieved by the invention; (4) recognition and praise of the invention by others skilled in the art; (5) taking of licenses under the patent by others; (6) skepticism, disbelief in or incredulity on the part of those skilled in the art that the patentee's approach worked; (7) rapid replacement of the prior art devices in the industry; (8) unsuccessful attempts by those skilled in the art to make the invention; (9) teaching way by those skilled in the art; and (10) deliberate copying of the invention.

30. I also understand that there must be a relationship, or nexus, between any such objective indicia and the invention. I further understand that contemporaneous and independent invention by others is a secondary consideration that may be an indication of obviousness when considered in light of all the circumstances.

31. I have been informed and understand that the obviousness analysis requires a comparison of the properly construed claim language to the prior art on a claim-by-claim basis, and must be proven by clear and convincing evidence. For an obviousness combination, it must be shown by clear and convincing evidence

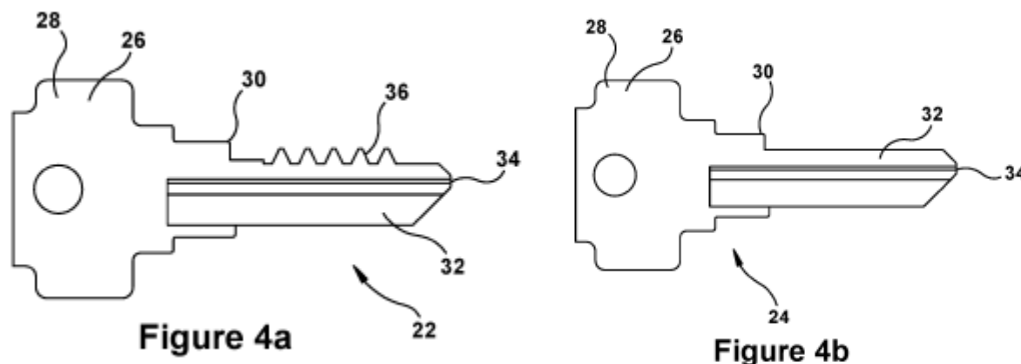
that a person of ordinary skill in the art at the time of the alleged invention would have had a reason (or reasons) for combining the teachings of those prior art references to achieve the claimed invention, and that the same person of ordinary skill in the art would have had a reasonable expectation of success from combining those teachings.

32. With these principles in mind, I provide the following opinions.

V. KEY DUPLICATION AND THE '133 PATENT

33. I have reviewed the '133 patent (Ex. 1001) and its file history (Ex. 1002). The '133 patent was issued on September 24, 2019 and claims priority to a provisional patent application filed on January 23, 2006. The '133 patent is entitled "Key Duplication Machine." The 133 patent's invention relates to "cutting duplicate keys based on a captured image of a master key." Ex. 1001 at 1:24-27.

34. Figures 4a and 4b of the '133 patent show a master key and a key blank, respectively:



Referring to Figure 4a and 4b above, in general, a master key 22 and a key blank 24 each have a key head 26 (where the key is grasped and held for use) and a key blade 32 (the portion of the key that is inserted into locks). The key shoulder 30 is where the key blade starts and is connected to the key head 26 and the key blade 32. Key blades 32 generally have a keyway groove 34 that is a “narrow, milled out area along the length of the blade 32 that allows the blade 32 to bypass the wards in a keyway.” Ex. 1001 at 5:51-54.

35. A master key 22 is a key that is to be duplicated and has a key pattern 36. Ex. 1001 at 5:60-67. A key blank 24 typically does not have a key pattern but has a keyway groove 34. A duplicate key is created by cutting a master key’s 22 key pattern 36 into a proper key blank 24 that has a matching keyway groove: “[W]hen duplicating a master key 22, a key blank 24 must include a keyway groove 34 that is either identical to or similar to the master key 22.” Ex. 1001 at 5:56-58.

36. The goal of key duplication is to reproduce the key pattern of a master key onto a key blank. Ex. 1001 at 1:31-32. Historically, this goal was accomplished by using a stylus that was attached to a cutting wheel. A master key and a key blank were clamped in place so that the stylus was positioned to trace the key pattern on the edge of the master key’s blade, and the cutting wheel was in contact with the edge of the key blank’s blade. As the operator maneuvered the

stylus to trace the master key's key pattern along its blade, the cutting wheel that was attached to the stylus and in contact with the key blank would translate that key pattern and reproduce it onto the edge of the key blank's blade. The end product would be a duplicate key with a key pattern that matched the key pattern of the master key. Ex. 1001 at 1:33-48.

37. The '133 patent is one of a family of patents that discloses a "key duplication machine." Ex. 1001 at Title. The '133 patent teaches a machine with "an optical imaging device, a logic, a clamping assembly, and a cutting member." Ex. 1001 at Abstract. Figures 1 and 2 of the '133 patent show a perspective view and a front view of an exemplary embodiment of the invention:

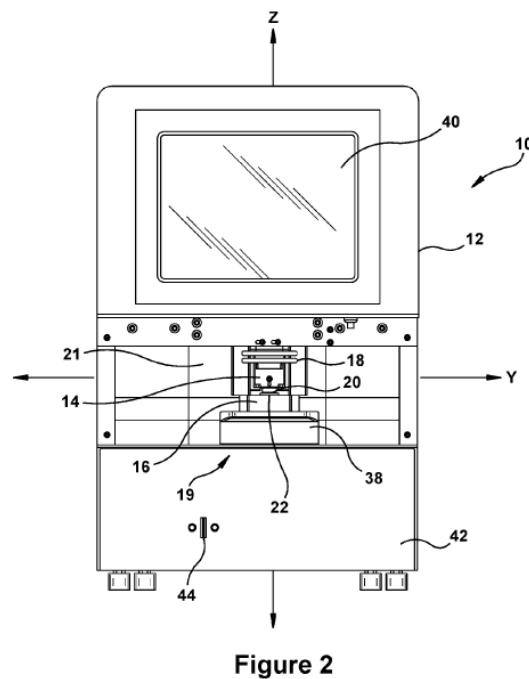
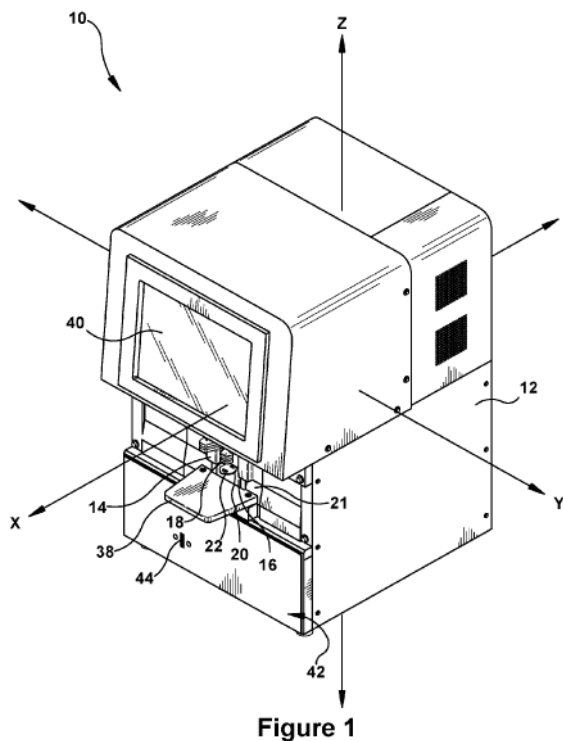
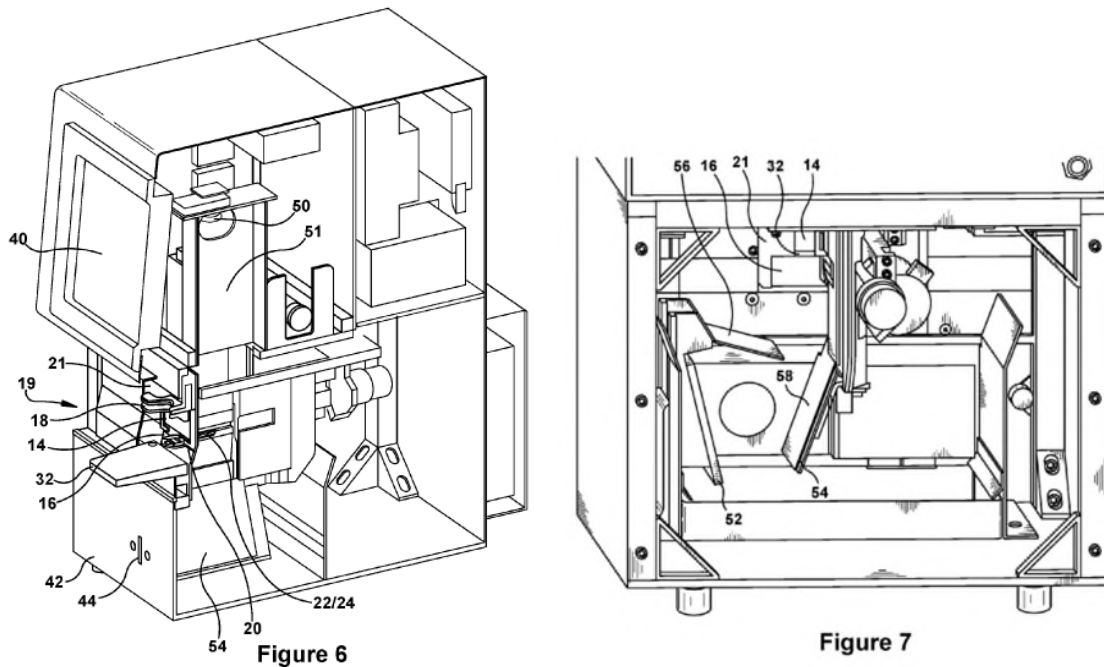


Figure 6 and 7 of the '133 patent show the interior of the same embodiment, including “a lighting panel 52” (Ex. 1001 at 8:17-19) that enables an optical imaging device 50 to capture an image of the key’s silhouette:



At a high level, the '133 patent and its related patents disclose a key duplication machine that receives a portion of a master key through a slot in its housing, retains the master key in a retention mechanism, uses an optical imaging device to capture a silhouette image of the master key’s blade, and identifies the proper key blank based upon the silhouette image. Notably, the key duplication machine described in the '133 patent does not need to include the key head in the silhouette image and does not need to use key head information to identify the proper key blank (see section V.B below). The key duplication machine also captures a second image showing the surface features of the key, including the master key’s

bitting pattern, and then cuts the key blank into a duplicate key. Ex. 1001 at 2:51-3:3, and 4:15-34.

38. Up to this point, the key duplication processes have been performed in the imaging zone of the '133 patent's key duplication machine. To begin the process of cutting a duplicate key, the operator retrieves the proper key blank and inserts it into the key duplicating machine. Ex. 1001 at 10:26-29. The key blank is then moved into the cutting zone. Ex. 1001 at 12:30-31. To resist the forces of the cutting wheels, a clamp is applied to the middle of the key blade (where no cuts are made) to secure the key blank in place. Ex. 1001 at 10:26-29, 10:52-56. The key blank is cut to match the master key's key pattern captured earlier when the master key was in the imaging zone. Ex. 1001 at 9:1-20, 10:29-34, 13:3-8.

39. The '133 patent thus discloses both a key blank identification system as well as a key cutting system. Either one, or both, can be used: "[T]he key duplication machine 10 described herein incorporates a key blank identification system and a key cutting system into a single apparatus. However, it should be understood that either system could be used individually or used together." Ex. 1001 at 5:32-36.

A. The Challenged Claims

40. The '133 patent specifically claims a system for an integrated key duplication machine that has a key blank identification system and a key cutting

system. Independent claims 1, 11, and 24 are exemplary. As explained above, either system can be used, or both can be used. The key blank identification system identifies the proper key blank to use when duplicating the master key. The key cutting systems cuts the identified key blank to match the bitting pattern of the master key. The two systems operate individually, but can interact with each other and share information. Ex. 1001 at 17:46-50, 18:31-34, and 19:20-24.

41. In each of independent claims 1, 11, and 24, the claim language recites that a portion of the master key or key blank is positioned outside the housing. Claim 1 recites that “a portion of said key is positioned outside said housing when a blade of said key is positioned within an imaging zone of said housing.” Ex. 1001 at 17:37-19. Claim 11 recites that “a portion of a key blank is positioned outside said housing when a blade of said key blank is to be cut by the cutting system.” Ex. 1001 at 18:27-30. Claim 24 recites that “a portion of said key is positioned outside said housing when said blade is retained by said retention mechanism panel [in the key cutting system].” Ex. 1001 at 18:17-19.

42. The challenged dependent claims recite additional features. Claims 2-4 and 12-14 recite optical imaging devices, a database, and logic for comparing features of the master key with reference data related to key blanks or the physical dimensions of key blanks. Claims 5, 6, 15, and 16 recite logic for determining and selecting the proper key blank. Claims 9 and 20 recite using the master key's

captured image to provide key pattern information for cutting. Claims 10 and 21 recite integrating the identification system and the cutting system into a single machine. Claim 18 recites a cutting system that has a retention mechanism and a cutting member. Claim 23 recites that the cutting system's retention mechanism can move vertically.

B. Key Head

43. The processes described in the '133 patent for identifying a proper key blank all require information about the key blade, not the key head. For example, the '133 patent teaches "captur[ing] the image of the blade 32 of a master key 22, including the key pattern 36" which runs along the edge of the blade 32. Ex. 1001 at 9:1-20. This image is then used to "select[] a key blank 24" and also to "compar[e] the key pattern cut into the key blank 24 and the key pattern 36 of the master key 22" (to confirm the accuracy of the cut). Ex. 1001 at 9:1-20.

44. The '133 patent relies on features that are on the key blade when analyzing the backlit silhouette image:

The *captured image of the blade 32 of the master key 22* may also be used to specifically determine the proper key blank 24 to use when duplicating the master key 22. The captured image may be analyzed using logic to quantify and specifically define *features of the master key blade 32* such as, for example, the *size and shape of the shoulder 30*, the *length and width of the blade*

32, whether the master key 22 is *single-sided or double-sided*,
whether the blade 32 includes any steps or grooves, and the like.

Ex. 1001 at 9:1-29.

45. When analyzing the additional image to identify a proper key blank,
the '133 patent continues to rely on features that are on the key blade:

Optionally, additional imaging of the master key 22 may be performed to determine or quantify surface features of the master key 22 such as, for example, *the keyway groove 34*. Such surface features may assist in narrowing or choosing the proper key blank 24. Such imaging may be performed by providing a ring of structured light *about the key blade 32* and an optical imaging device to *record a tip view or cross-sectional view of the key 24*, performing a *laser scan across the key blade 32* to identify the *width and spacing of a keyway groove 34*, or *projecting a shadow across the surface of the blade 32* to measure the variations in shadow contour related to surface area contour.

With regard to a *laser scan of the key blade 32*, ... *[i]nformation on the groove 34* may likewise be analyzed and compared by the logic to groove information stored in the database related to known key blanks 24. Therefore, based upon the master key 24 silhouette and, optionally, *the key groove 34 features*, the logic may identify a single key blank 24 for use in duplicating the master key 24.

Ex. 1001 at 9:40-64.

46. Thus, the '133 patent teaches only using key blade features, and not key head features, to identify the proper key blank. *See, generally*, Ex. 1001.

C. “Retention Mechanism”

47. A person of ordinary skill in the art would have understood “mechanism” to mean something more than a static structure. “Mechanism” denotes coordinated movement of multiple parts, like a machine. For example, in one embodiment, “[t]he combination of the door clamp 14, base 16, handle 18, and biasing member forms a retention mechanism” and the “door clamp 14 may be raised against the biasing force by a handle 18” for the purpose of “retaining or securing a master key 22 or key blank 24.” Ex. 1001 at 6:5-15. A person of ordinary skill in the art would recognize this combination of components that move in a coordinated fashion as a type of mechanism.

VI. THE PRIOR ART AND SPECIFIC RESPONSES TO THE PETITION

48. I have reviewed U.S. Patent No. 6,064,747 (Ex. 1003, “Wills”), the July 2000 National Locksmith Publication describing the Speedypik system (Ex. 1004, “SpeedyPik Article”), U.S. Patent No. 4,899,391 (Ex. 1006, “Cimino”), U.S. Patent No. 6,543,972 (“Cimino ’972”), and U.S. Patent No. 4,666,351 (“Marchal”).

A. U.S. Patent No. 6,064,747 (Wills)

49. Wills teaches a key duplication system that captures a backlit silhouette image of the entire master key. Ex. 1003 at 7:8-11. At a high level, Wills discloses a system that includes a housing 20 with a drawer 30, an array of LED lights 23, and a camera 28:

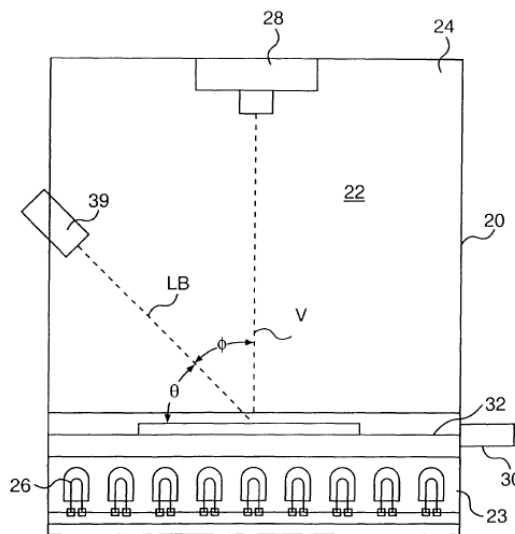


FIG. 6

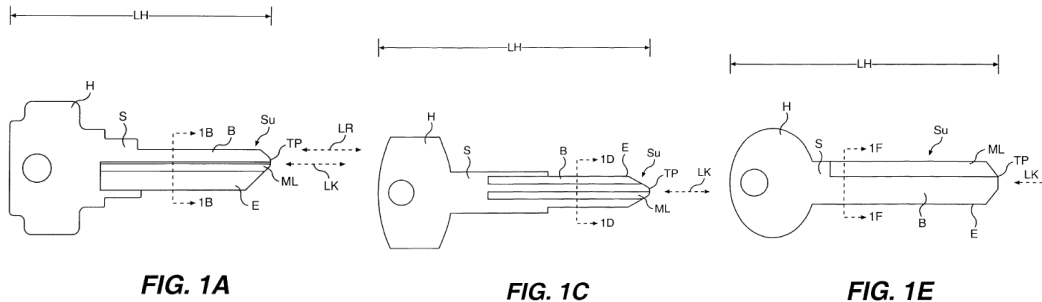
Ex. 1003 at Figure 6. The operator pulls open and places a master key into the drawer 30, and then pushes the drawer closed. In this manner, the master key is simultaneously received by the system and positioned in the imaging zone within the housing—once the drawer closes, Wills does not teach any movement of the key. Ex. 7:52-59. Because there are no mechanisms or structures to hold the master key on edge, it lays inside the housing flat side down.

50. Wills also describes alternatives, including a drawer with a template and a housing with a “clear shelf” or “clear protrusions.” Ex. 1003 at 7:11-29 and Figure 7C. The operator places the master key directly onto the clear shelf or protrusion, thus simultaneously inserting the master key and positioning it in the imaging zone.

51. Regardless of whether drawer, shelf, or protrusions have a template cut out, Wills instructs that precise alignment is not necessary and that “the primary consideration...is ensuring that the master key is positioned away from the edge of the drawer 30 with the tip facing forward” because “one issue is ensuring that the edge of the drawer does not interfere with the backlit image of the master key.” Ex. 1003 at 7:29-37. Thus, a person of ordinary skill in the art would have understood that Wills required that the entire key be placed inside the housing during imaging.

52. Wills’ elimination procedures and the database employed by those procedures provide additional clarity on the location of the master key during imaging. After the backlit silhouette image of the master key is generated, it is digitized, analyzed, and compared against a “database of reference keys.” Ex. 1003 at 6:19-22. The database “includes data about the *length* of each of the reference keys and the *head* of each of the reference keys.” Ex. 1003 at 9:42-44

(emphasis added). As shown in Figures 1A, 1C, and 1E of Wills, key length includes key head:



53. Not only does the database of reference keys require that the master key's key head be imaged, the process by which Wills eliminates improper key blanks also would have indicated to a person of ordinary skill in the art that the key head must be imaged. Figure 23 of Wills shows a computer subsystem for key identification that includes a length elimination means 2380 and head shape elimination means 2390, both of which (like the database of reference keys) require comparison to the master key's key head:

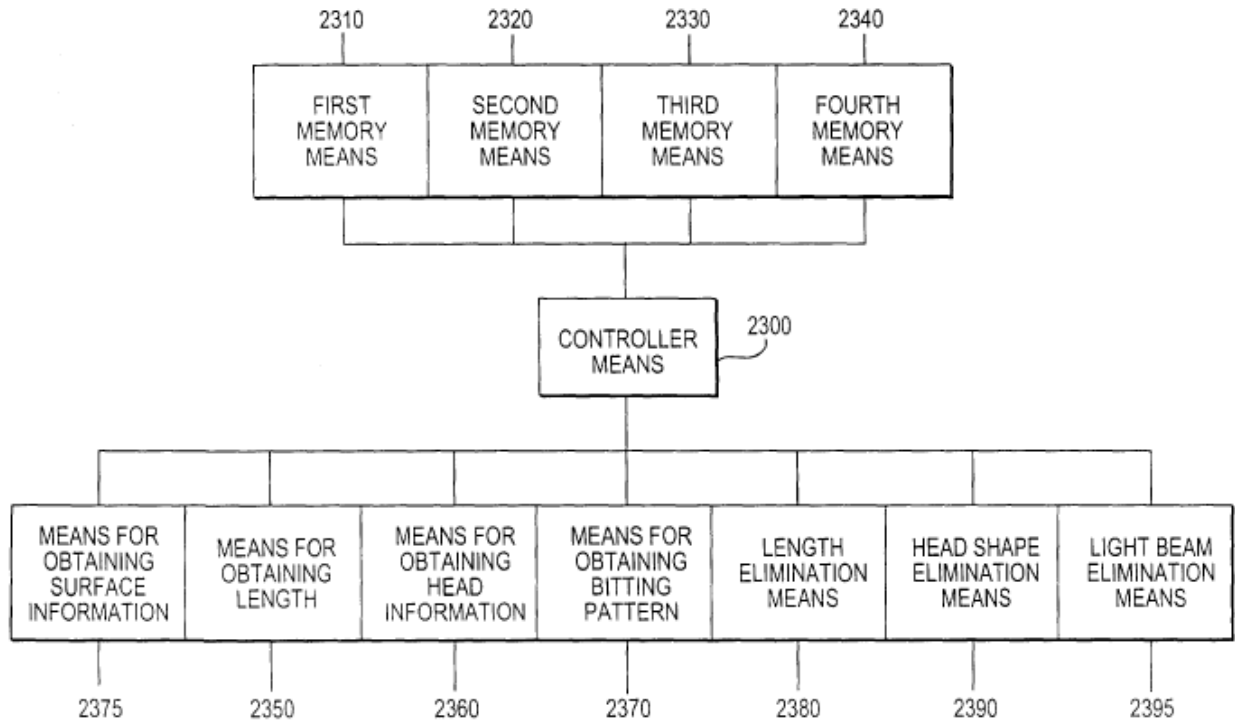


FIG. 23

There is a third elimination means using light beams (“light beam elimination means 2395”). However, it is used after elimination by key length and head shape is complete, and “[only i]f an additional elimination step is necessary”:

After performing the elimination process for the length and the head shape, the subset of keys may have been reduced to a single key, decreased to multiple keys, or, alternatively, eliminated all keys. [But], for some types of keys, *an additional elimination step is required to narrow the subset of keys further* to a single reference key that matches the master key.

Surface Information Analysis

If an additional elimination step is necessary, it involves analyzing the surface information of the master key, specifically

the milling in the preferred embodiment, and *disqualifying the remaining keys* that have a different surface. Since the surface information is not discernable by backlighting, the milling is preferably detected using a light beam in the preferred embodiment.

Ex. 1003 at 11:22-43 (emphasis added).

54. I have considered claim 60 of Wills. When reading Wills in its entirety, a person of ordinary skill in the art would not have understood that claim 60 can exclude the key head from analysis. As explained above in paragraphs 52 and 53, the two analyses that Wills requires in the elimination of improper key blanks observes the key length and head shape, both of which requires the entire key head to be imaged. Additionally, claim 60's recitation is met by embodiments described in Wills: "The drawer 30 has a bottom 32 against which one side of the master key is disposed and *at least a portion of the bottom 32 of the drawer 30 is adapted to allow light to pass therethrough*. ... Other embodiments of the supporting means are contemplated, such as ... designs that *allow at least the relevant portion of the profile of the master key to be outlined*." A person of ordinary skill in the art, considering the entirety of Wills' disclosure, would understand claim 60 to refer to a drawer or other support structure that is clear on one end and opaque on the other and the master key would be placed such that the key head is on the clear end. In this manner, backlighting the key would "form an

image of at least a portion of the profile of the key,” as recited by claim 60, and also allow the key length and head shape elimination processes to identify the proper key blank.

55. Thus, a person of ordinary skill in the art would have understood that the backlit silhouette image captured by the camera in Wills must include the key head, and that Wills teaches away from positioning head of the master key outside the housing.

B. July 2000 National Locksmith Article (Speedypik Article)

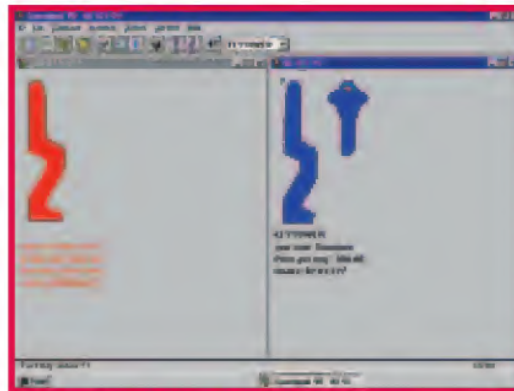
56. The Speedypik Article describes the Speedypik system. For purposes of this declaration only, I have been instructed to assume that U.S. Patent Nos. 3,899,391 and 6,543,972 (“Cimino” and “Cimino ’972,” respectively) describe the Speedypik system. Exs. 1004, 1006, 1007, and 1017 at ¶ 55. If the Board institutes *inter partes* review of the 133 patent, I reserve the right to evaluate whether Cimino and/or Cimino 972 does describe the Speedypik system.

57. The Speedypik Article describes a “computerized keyway identifier” for proposing potential key blanks for master key duplication. Ex. 1004 at 32-34. The operator is provided with a Speedypik unit (pictured below) and software to be installed on the operator’s computer:



7. Front of the Speedypik unit.

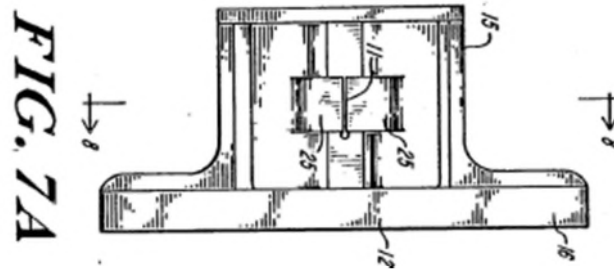
Ex. 1004 at Photograph 7. The operator inserts a master key into the Speedypik unit (Ex. 1004 at Photograph 9) and the Speedypik software generates a scan outline of the cross-section of the key blade (red) and proposes a key blank (blue) for cutting a duplicate key:



D. Scan of the key inserted.

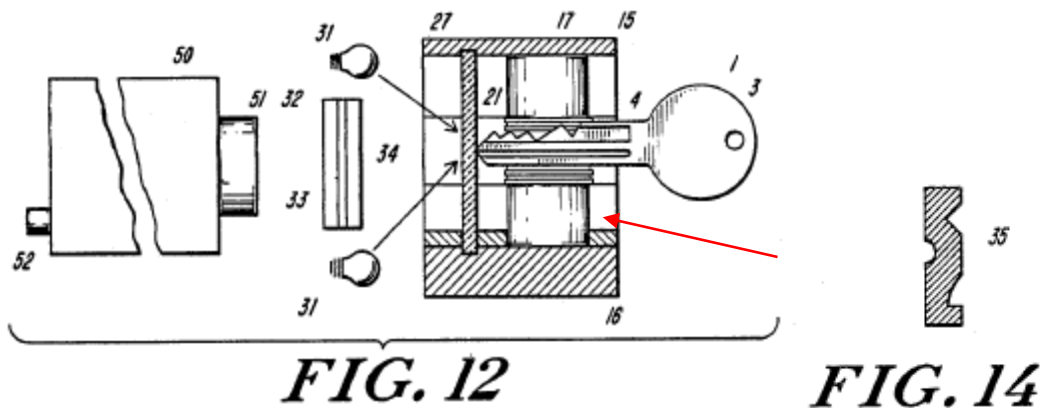
Ex. 1004 at Figure D. The red keyway outline that the Speedypik unit scanned does not include the key head.

58. Cimino provides more information regarding how the Speedypik captures, generates, and processes the master key's information. Figure 7A of Cimino depicts the Speedypik's key holder 10:



The key holder 10 includes a vertical aperture 11 where the master key is inserted.

Ex. 1006 at 3:21-34. The master key's 1 key blade is inserted into the key holder 10 until the blade's tip touches a viewing glass 13 (Ex. 1006 at 4:16-23):



Ex. 1006 at Figure 12. The viewing glass 13 is shown but not labeled with a number. However, I have added a red arrow to the image above to indicate the viewing glass component. A person of ordinary skill in the art would have understood that this viewing glass also prevents the master key 1 from being inserted any farther into the Speedypik unit, leaving the key head outside of the unit as shown. Light from light bulbs 31 is directed at the tip of the master key's blade, and input lens 51 of the video subsystem 50 captures head-on the front 2 of the master key 1 (see Figure 14 of Cimino, above). Ex. 1006 at 4:59-61 and Figure

14. The Speedypik unit converts the image into an electrical signal, and then generates and displays “an end-on cross-section image 35 of the front 2 of the key 1.” Ex. 1006 at 3:1-12 and 4:18-20.

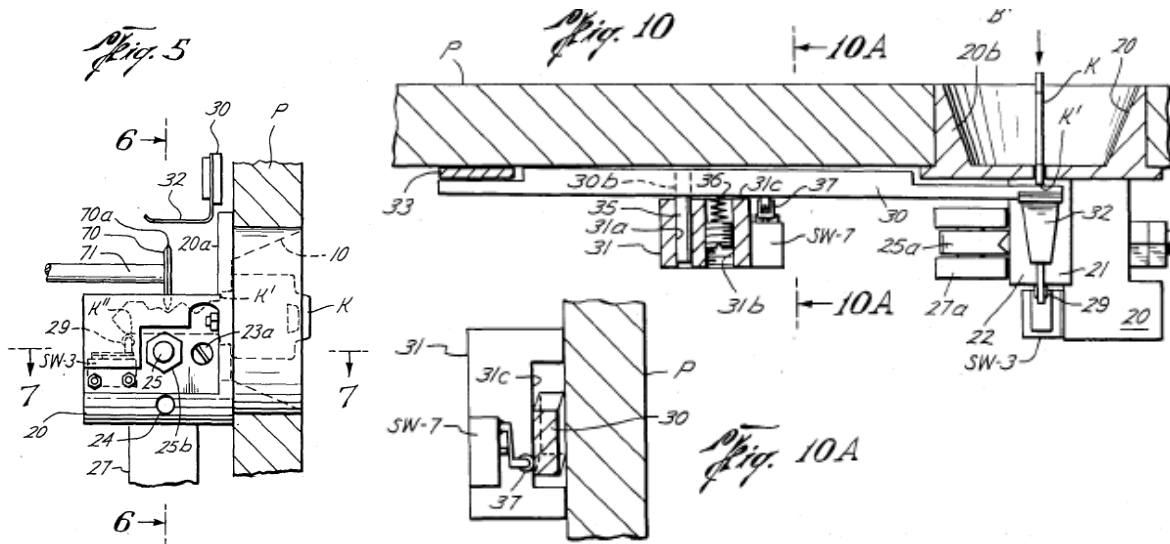
59. A person of ordinary art would have understood that the master key’s key head would not be involved in the keyway imaging process (since the key head has no keyway grooves). Rather, the SpeedyPik approach depends on precision interpretation of the keyway grooves, as viewed axially along the blade. Thus the key head is not imaged. In fact, a view of the head would be detrimental to the SpeedyPik method, as the head would occlude the view of the keyway grooves from an axial viewpoint. As such, the Speedypik method is diametrically opposed to the Wills method, since the Wills method depends on viewing the head of the key.

60. Thus, a person of ordinary skill in the art would have understood that the master key’s key head would be located outside the Speedypik unit.

C. U.S. Patent No. 4,666,351 (Marchal)

61. Marchal discloses a machine that “automatically” duplicates a key. Ex. 1005 at Title. It claims priority to a patent application filed on October 13, 1983 and teaches the using a stylus-type tracing described above. (See paragraph 36 above.)

62. Marchal discloses a key duplication machine that uses direct key-to-blank tracing. As shown in Figures 5 and 10, a customer inserts a master key for duplication into a beveled opening 10, blade first into a mounting plate P:



An outline of the master key K can be seen in Figure 5. The portion of the master key between its tip and its shoulder K' is located inside the machine, as demarcated by the mounting plate P. Referring to Figure 10, Marchal teaches that “[t]he engagement of switches SW-3 and SW-7 as described above activates the solenoid S-1 for clamping the master key K when the edge K'' and the shoulder K' of the master key K are positioned properly within the clamping mechanism.” Ex. 1005 at 5:6-10. Thus, the key head stays outside the Marchal key duplication system.

63. Once the master key is inserted, Marchal discloses a key follower 70 that the system runs along (or “traces”) the master key’s K biting pattern on its

blade edge. This immediately transmits the biting pattern to the key cutter 68, which cuts the biting pattern into the key blank B. Ex. 1005 at 6:13-32.

64. I have reviewed Marchal in its entirety. Its technology is limited to tracer systems. Its teachings would not have suggested to a person of ordinary skill in the art that it could be adapted for an optical identification system or any key identification system that utilizes imaging.

D. Combination of Wills and the Speedypik Article

65. A person of ordinary skill in the art would not have had a rationale for combining the Speedypik Article with Wills.

66. As explained in section VI.A above, Wills requires the key head. Wills captures a backlit silhouette image depicting the outline of the master key as it lays flat side down. Additionally, a person of ordinary skill in the art would understand that the entire master key is enclosed in the housing and its image captured in its entirety. Wills' procedures for eliminating improper key blanks requires that the captured backlit silhouette image include the entire key, including the entire key head.

67. On the other hand, as explained in section VI.B above, Speedypik rejects the key head. The Speedypik unit captures only the keyway profile image of the master key as the master key, and the master key's key head remains outside the unit. Furthermore, the Speedypik key blank identification process ignores all

information describing the master key's key head, which it must necessarily do because it relies on the keyway profile (which is not a feature of the key head and which would be occluded if the key head were visible to the camera when the Speedypik unit imaged the blade tip head on).

68. A person of ordinary skill in the art would have understood that Wills and Speedypik approached a common or similar problem but taught diametrically opposed solutions. Combining Speedypik's key holder (as described in Cimino) or the pivot handle (as described in the Speedypik Article) with Wills' housing would occlude the key head, on which Wills depends, making the combination inoperable. Additionally, replacing the internal support structures of Wills (whether they be a transparent drawer, shelves, or protrusions) with the Speedypik key holder or pivot handle would place opaque objects where transparent objects ought to be and interfere with the backlighting that is necessary to produce a quality silhouette image. And, the data points relied upon by Wills (key profile silhouette, blade surface features, and head characteristics (key length and head shape)) to identify key blanks have no overlap with the one feature relied upon by Speedypik—the keyway profile. Further, the methods of image capture are incompatible. Wills places the master key between the light source and the camera in order to back-light the master key. Speedypik places the light source in front of

the master key in order front-light the master key. A person of ordinary skill in the art would not have any rationale to combine Wills and Speedypik.

VII. CONCLUSION

69. At this preliminary stage, I have been asked to provide only this limited set of opinions. I reserve the right to supplement this declaration or provide additional declarations including further analysis and opinion regarding Petitioner's arguments, the Heredia Declaration, the references cited in the Petition, additional claim construction issues, decisions by the Board or Patent Office, or any other issues that may arise in this matter.

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

Executed this 16 day of February, 2022 at Cleveland, OH.

By: /Wyatt Newman/

Dr. Wyatt Newman