

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KOKI HOLDINGS AMERICA LTD.

Petitioner

v.

KYOCERA SENCO INDUSTRIAL TOOLS, INC.

Patent Owner.

PETITION FOR INTER PARTES REVIEW
U.S. PATENT NO. 11,034,007

Case No. IPR2025-00261

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U.S. Patent and Trademark Office
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1002	Prosecution History of the ’007 patent
1003	Declaration of Dr. Glenn E. Vallee
1004	U.S. Patent No. 3,150,488 (“Haley”)
1005	U.S. Patent No. 5,503,319 (“Lai”)
1006	U.S. Patent No. 3,924,692 (“Saari”)
1007	U.S. Patent No. 3,913,685 (“Enstrom”)
1008	U.S. Patent No. 5,720,423 (“Kondo”)
1009	U.S. Patent Publication No. 2006/0180631 (“Pedicini”)
1010	U.S. Patent No. 4,834,278 (“Lin”)
1011	U.S. Publication No. 2006/0261127 (“Wolf”)
1012	U.S. Patent No. 3,636,707 (“Saari ’707”)
1013	U.S. Patent No. 4,953,774 (“Lai ’774”)
1014	U.S. Patent No. 860,536 (“Ellingham”)

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1.P]	1. A gas pressure system for a portable power tool, said gas pressure system comprising:
[1.1]	a hollow cylinder having a movable piston therewithin; and
[1.2]	a storage chamber that is in fluidic communication at all times with said cylinder, said storage chamber being charged with a pressurized gas;
[1.3]	wherein: said movable piston moves in a reciprocating pattern during an operating cycle, including moving through a drive stroke that is caused by said pressurized gas;
[1.4]	said pressurized gas is not vented to atmosphere after said drive stroke, but instead said pressurized gas is re-used for a plurality of said operating cycles; and
[1.5]	said movable piston is the sole movable piston in the gas pressure system.
Claim 2	
[2.1]	2. The gas pressure system of claim 1, further comprising: (a) a movable driver that is in communication with said piston, said movable driver including at least one protrusion; and
[2.2]	(b) a lifter that causes said driver and said piston to move through a return stroke, by a mechanical engagement between said lifter and said at least one protrusion of the driver.
Claim 3	
[3.1]	3. The gas pressure system of claim 2, further comprising: a guide body with a linear passageway for said driver;
[3.2]	wherein: said lifter moves in a rotational motion and causes said driver to move in a linear motion.
Claim 4	
[4.1]	4. The gas pressure system of claim 2, wherein: said cylinder and piston act as a gas spring during said drive stroke, and

[4.2]	said lifter does not engage said driver during said drive stroke.
Claim 5	
[5]	5. The gas pressure system of claim 2, further comprising: a motor and an on-board electrical power source, wherein said motor provides motive power for said lifter.
Claim 6	
[6]	6. The gas pressure system of claim 5, wherein: (a) said on-board electrical power source comprises a detachable battery; and (b) said motor comprises an electric motor.
Claim 7	
[7]	7. The gas pressure system of claim 1, wherein: said movable piston moves through a pathway through said hollow cylinder between a higher pressure position and a lower pressure position.
Claim 8	
[8]	8. The gas pressure system of claim 1, wherein: said pressurized gas in the storage chamber remains above atmospheric pressure during all portions of an operating cycle.
Claim 9	
[9.P]	9. A portable fastener driving tool, comprising:
[9.1]	a housing with a storage chamber that contains a pressurized gas, a hollow cylinder that includes a movable piston, a driver that is in communication with said piston at least during a drive stroke, a lifter that is in communication with said driver at least during a return stroke, a prime mover, and a source of energy;
[9.2]	wherein: said pressurized gas is used as a gas spring to propel said piston during said drive stroke;
[9.3]	said prime mover causes said lifter to mechanically engage said driver during said return stroke;
[9.4]	said housing has no external energy source cable and no external hose attached thereto; and

[9.5]	said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber.
Claim 10	
[10]	10. The portable fastener driving tool of claim 9, wherein: said storage chamber and said hollow cylinder are always in fluidic communication.
Claim 11	
[11]	11. The portable fastener driving tool of claim 10, wherein: said pressurized gas is re-used for a plurality of operational cycles that each include said drive stroke and said return stroke.
Claim 12	
[12]	12. The portable fastener driving tool of claim 9, wherein: said piston has a rest position between operational cycles; and said rest position is achieved after said return stroke.
Claim 13	
[13]	13. The portable fastener driving tool of claim 9, wherein: said prime mover comprises an electric motor; and said source of energy comprises a detachable battery.
Claim 14	
[14.P]	14. A portable fastener driving tool, comprising:
[14.1]	a housing with a storage chamber that contains a pressurized gas, a hollow cylinder that includes a movable piston, a driver that is in communication with said piston at least during a drive stroke, a lifter that is in communication with said driver at least during a return stroke, a prime mover, and a source of energy;
[14.2]	wherein: said pressurized gas is used as a gas spring to propel said piston during said drive stroke;
[14.3]	said prime mover causes said lifter to mechanically engage said driver during said return stroke;
[14.4]	said housing has no external energy source cable and no external hose attached thereto;

[14.5]	said piston travels through said hollow cylinder between a higher pressure position and a lower pressure position;
[14.6]	said piston has a rest position between operational cycles; and a location of said rest position is proximal to said higher pressure position.
Claim 15	
[15]	15. The portable fastener driving tool of claim 14, wherein: said storage chamber and said hollow cylinder are always in fluidic communication.
Claim 16	
[16]	16. The portable fastener driving tool of claim 14, wherein: said pressurized gas is re-used for a plurality of operational cycles that each include said drive stroke and said return stroke.
Claim 17	
[17.P]	17. A gas pressure system for a portable power tool, said gas pressure system comprising:
[17.1]	a hollow cylinder having a movable piston therewithin; and
[17.2]	a storage chamber that is in fluidic communication at all times with said cylinder, said storage chamber being charged with a pressurized gas;
[17.3]	wherein: said movable piston moves in a reciprocating pattern during an operating cycle, including moving through a drive stroke that is caused by said pressurized gas;
[17.4]	said pressurized gas is not vented to atmosphere after said drive stroke, but instead said pressurized gas is re-used for a plurality of said operating cycles; and
[17.5]	said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber of the gas pressure system.
Claim 18	
[18.1]	18. The gas pressure system of claim 17, further comprising: (a) a movable driver that is in communication with said piston, said movable driver including at least one protrusion; and

[18.2]	(b) a lifter that causes said driver and said piston to move through a return stroke, by a mechanical engagement between said lifter and said at least one protrusion of the driver.
Claim 19	
[19]	19. The gas pressure system of claim 18, further comprising: a motor and an on-board electrical power source, wherein said motor provides motive power for said lifter.
Claim 20	
[20]	20. The gas pressure system of claim 17, wherein: said pressurized gas in the storage chamber remains above atmospheric pressure during all portions of an operating cycle.

I. INTRODUCTION

Koki Holdings America Ltd. (“Petitioner”) petitions for Inter Partes Review (“IPR”) of claims 1–20 of U.S. Patent No. 11,034,007 (“the ’007 patent”). The ’007 patent describes “portable tools that drive staples, nails, or other linearly driven fasteners” and, more specifically, “a gas spring linear fastener driving tool, in which a cylinder filled with compressed gas is used to quickly force a piston through a driving stroke movement, while also driving a fastener into a workpiece.” Ex. 1001, 1:35–41.

The gas spring tool claimed in the ’007 patent is not the result of any innovation on the part of the named inventors, but instead amounts to a grab-bag of conventional, off-the-shelf designs that was made possible by recent advancements in the unrelated field of lightweight rechargeable lithium-ion batteries.

The idea of gas spring nailers date back to the 1960’s and 1970’s (as shown by the Haley and Saari patents) and the structure of the claimed “lifter member” was developed in the mid-1990’s (as shown by the Lai and Kondo patents). Grounds 1–2 are based on prior art combinations that were never substantively considered by the USPTO. Grounds 3–4 show how the claims are also unpatentable based on the prior art that was considered during original examination.

II. MANDATORY NOTICES

A. Real Parties-In-Interest

Koki Holdings America Ltd. and Koki Holdings Co., Ltd. are the real parties-in-interest.

B. Related Matters

The challenged patent has not been previously asserted. Related patents from the same patent family have been involved in litigation. On January 5, 2017, the Patent Owner filed a complaint in *Senco Brands, Inc. v. Hitachi Koki USA Ltd.*, S.D.OH. No. 1:17-cv-00061, asserting infringement of U.S. Patent Nos. 8,011,547, 8,267,296, 8,267,297, 8,286,722, 8,387,718, and 8,602,282 against Petitioner. That case was refiled on May 23, 2017 as D.DE. No. 1:17-cv-00598. On September 25, 2017, the Patent Owner requested a Section 337 investigation at the International Trade Commission (ITC) alleging the same patents, which was instituted as *Certain Gas Spring Nailers and Components Thereof*, ITC Inv. No. 337-TA-1082. The district court case was stayed pending resolution of the ITC investigation. The ITC investigation led to cross-appeals: *Kyocera Senco Indus. Tools Inc. v. ITC*, C.A.F.C. No. 20-1046 and *Koki Holdings America Ltd. v. ITC*, C.A.F.C. No. 20-2050. The Federal Circuit affirmed the ITC's finding of no violation on January 21, 2022 for four of the patents and reversed the ITC's finding of a violation for the fifth patent (one patent was withdrawn). On remand, the ITC terminated the investigation at the patent owner's request.

The '007 patent is in the same patent family as U.S. Patent Nos. 10,478,954, 11,241,776, and 11,845,167 for which Petitioner is concurrently petitioning for IPR.

C. Counsel

Petitioner provides the following designation of counsel:

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D. Service Information

Please address all correspondence to the lead counsel's address above. Petitioner also consents to electronic service by email at Koki_IPR@mwe.com.

III. FEES

Petitioner authorizes the Office to charge Deposit Account No. 50-0417 for the petition fee set in 37 C.F.R. §42.15(a) and for any other required fees.

IV. REQUIREMENTS FOR IPR

A. Grounds for Standing

Petitioner certifies that the '007 patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR.

B. Challenge and Relief Requested

Petitioner requests IPR of claims 1–20 of the '007 patent on the grounds listed below. This Petition is supported by the declaration of Dr. Glenn E. Vallee (Ex. 1003, “Vallee”).

Ground	Claims	Basis for Rejection
1	1, 7–8, 17, 20	Anticipated by U.S. Patent No. 3,150,488 (“Haley”)
	2–6, 9–16, 18–19	Obvious based on Haley in view of U.S. Patent No. 5,503,319 (“Lai”)
2	1–20	Obvious based on U.S. Patent Nos. 3,924,692 (“Saari”) and 3,913,685 (“Enstrom”) in view of U.S. Patent No. 5,503,319 (“Lai”)
3	1–20	Obvious based on U.S. Patent No. 5,720,423 (“Kondo”)
4	1–20	Obvious based on U.S. Patent Publication No. 2006/0180631 (“Pedicini”)

Haley issued in 1964. Saari and Enstrom issued in 1975. Lai issued in 1996. Kondo issued in 1998. Pedicini was published on August 17, 2006. All qualify as prior art because they were patented or published over a year before the earliest possible priority date. Kondo and Pedicini are discussed in the specification of the '007 patent and identified as “Related Art.”

V. SUMMARY OF THE '007 PATENT

A. Brief Description

The '007 patent is directed to “a gas spring linear fastener driving tool, in which a cylinder filled with compressed gas is used to quickly force a piston through

a driving stroke movement, while also driving a fastener into a workpiece.” ’007 patent, 1:37–41. In an embodiment illustrated below, a driver member 490 (orange) is attached to a piston 458 (green) and lifted by a lifter member 400 (bright yellow) against compressed gas in a hollow cylinder 492 (light yellow) and a storage chamber 454 (blue). ’007 patent, Figs. 20–21, 21:57–22:23. The driver member is then released and the compressed gas pushes no the piston and driver member to drive a nail (red) into a workpiece. *Id.*

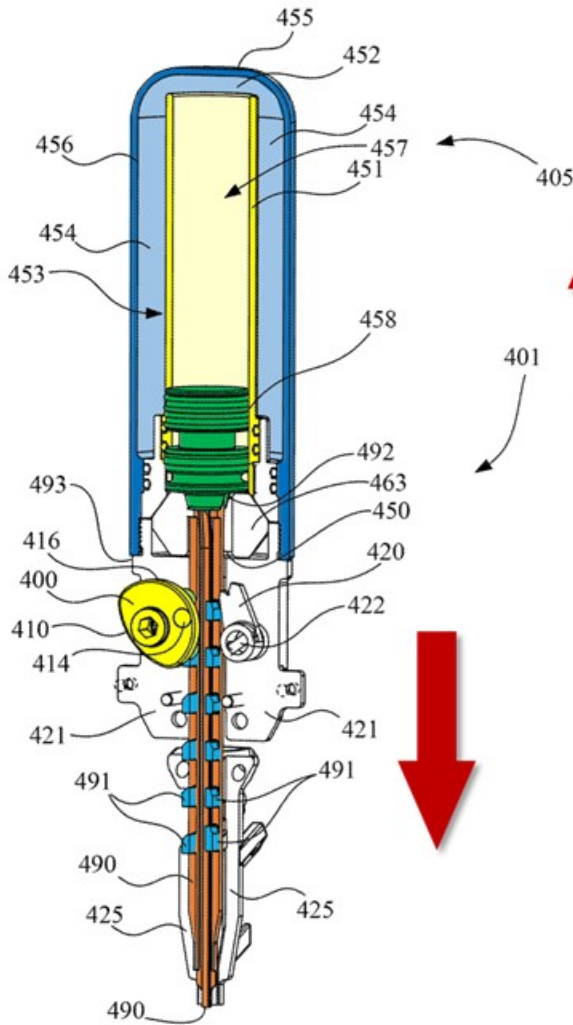


Fig. 20

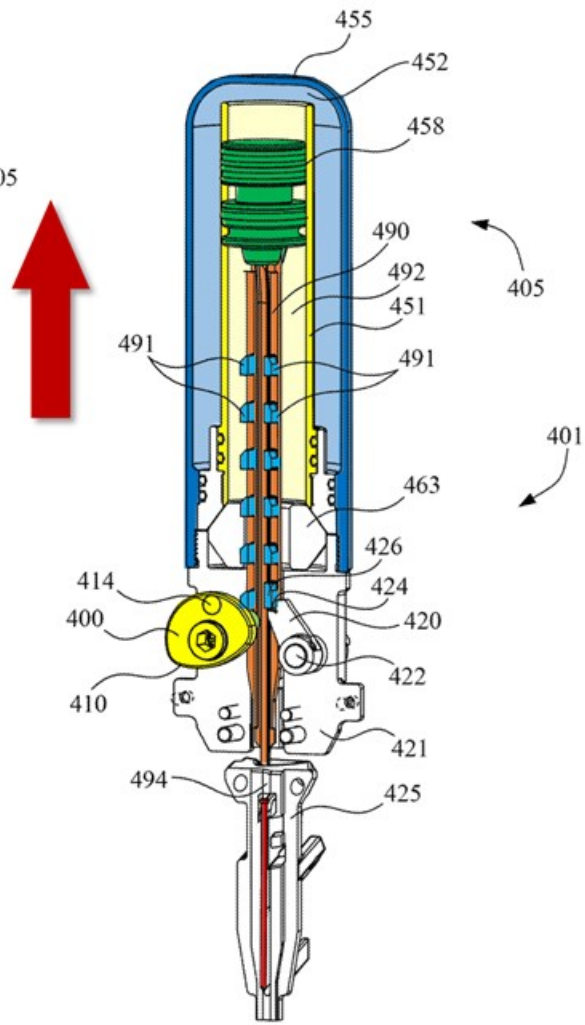


Fig. 21

B. Summary of the Prosecution

The '077 patent issued from a continuation application filed on November 5, 2020, was granted June 15, 2021, and claims priority through six applications to a provisional application filed on October 5, 2007.

During prosecution, claims 1–12, 14–15, and 17–21 were rejected as anticipated by Kondo and claims 22–24 (which called for the driver to have “a

plurality of spaced-apart protrusions”) were rejected as obvious based on Kondo in view of U.S. Patent No. 4,215,808 (“Sollberger”). Dependent claims 13 and 16—which called for the “rest position” of the piston to be “proximal to said higher pressure position”—were held to be allowable if rewritten in independent form. In response, Patent Owner: (1) amended independent claims 1 and 9 to add a new limitation that the movable piston is the “sole movable piston in the gas pressure system,” (2) rewrote dependent claim 13 as an independent claim, (3) cancelled claims 15–24, and (4) added new claims 25–30, with the new independent claim 25 including the new “sole movable piston” limitation. The Examiner thereafter issued a Notice of Allowance.

VI. CLAIM CONSTRUCTION UNDER 37 C.F.R. § 42.104(B)(3)¹

The Federal Circuit held that the term “lifter member” in the related patents is a means-plus-function term subject to §112(f). Petitioner submits that the term “lifter” in the claims of the ’007 patent is likewise a means-plus-function term, because the ’007 patent claims also lack any “recital of structure, material, or acts in support thereof” for the “lifter” element. 35 U.S.C. § 112(f). The “lifter” of the independent claims only describes a function and is not accompanied by any structural recitations. ’007 patent, claims 9, 14. Furthermore, the dependent claims

¹ The constructions of “lifter” and “storage chamber” are only relevant to Ground 4. Grounds 1–3 satisfy any conceivable constructions.

cannot transform the means-plus-function “lifter” from the independent claims into a broader, *non*-means-plus-function term, because §112(d) requires that each of those dependent claims “shall be construed to incorporate by reference all the limitations of the claim to which it refers” and must “specify a further limitation.” 35 U.S.C. § 112(d).

The parties agreed during the ITC investigation that “main storage chamber” means “a chamber that is distinct from the volume of the cylinder and contains part of the working air volume during operation.” A dispute later arose as to how to interpret the agreed-upon construction. Petitioner believed the terms “volume” and “cylinder” in the agreed construction respectively referred to the “displacement volume” and “hollow cylinder” expressly recited in the claims. In contrast, Patent Owner conceded that “cylinder” referred to the claimed “hollow cylinder,” but alleged that “volume” did not refer the claimed “displacement volume” and instead referred to the entire region enclosed by the “hollow cylinder,” including regions that are not part of the “displacement volume.” The ITC ultimately found in the Patent Owner’s favor. On appeal, the Federal Circuit did not conduct a *de novo* claim construction (as it did for “lifter member”), but instead only reviewed the ITC’s resolution of the parties dispute over the agreed-upon construction at the deferential clear error standard. *Kyocera Senco Indus. Tools Inc. v. ITC*, 22 F.4th 1369, 1381 (Fed. Cir. 2022).

Given the misunderstanding caused by the ambiguity in the prior agreed-upon construction—and given that the ITC’s claim construction is not binding here or in any other forum beyond the ITC—Koki proposes that “storage chamber” be construed with clarification to mean “a chamber that is distinct from the displacement volume of the hollow cylinder and contains part of the working air volume during operation.” The claims only recite two volumes: the “storage chamber” and the “displacement volume.”² The only “volume” that is already allocated in the “hollow cylinder” is its “displacement volume,” which is the portion of that cylinder “created by a stroke of said piston.” ’007 patent, 10:23–25, claims 1, 7, 14. Certain dependent claims in related patents require the “storage chamber” to be outside the cylinder (*see, e.g.*, U.S. Patent No. 9,676,088 patent, claim 5), but there is nothing in the intrinsic record or any of the claims of the ’007 patent that prevents the “storage chamber” from being in the hollow cylinder, so long as it is distinct from its separately-recited “displacement volume.” Furthermore, the ’007 patent claims differ from those considered by the ITC and Federal Circuit in that they recite a “storage chamber” rather than the “*main* storage chamber,” which further undermines any argument in favor of a narrow construction that excludes any volume within the hollow cylinder.

² The “storage chamber” does not refer to a separate physical enclosure, but rather to a fixed volume of air. ’007 patent, 21:64–67.

VII. REASONABLE LIKELIHOOD OF UNPATENTABILITY

A. Ground 1: Claims 1–20 are Anticipated by Haley and Obvious based on Haley in view of Lai

1. Claim 1

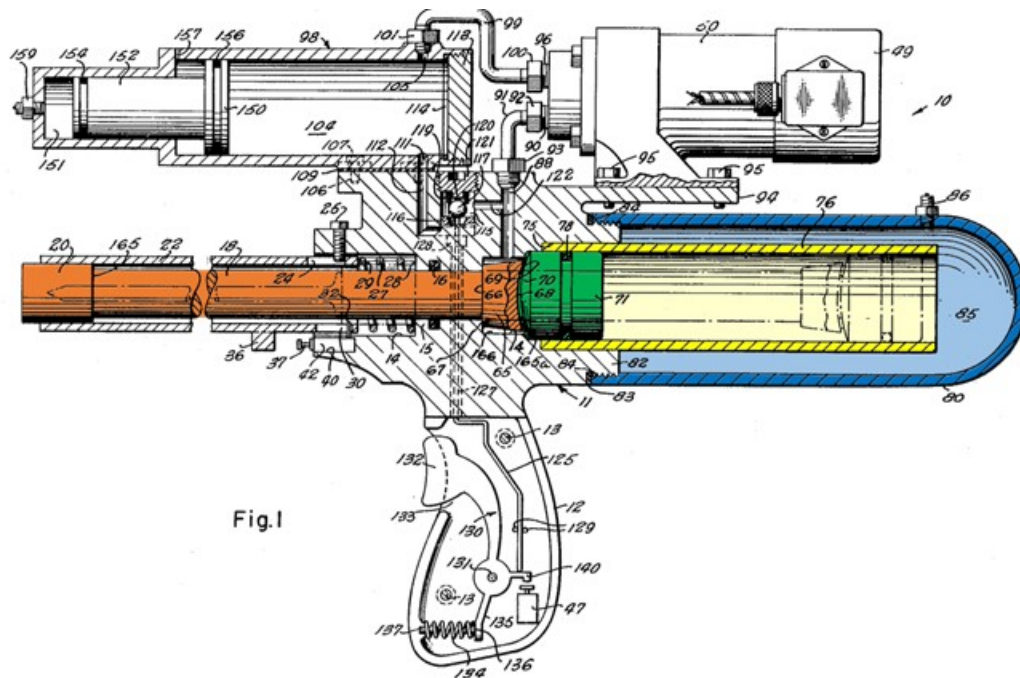
Element [1.P]

U.S. Patent No. 3,150,488 (“Haley”) discloses “[a] gas pressure system for a portable power tool.” Haley’s “invention relates to power devices and more particularly to a pressure fluid power device for operating hand tools.” Haley, 1:7–9.

Element [1.1]

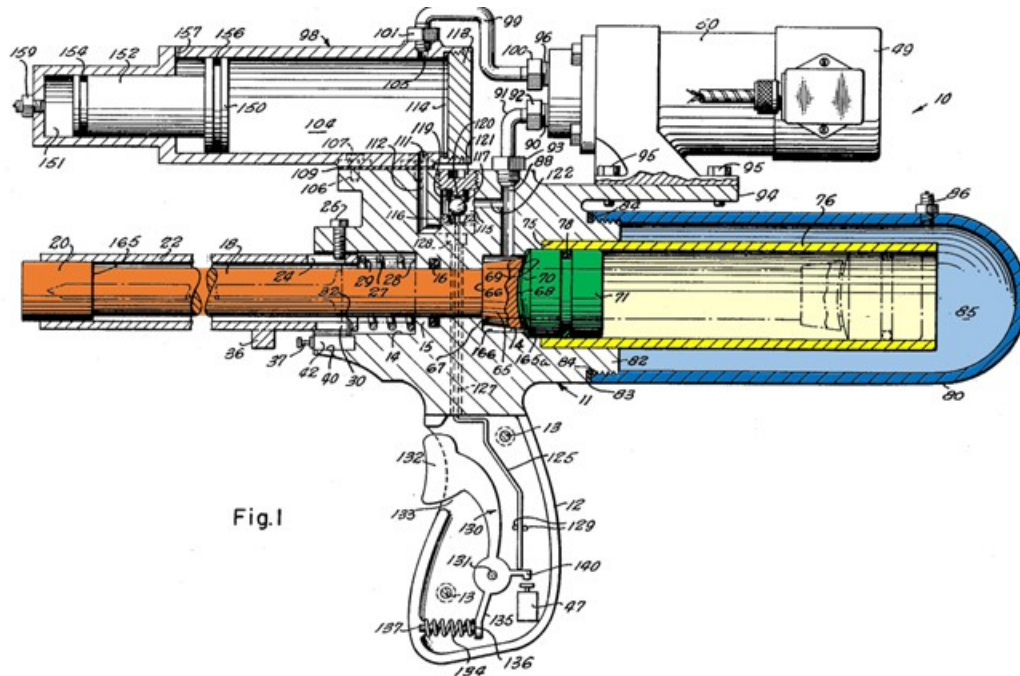
Haley discloses “a hollow cylinder having a movable piston therewithin.”

Haley’s hollow cylinder (“extension cylinder 76,” yellow) contains a piston (“accumulator piston 71,” green) that is “moveable within the cylinder extension.” Haley, 3:33, 3:35–39, Figs. 1, 3–4.



Element [1.2]

Haley discloses “a storage chamber that is in fluidic communication at all times with said cylinder.” Haley’s storage chamber (“chamber 85,” blue) is formed by “elongate accumulator shell 80.” Haley, Fig. 1; 3:40–54.



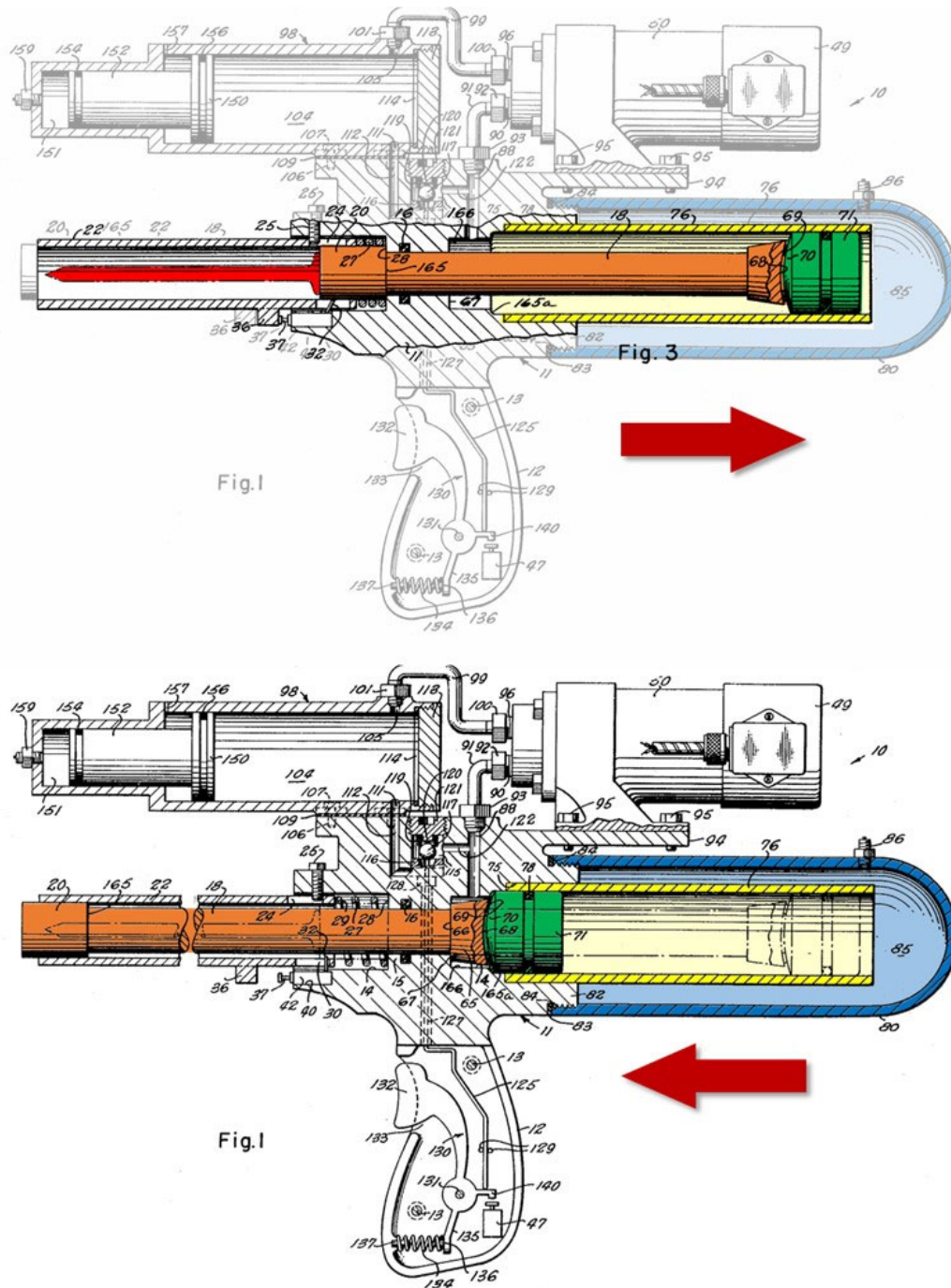
Haley's storage chamber (blue) is distinct from the cylinder (yellow) and remains in fluidic communication at all times with the cylinder's displacement volume, which is shown in Figure 1.

Haley discloses "said storage chamber being charged with a pressurized gas." In Haley, "the gas introduced into the gas chamber 85 may be initially of a relatively large value, say 1,000 pounds per square inch." Haley, 7:1–13. Movement of the accumulator piston upward causes the gas pressure in chamber 85 to increase up to 2,000 psi. Haley, 7:6–10.

Element [1.3]

Haley discloses “said movable piston moves in a reciprocating pattern during an operating cycle, including moving through a drive stroke that is caused by said pressurized gas.”

Haley’s “cylinder extension” (yellow) and “chamber 85” (blue) contain compressed gas and move the moveable piston (“accumulator piston 71,” green) and the driver (“drive piston 18” and its “hammerhead 20,” orange) through a drive stroke toward the exit end (the left side in the figures) to drive a nail (red) into a workpiece. Haley, 5:74–6:7; 6:7–26; 6:48–53; 7:6–13, Figs. 1, 3–4.



Haley's movable piston is lifted during the operation cycle in preparation for another drive stroke, and thus moves in a reciprocating pattern. Haley, 5:32–74, 6:54–75, Figs. 1, 3–4.

Element [1.4]

Haley discloses “said pressurized gas is not vented to atmosphere after said drive stroke, but instead said pressurized gas is re-used for a plurality of said operating cycles.”

While Haley’s storage chamber has a “valve 86,” that valve is only a connection point by which compressed gas may be introduced from an external gas supply to initially charge the chamber to then be re-used for a plurality of said operating cycles. Haley, Fig. 1, 3:45–47; Vallee, ¶56 . Haley discloses a sealing means 83 for its elongate accumulator shell 80 to “effect a fluid tight seal,” which prevents the pressurized gas from being vented to the atmosphere and allows it to instead be re-used. Haley, 3:40–45, Fig. 1; Vallee, ¶56.

Element [1.5]

Haley discloses “said movable piston is the sole movable piston in the gas pressure system.”

Haley’s other piston (“piston 150”) pushes non-compressible power fluid in reservoir 98 of large chamber 104. Haley, 4:62–67, Fig. 1; Vallee, ¶57. That other piston is in Haley’s *hydraulic* system and thus is not another piston “in the gas pressure system.” Vallee, ¶57.

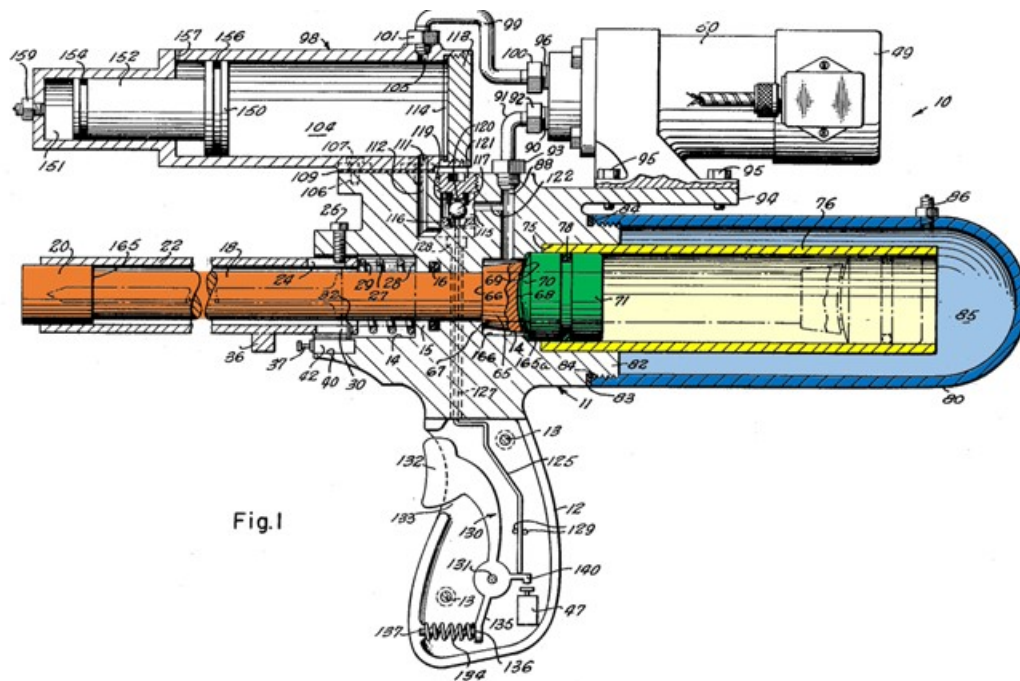
Also, Haley’s other piston would be eliminated in the combination with Lai discussed below for claim 2.

2. Claim 2

Elements [2.1]–[2.2]

Claim 2 requires: “(a) a movable driver that is in communication with said piston, said movable driver including at least one protrusion” and “(b) a lifter that causes said driver and said piston to move through a return stroke, by a mechanical engagement between said lifter and said at least one protrusion of the driver.”

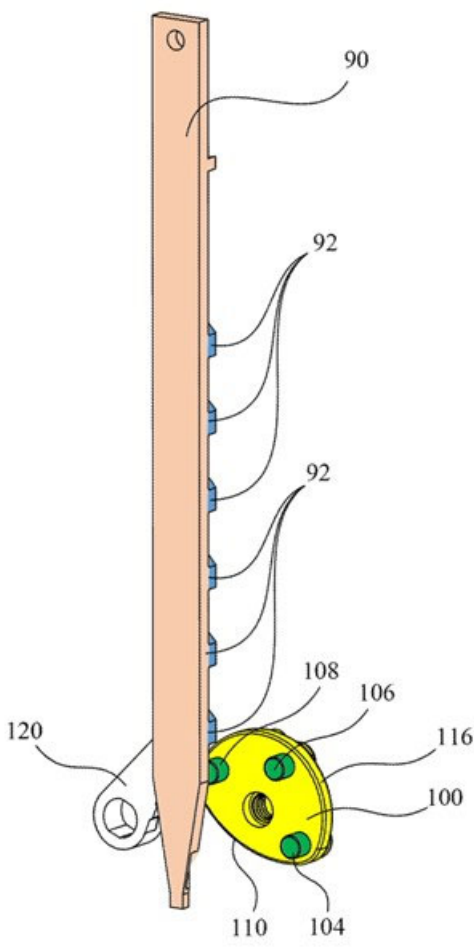
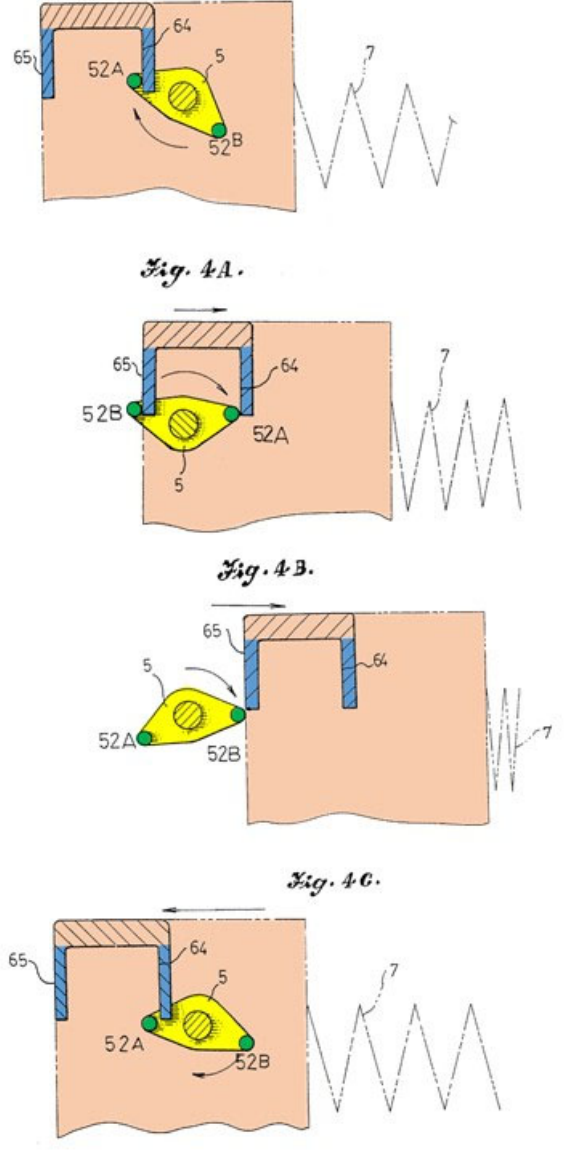
Haley’s “movable driver” (“drive piston 18” and its “hammerhead 20,” orange) is in communication with its piston (“accumulator piston 71,” green). Haley, 2:20–23, 5:51–70, 5:74–6:7, Fig. 1, 3–4.



Haley discloses a hydraulic lifting mechanism and thus does not have a protrusion on its movable driver that is mechanically engaged by a lifter through its

return stroke. It was obvious to replace Haley's hydraulic lifter with the claimed "lifter" disclosed by U.S. Patent No. 5,503,319 ("Lai"), in which case the driver would have protrusions that are mechanically engaged by the lifter through its return stroke. Vallee, ¶¶ 58-68.

Lai discloses an electrically-powered, mechanical lifting mechanism with a structure that is essentially identical to the "lifter member" disclosed in the '007 patent. *Compare* '007 patent, Fig. 12 with Lai, Figs. 3-4. The "lifter" ("lifter member") of the '007 patent includes a rotatable cam lifter 100 (yellow below left), with pin 104, 106, and 108 (green) on its face surface that engage protrusions 92 (blue) on the driver member 90 (orange). '007 patent, 9:36-52, 16:39-53, Fig. 12. The '007 patent also discloses two-pin variants: lifter members 465 and 480 in Figs. 31, 33. '007 patent, 32:23-38, 32:56-33:4. Lai discloses a rotatable cam 5 (yellow below right), with pins 52A and 52B (green) on its face surface that engage two protrusions 64 and 65 (blue) from a U-shaped member 61 on the driver member 6 ("hammer," orange). Lai, 1:62-63, 2:14-25, Figs. 4A-D. Lai's lifter member is moved by a prime mover ("motor 3"). Lai, 2:14-16, Fig. 2.

'007 Patent Lifter	Lai Lifter Member
 Fig. 12	 Fig. 4A. Fig. 4B. Fig. 4C. Fig. 4D.

Lai is directed to an “electric stapling gun.” Lai, 1:1–2. The’007 patent covers “portable tools that drive staples, nails, or other linearly driven fasteners.” ’007 patent, 1:34–36. A POSITA would consider staplers to be a subcategory of nailers. Vallee, ¶61. For example, U.S. Patent No. 4,834,278 (“Lin,” Ex. 1010) is

titled “Structure of DC Motorized Nailing Machine” and discloses a preferred embodiment that drives staples. Thus, Lai and Lin are directly relevant prior art for the ’007 patent. Developments in portable nailers would tend to appear first in the context of portable staplers such as Lin and Lai due to the lower power needed to drive staples as compared to nails, and these improvements would later be applied generally to portable nail guns, notwithstanding their larger power drain requirements, as battery technology continued to improve. Vallee, ¶62. While Lin and Lai use metal springs rather than compressed gas springs, A POSITA would consider metal springs and compressed-gas springs to be interchangeable depending on the use case. *Id.* This is reflected by various prior art references—Saari discloses an embodiment “which utilizes a compressible gas, such as air or the like, as the spring means” (Saari, 4:1–3) and U.S. Publication No. 2006/0261127 (“Wolf,” Ex. 1011) discloses an embodiment where “the compression spring element 42 is formed as a gas spring (Wolf, ¶[0048]). The ’007 patent reflects this interchangeability with an embodiment where the compressed gas spring is exchanged for “a mechanical spring 496, which could be a fast-acting coil spring.” ’007 patent, 20:3–10. A POSITA would look to Lai’s portable stapler design for improvements to incorporate into nailers such as Haley’s nail gun and would have done so by the filing of the ’007 patent as battery technologies had continued to progress following Lai’s issuance in 1996. Vallee, ¶62.

A POSITA was motivated to replace Haley’s hydraulic lifting mechanism with Lai’s lifter member. Haley’s hydraulic lifting mechanism was a known problem, because it was bulky and subject to the risk of hydraulic fluid leaking into the compressed gas chambers. Vallee, ¶63. This problem was explicitly discussed less than a decade later in U.S. Patent No. 3,636,707 (“Saari ’707,” Ex. 1012), which explained that “[t]he Haley devices are cumbersome, too heavy for prolonged use by an operator and subject to comingling of the noncompressible fluid with the compressible fluid or gas resulting in malfunctioning of the devices as well as having too long a time cycle between operative strokes thereof.” Saari ’707, 1:12–16. These problems stemmed solely from Haley’s hydraulic lifting mechanism and a complete solution to Haley’s identified problem was not feasible at the time of Saari ’707, which could only address the cumbersomeness factor by moving the hydraulic pump off the tool. Vallee, ¶64; Saari ’707, 5:20–28. Not long after, Saari disclosed another powered nailer that eliminated the hydraulic lifting mechanism and replaced it with an electrically-powered mechanical lifter. *See* Saari. That trend to electrically-powered mechanical lifting mechanisms is also reflected by Lin, which denigrates both “pneumatic power operated and motorized stapling machines” because they are “not portable and the utility of which are within the confines of the area where power source is available.” Lin, 1:27–30. Lin’s proposed solution involved “a nailing machine to make use of battery power to drive a DC motor so as

to turn round gear set, ball screws and gear wheel, letting spring and guide block start nailing.” Lin, 1:56–58.

Lai further refines the battery-powered mechanical lifter of Lin. Lai expressly discusses its benefits in efficiency, power, and compactness over the prior art. Lai identifies an “ideal” electric stapling gun as being “energy saving, strong in hitting force and compact in size” and explains that its disclosed lifter member with two pins that engage two protrusions of the U-shaped member 61 leads to “1.8 times the compression of the prior art,” “provide the same hitting effect with less power consumption,” and be “smaller in size thereby increasing flexibility.” Lai, 1:9–10. 2:26–45.

A POSITA would have solved Haley’s problem by incorporating Lai’s lifter member. Vallee, ¶66. Lai was a known solution to Haley’s identified problem of being bulky (solved by Lai’s use of a compact mechanical lifter) and risk of hydraulic fluid leaking (solved by Lai’s use of a mechanical, rather than hydraulic, lifter). A POSITA was able to implement Lai’s lifter member in Haley with predictable results. *Id.* Lai teaches adding a “U-shaped member 61” with protrusions to the driver blade (as a modification to prior art such as Lin, which has a driver blade without protrusions) that can be engaged by pins 52A and 52B of Lai’s lifter member. Lai, 2:4–7. A POSITA would have understood that by adding

protrusions to Haley's driver blade it could be lifted by Lai's lifter member and would have achieved the same results predicted by Lai. Vallee, ¶66.

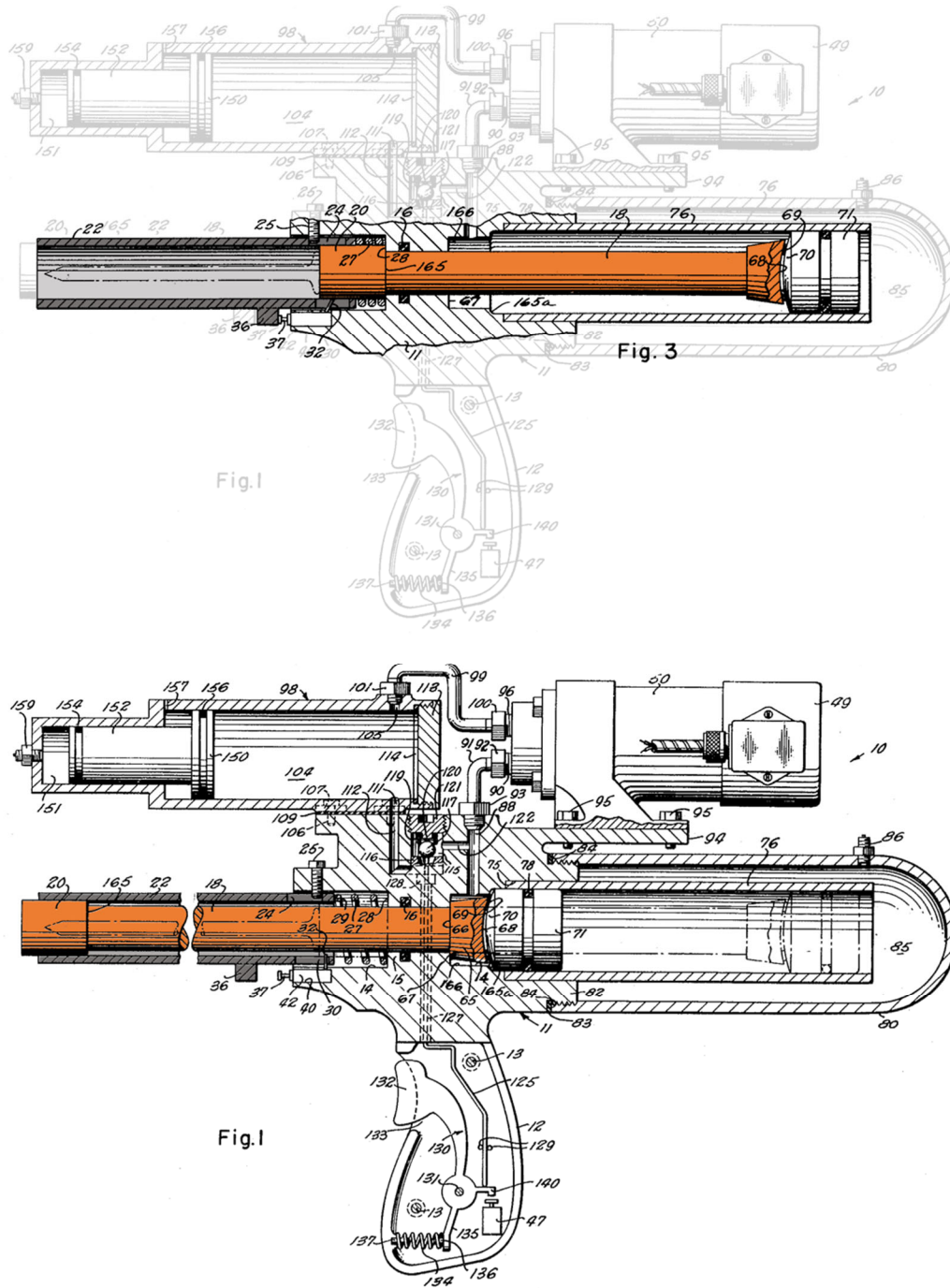
An additional, independent motivation to replace Haley's hydraulic lifting mechanism with Lai's lifter member was the market forces and design needs favoring a portable, battery-powered nailer. Vallee, ¶67. Artisans in the field had repeatedly highlighted the problems with prior nailer designs. *Id.*; Lin, 1:6–31 (discussing state of the art in 1989); Kondo, 1:9–44 (same for 1998); Pedicini, ¶¶[0003]–[0019] (same for 2006). Artisans repeatedly noted over the years that corded power nailers (with a pneumatic air hose, an electrical power cable, or both) were not ideal because of their lack of portability. Vallee, ¶67; Lin, 1:21–26; Kondo, 1:9–29; Pedicini, ¶[0005]. But the commercially-available portable power nailers were either combustion nailers (which required costly fuel and emitted waste fumes) or electrical flywheel nailers (which had low power output). Vallee, ¶67; Pedicini, ¶¶[0006]–[0007]. The clear and obvious solution presented by the prior art was to take the compressed gas spring design first conceived by Haley and make it portable by implementing the battery-powered lifter member of Lai. Vallee, ¶68. The only missing piece for that solution was a reasonably-priced portable battery pack that could provide the power needed to make these off-the-shelf designs commercially feasible. Vallee, ¶68. Battery technologies continued to advance, largely driven by smartphones and electric vehicles in the early 2000s, such that by the filing of the

'007 patent, it was obvious to obtain a portable, battery-powered nailer by combining Haley's compressed gas nailer design with Lai's battery-powered lifter member. Vallee, ¶68. The compressed gas nailer claimed by the '007 patent was not unlocked by any innovation in the field of powered nailers, but rather was an obvious combination of old, off-the-shelf designs that was motivated by the market need for a battery-powered nailer and the market availability of suitable portable batteries. Vallee, ¶68.

3. Claim 3

Element [3.1]

Haley discloses “a guide body with a linear passageway for said driver.” Haley's guide body (“guide barrel 22,” grey) has a linear passageway for the driver (“drive piston 18,” orange). Haley, 2:23–27, Figs. 1, 3.



Element [3.2]

The combination discloses “said lifter moves in a rotational motion and causes said driver to move in a linear motion.”

Lai's lifter is a rotatable cam 5 (yellow) that moves in rotational motion (curved arrows) to cause the driver (light orange) to move in a linear motion (straight arrow). Lai, Figs. 4A–D, 1:62–63, 2:14–25.

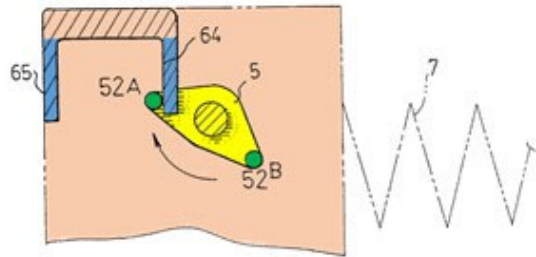


Fig. 4A.

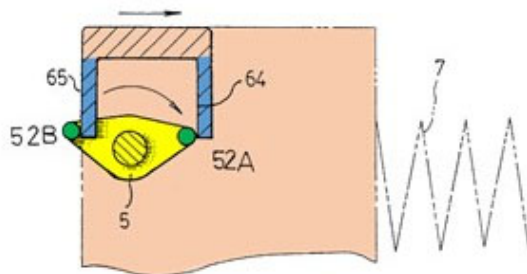


Fig. 4B.

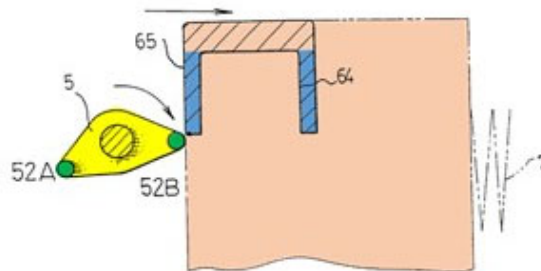


Fig. 4C.

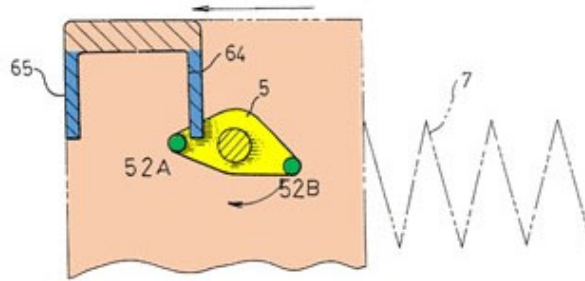
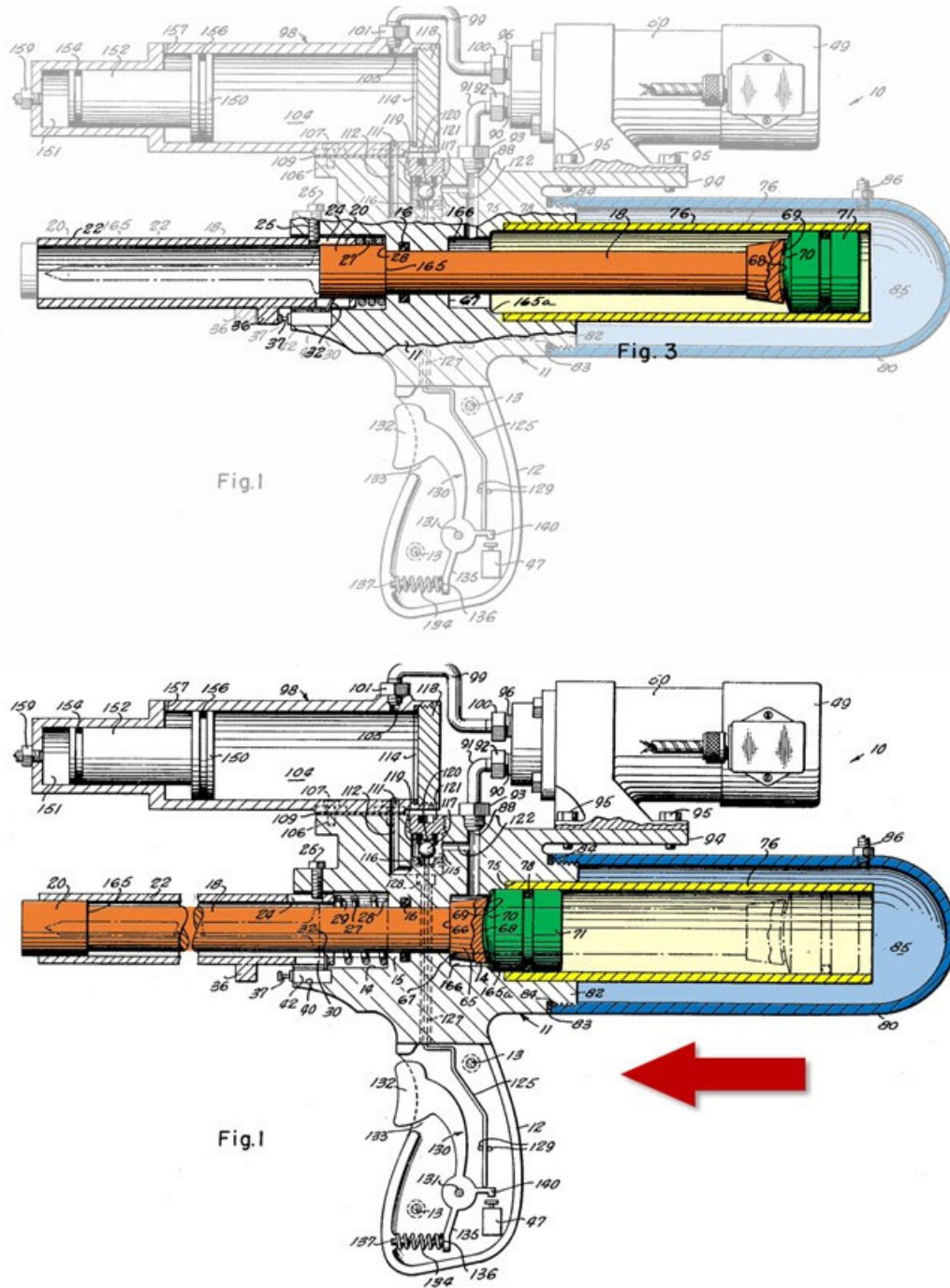


Fig. 4D.

4. Claim 4

Element [4.1]

Haley discloses “said cylinder and piston act as a gas spring during said drive stroke.” In Haley, the pressurized gas of the storage chamber (“chamber 85”) and the cylinder (“extension cylinder 76”) act on the piston (“accumulator piston 71”) to form a gas spring for driving a nail during a drive stroke. Haley, Figs. 1, 4; 5:74–6:7; 6:7–26; 6:48–53; 7:6–13. When the accumulator piston 71 is moved upward in the cylinder extension 76, the compressed gas in the chamber increases from 1,000 psi to 2,000 psi—because the pressurized gas from the displacement volume of the cylinder (yellow) is pushed by the piston upward into in the cylinder and into the storage chamber (blue)—and that further compressed gas “is employed to operate the drive piston which may perform such functions as the driving of a nail.” Haley, 7:1–13, Figs. 1, 3.



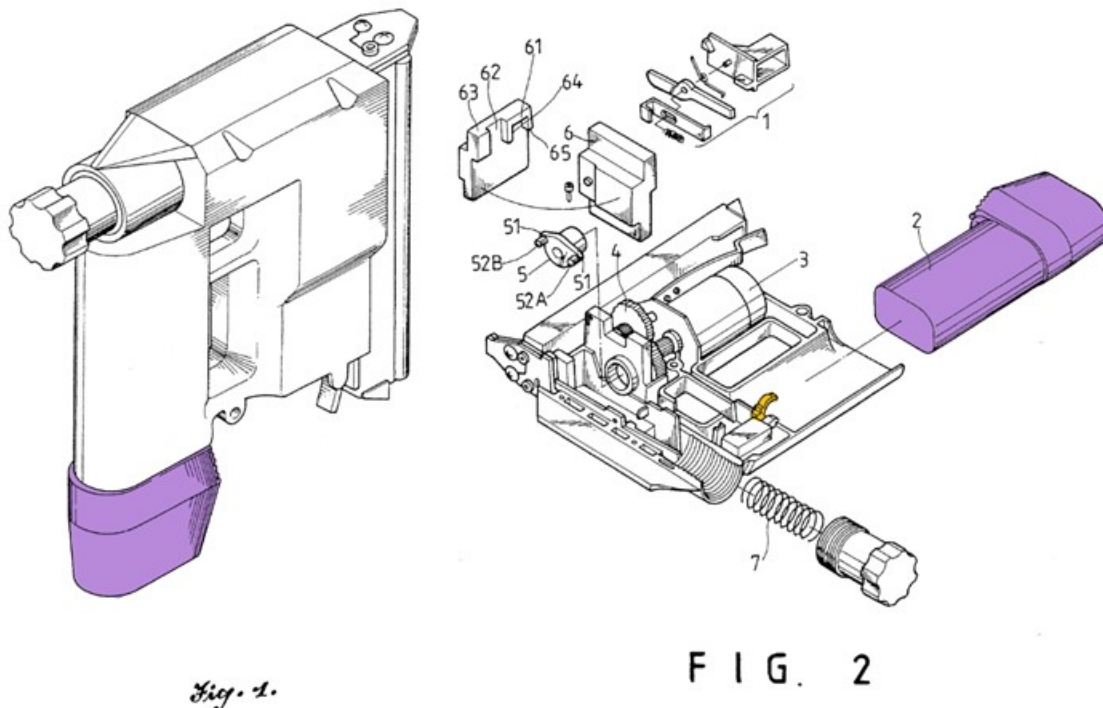
Element [4.2]

The combination discloses “said lifter does not engage said driver during said drive stroke.” Lai’s lifter (cam 5) does not engage (“is separated from”) the

protrusions of the driver (U-shaped member 61) during the drive stroke. Lai, 2:22–25, Fig. 4D.

5. *Claim 5*

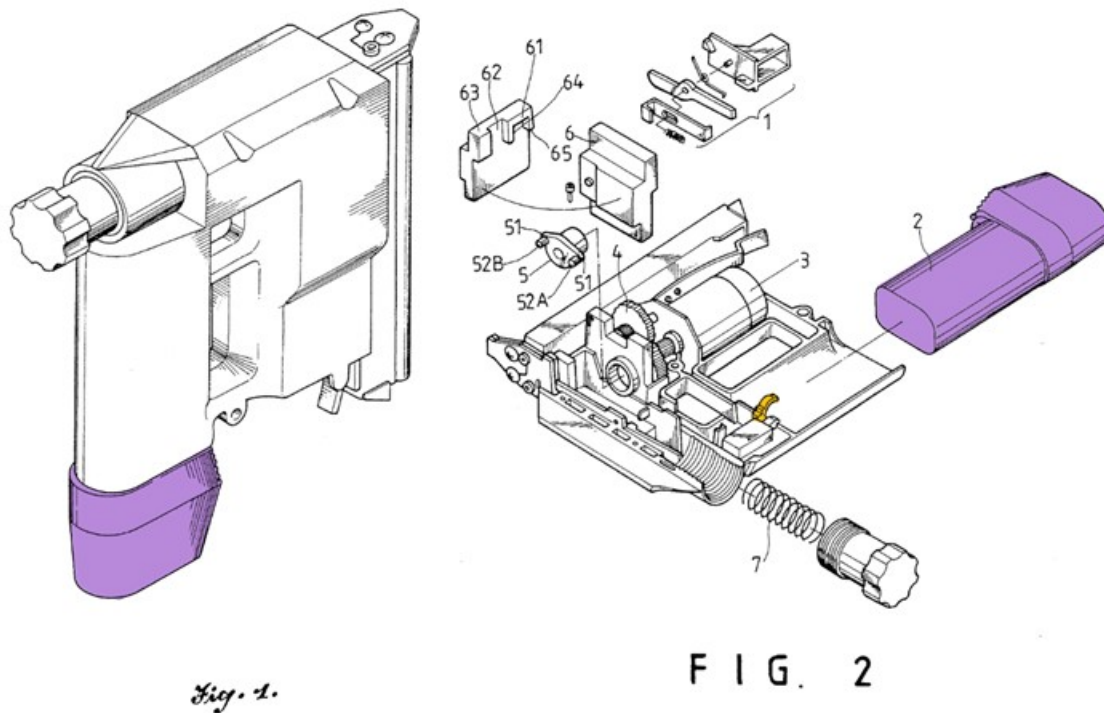
The combination discloses a motor and an on-board electrical power source, wherein said motor provides motive power for said lifter.” Lai’s lifter is provided with motive power by a motor (“motor 3”). Lai, 2:14–16. Lai’s motor is powered by an on-board electrical power source (Lai’s battery 2). Lai, Figs. 1–2, 1:25–35, 1:44–54, 1:60–62, 2:2; Vallee, ¶¶73–74.



6. *Claim 6*

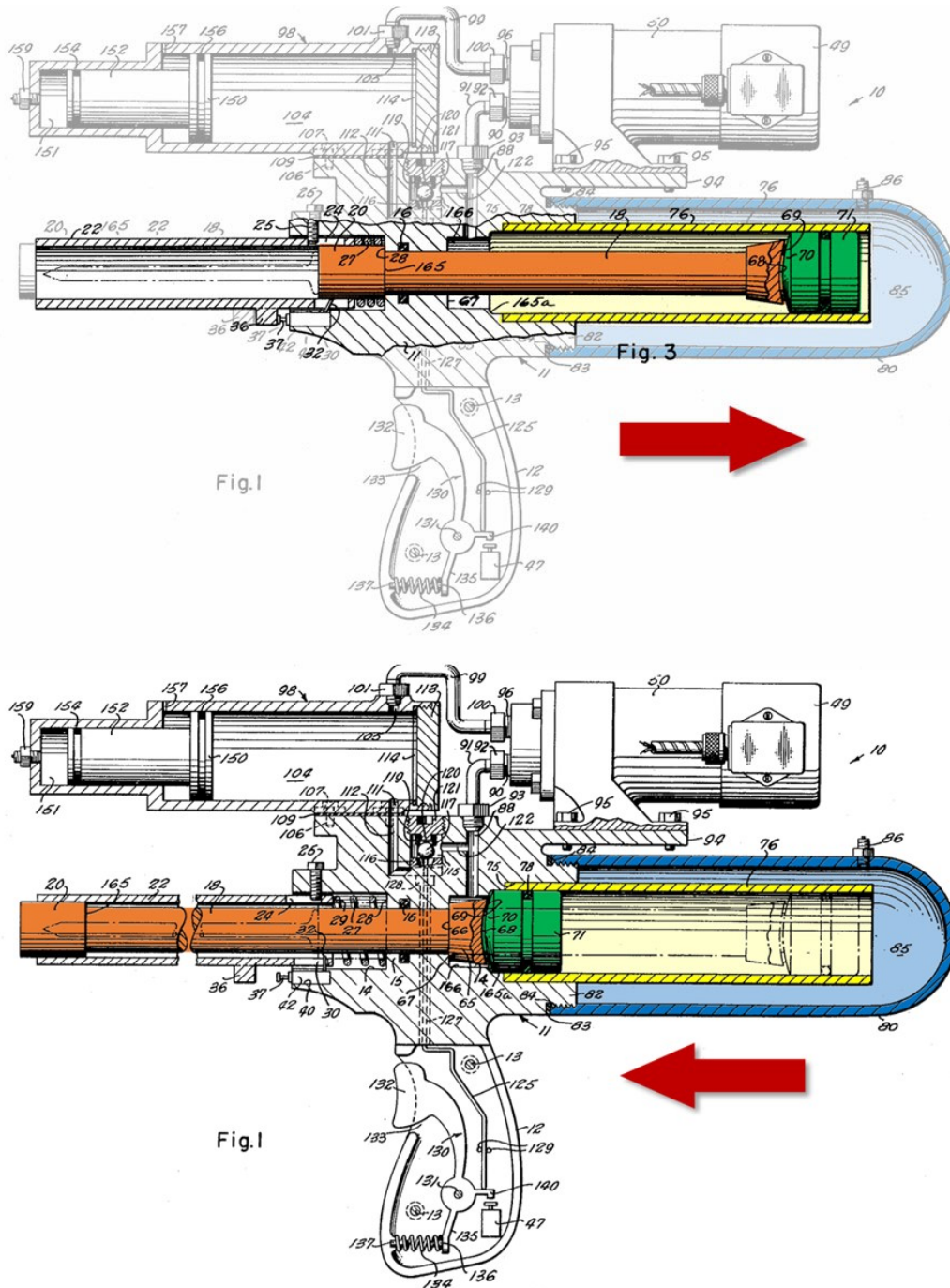
The combination discloses (a) said on-board electrical power source comprises a detachable battery; and (b) said motor comprises an electric motor.”

Lai's on-board electrical power source (battery pack, purple) is attached and detached using an internal attachment clip (orange). Lai, Figs. 1–2; Vallee, ¶75. Lai's motor ("motor 3") is an electric motor. Lai, 1:25–35, 1:44–54, 1:60–62, 2:2; Vallee, ¶75.



7. Claim 7

Haley discloses “said movable piston moves through a pathway through said hollow cylinder between a higher pressure position and a lower pressure position.” Haley’s movable piston (“accumulator piston 71,” green) moves through a pathway along the axis of the hollow cylinder (“extension cylinder 76,” yellow) between a higher pressure position (rightward position in Fig. 3) and a lower pressure position (leftward position in Fig. 1). Haley, Figs. 1, 3, 7:4–10; Vallee, ¶76.



8. Claim 8

Haley discloses “said pressurized gas in the storage chamber remains above atmospheric pressure during all portions of an operating cycle.” Haley’s “gas

introduced into the gas chamber 85 may be initially of a relatively large value, say 1,000 pounds per square inch.” Haley, 7:1–13. Movement of the accumulator piston upward causes the gas pressure in chamber 85 to increase up to 2,000 psi. Haley, 7:6–10. Both values are above atmospheric pressure (14.7 psi). Vallee, ¶77.

9. Claim 9

Element [9.P]

Haley discloses “[a] portable fastener driving tool.” Haley’s “invention relates to power devices and more particularly to a pressure fluid power device for operating hand tools.” Haley, 1:7–9.

Element [9.1]

Haley discloses “a housing with a storage chamber that contains a pressurized gas.” Haley’s housing (“housing 40,” green) has the storage chamber (“chamber 85,” blue) that contains pressurized gas. Haley, Fig. 1; 2:47, 3:40–54, 7:1–13; Vallee, ¶79; *see* Element [1.2].

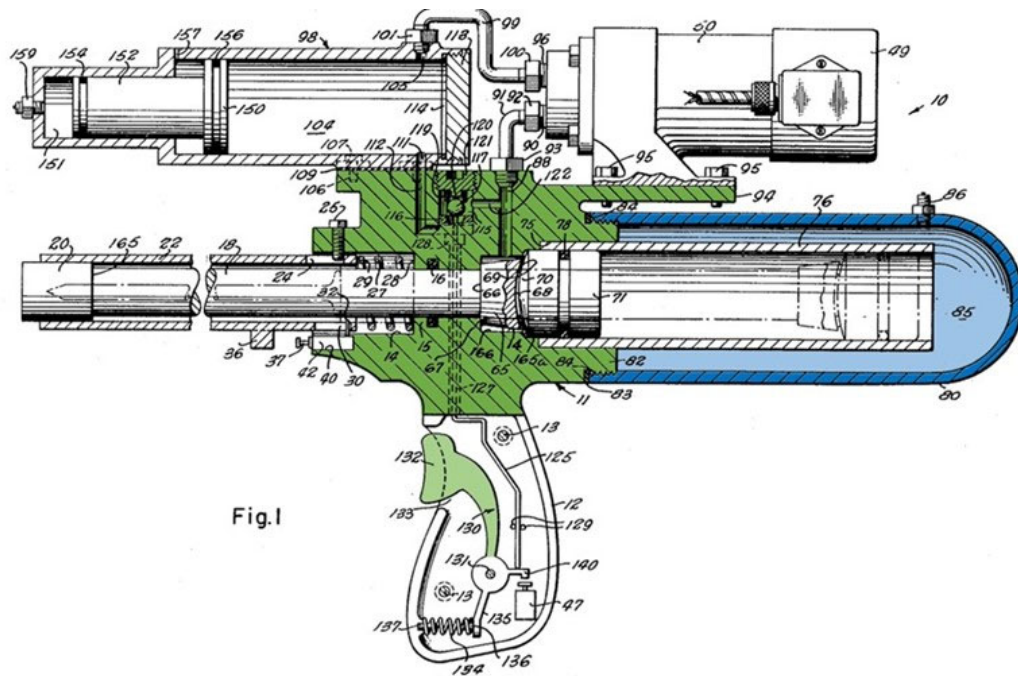


Fig.1

Haley discloses “a hollow cylinder that includes a movable piston.” See Element [1.1].

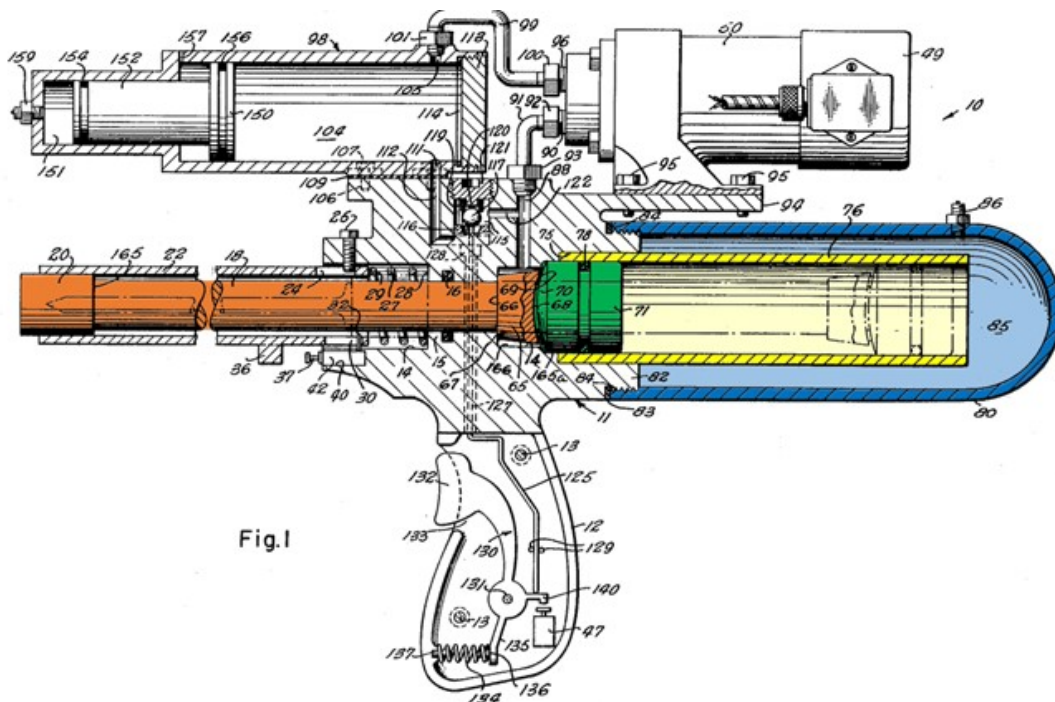
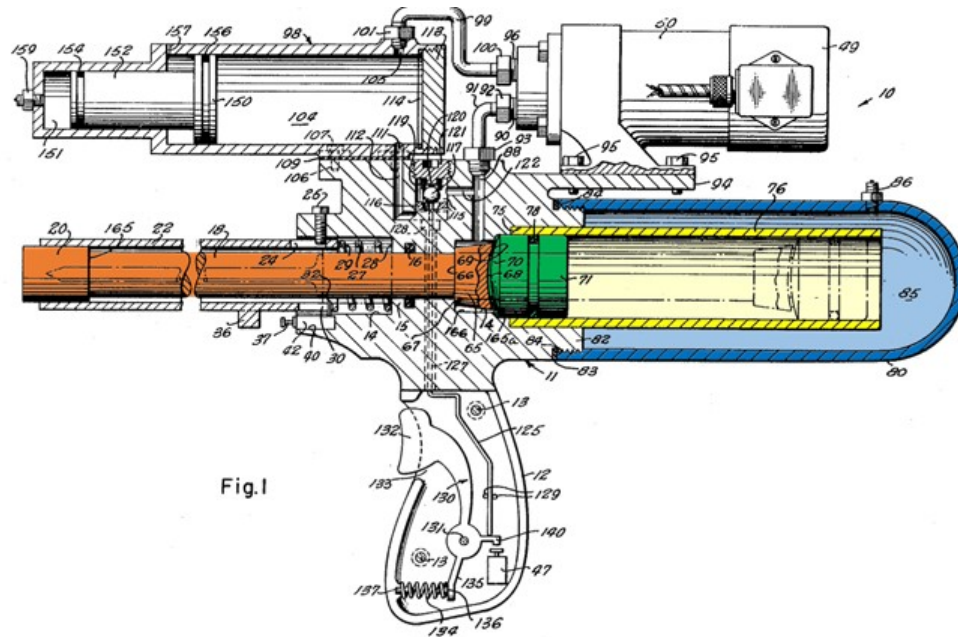
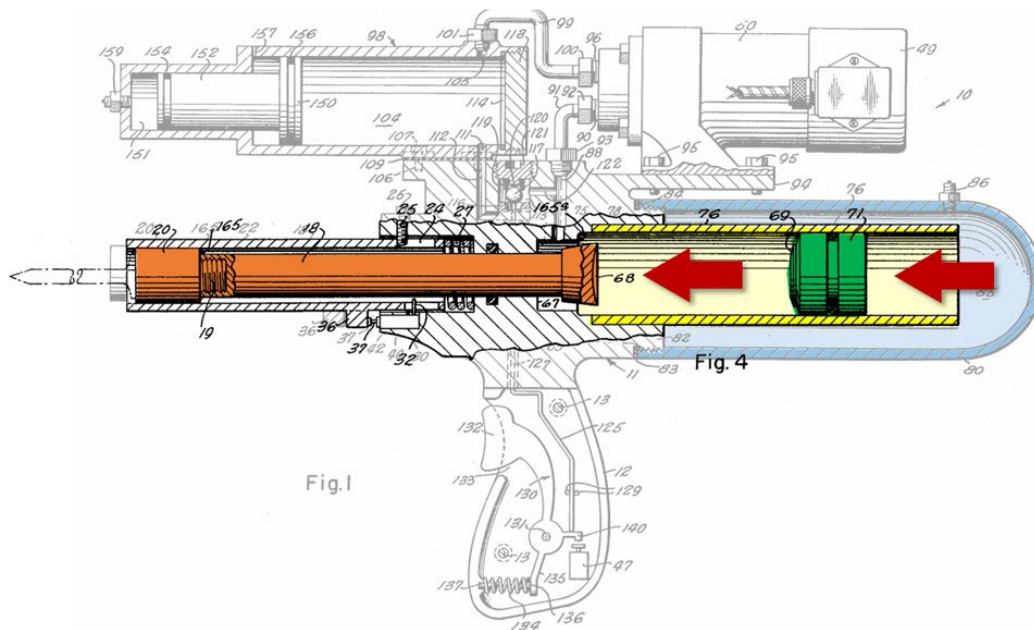


Fig.1

Haley discloses “a driver that is in communication with said piston at least during a drive stroke.” See Element [2.1].



Haley’s piston detaches from direct physical contact with the driver during the drive stroke, but the compressed gas in chamber 85 continues to exert force on drive piston 18 through both accumulator piston 71 and the incompressible power fluid in extension cylinder 76. Vallee, ¶82; Haley, 6:16–31, Fig. 4. Haley states that “the movement of the drive piston is primarily due to the force exerted by the compressed gas in the chamber 85 which is transmitted through the accumulator piston to the power fluid.” Haley, 6:50–53. Haley’s piston and driver thus remain in communication throughout the drive stroke. Vallee, ¶82.



If “in communication with” requires direct physical contact, this element was obvious based on the combination of Haley and Lai. Vallee, ¶83. Haley’s piston detaches from its driver solely as a result of its hydraulic lifting mechanism, which is replaced with Lai’s mechanical lifter in the combination. *Id.* In such a combination, a POSITA would not need or want to have the piston and driver detach during the drive stroke and they would remain in direct contact throughout the drive stroke. Vallee, ¶83.

The combination discloses “a lifter that is in communication with said driver at least during a return stroke.” As explained above, it was obvious to replace Haley’s hydraulic lifter with the claimed “lifter” disclosed by Lai. *See* Element 2.2; Vallee, ¶84. Lai’s lifter (cam 5) is in communication with the driver during the return stroke. Lai, 2:13–21, Figs. 4A–4D; Vallee, ¶84.

The combination discloses “a prime mover” and “a source of energy.” See Claims 5–6.

Element [9.2]

Haley discloses “said pressurized gas is used as a gas spring to propel said piston during said drive stroke.” See Element [4.1].

Element [9.3]

The combination discloses “said prime mover causes said lifter to mechanically engage said driver during said return stroke.” See Elements [2.2], [5].

Element [9.4]

The combination discloses “said housing has no external energy source cable and no external hose attached thereto.” That combination is spurred on by the need for a portable, battery-powered nailer, and Lai both teaches and encourages its energy-efficient and compact lifting mechanism powered by its portable battery pack. See Element [2.2]. Accordingly, in that combination, Haley’s electrical cable is replaced with Lai’s battery (battery 2), and there is no external cable or hose. Vallee, ¶89.

Element [9.5]

The combination discloses “said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber.” See Element [1.5].

10. Claim 10

Haley discloses “said storage chamber and said hollow cylinder are always in fluidic communication.” *See* Element [1.2].

11. Claim 11

Haley discloses “said pressurized gas is re-used for a plurality of operational cycles that each include said drive stroke and said return stroke.” *See* Element [1.4].

12. Claim 12

Haley discloses “said piston has a rest position between operational cycles; and said rest position is achieved after said return stroke.” Haley discloses two positions: (1) the lower position following a drive stroke shown in Fig. 1, the “normal at rest” position (Haley, 5:22–23), and (2) the higher position following a return stroke shown in Fig. 3, the “fully retracted or cocked position” (Haley, 6:13–14). Vallee, ¶94. Haley will rest at or near the higher position (i.e., after the return stroke)—if the guide barrel “has not been moved inwardly . . . movement of the drive piston and the accumulator piston will stop.” Haley, 5:70–74, Fig. 3; Vallee, ¶94. The piston and driver will rest in that position until “the forward end of the guide barrel is then pressed against the work piece or structure into which the nail is to be driven,” at which point “the motor 49 is once again connected to the input circuit 52.” Haley, 5:74–6:7; Vallee, ¶94.

13. Claim 13

The combination discloses “said prime mover comprises an electric motor; and said source of energy comprises a detachable battery.” *See* Claims 5–6; Vallee, ¶95.

14. Claim 14

Elements [14.P]–[14.5]

Elements [14.P]–[14.4] are identical to Elements [9.P]–[9.4], respectively, and are met as described above. Element [14.5] is substantially the same as Element [7] and is met as described above.

Element [14.6]

Haley discloses “said piston has a rest position between operational cycles; and a location of said rest position is proximal to said higher pressure position.”

As discussed above, Haley discloses two rest positions, including a “fully retracted or cocked position.” *See* Claim 12. This rest position is proximal to the higher pressure position.

15. Claims 15–16

Claims 15–16 are identical to Claims 10–11, respectively, and are met as described above.

16. Claim 17

Elements [17.P]–[17.4]

Elements [17.P]–[17.4] are identical to Elements [1.P]–[1.4], respectively, and are met as described above.

Element [17.5]

Haley discloses “said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber of the gas pressure system.” *See* Element [1.5].

17. Claims 18–20

Claims 18–20 are identical to Claims 2, 5 and 8, respectively, and are met as described above.

B. Ground 2: Claims 1–20 are Obvious based on Saari and Enstrom in view of Lai

U.S. Patent Nos. 3,924,692 (“Saari”) and 3,913,685 (“Enstrom”) are closely related patents that were filed on the same day and given sequential application numbers, assigned to the same company, have identical titles and terminology, and contain overlapping specifications and figures. *See* Saari, Enstrom. Because of the close relationship between Saari and Enstrom, a POSITA would look to their collective teachings together and would have combined them as a matter of course. Vallee, ¶46. To the extent there are aspects described in only one of Enstrom or Saari, a POSITA would understand that is simply due to their separate focuses on

different inventive aspects of the tool (warranting the separate patents for different inventors). Vallee, ¶46. Saari describes the switching means for controlling the fastener driving tool (Saari, 1:48–57, 3:19–68, Figs. 7–9), whereas Enstrom describes the lifting mechanism and compressed gas chamber for that tool (Enstrom, 2:35–3:19, Figs. 6–7). Accordingly, a POSITA would combine the two teachings to achieve the complete tool worked on by Enstrom and Saari. Vallee, ¶¶46–47. Saari and Enstrom are treated as such below.

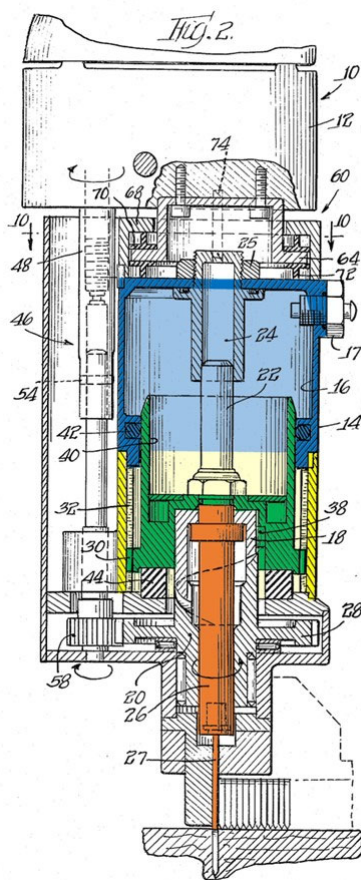
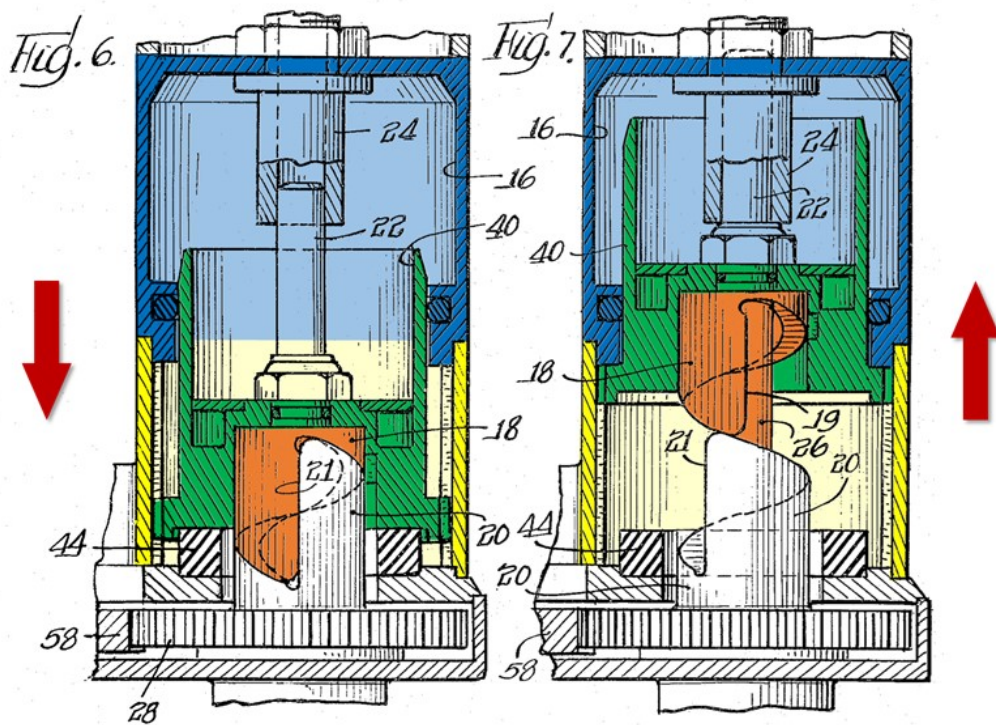
1. Claim 1

Element [1.P]

Saari/Enstrom discloses “[a] gas pressure system for a portable power tool.” Saari/Enstrom disclose a “driving tool” with a spring (including a compressed gas spring) to “provide the actual driving force to seat the fastener.” Saari, 1:27–33; Enstrom, 1:27–32.

Element [1.1]

Saari/Enstrom discloses “a hollow cylinder having a movable piston therewithin.” Saari/Enstrom’s hollow cylinder (yellow) contains a piston (“cup-like piston 40,” green) movable within the cylinder along “key and spline devices 30 and 32.” Enstrom, 2:52–60, Figs. 2, 6–7; Saari, 4:1–9, Fig. 10.



Element [1.2]

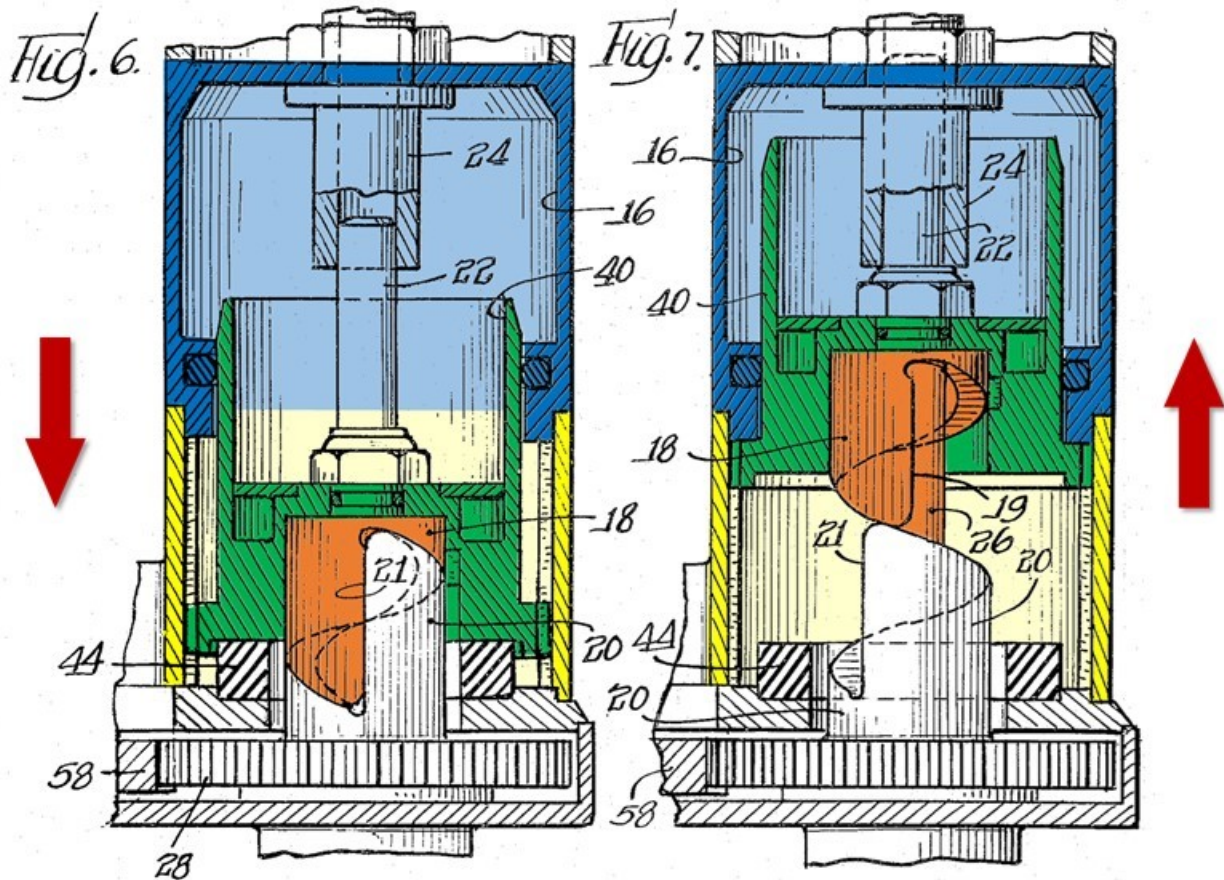
Saari/Enstrom discloses “a storage chamber that is in fluidic communication at all times with said cylinder.” Saari/Enstrom’s storage chamber (“chamber 16,” blue) is distinct from the cylinder (yellow) and remains in fluidic communication at all times with the cylinder, which is shown in Figure 1. Enstrom, 2:35–39, Figs. 1, 6–7; Saari, 4:1–9, Fig. 10.

Saari/Enstrom discloses “said storage chamber being charged with a pressurized gas.” Saari’s “valve 86 is provided for selectively charging the chamber with the appropriate compressible gas,” which “will thus allow the compressibility of the spring to be conveniently varied.” Saari, 4:11–14, Fig. 10; *see* Enstrom, Fig. 2. Saari’s “gas chamber is sealed by suitable seal means 84 between the inner walls of the housing 14a and the outer side walls of the piston 80.” Saari 4:6–9, Fig. 10; *see also* Enstrom, 2:52–55, Figs. 1, 6–7. A POSITA would understand the disclosure of a sealed storage chamber and a valve for “selectively charging the chamber” means that the chamber is “charged with a pressurized gas,” since a charging valve would have no use if the chamber is allowed to reach atmospheric pressure. Vallee, ¶105. Saari/Enstrom explicitly denigrate pneumatic devices that “require[] convenient sources of compressors and air hoses which makes a tool undesirable for the various remote locations required on a construction site.” Saari, 1:9–15; Enstrom, 1:7–13.

Element [1.3]

Saari/Enstrom discloses “said movable piston moves in a reciprocating pattern during an operating cycle, including moving through a drive stroke that is caused by said pressurized gas.”

Saari/Enstrom’s storage chamber (“chamber 16,” blue) and cylinder (yellow) contain compressed gas that cause the moveable piston (“cup-like piston 40,” green) and the driver (“ram 26,” orange) to move through a drive stroke, i.e., “driven downwardly under the bias of the compressed gas.” Vallee, ¶106; Enstrom, 2:45–46, Figs. 6–7; Saari, Fig. 10.



Saari/Enstrom's movable piston is then lifted during the operation cycle in preparation for another drive stroke, and thus moves in a reciprocating pattern. Enstrom, Figs. 6–7, 2:32–46; Saari, 2:51–61, 4:45–46, 5:6–7.

Element [1.4]

Saari/Enstrom discloses “said pressurized gas is not vented to atmosphere after said drive stroke, but instead said pressurized gas is re-used for a plurality of said operating cycles.” As discussed above, Saari/Enstrom disclose a valve for “charging the chamber,” which is “sealed by suitable seal means.” *See* Element [1.2]. A POSITA would understand the disclosure of a sealed storage chamber and a valve for “selectively charging the chamber” means that the pressurized gas is “not vented to atmosphere” and instead is “re-used for a plurality of said operating cycles,” since a charging valve would have no use if the chamber is vented to reach atmospheric pressure. Vallee, ¶108. Saari/Enstrom explicitly denigrate pneumatic devices that “require[] convenient sources of compressors and air hoses which makes a tool undesirable for the various remote locations required on a construction site.” Saari, 1:9–15; Enstrom, 1:7–13.

Element [1.5]

Saari/Enstrom discloses “said movable piston is the sole movable piston in the gas pressure system.” Saari/Enstrom's cup-like piston 40 is the sole piston. Enstrom, 2:52–55, Figs. 2, 6–7; Saari, Fig. 10.

2. Claim 2

Elements [2.1]–[2.2]

The elements of claim 2 require: “(a) a movable driver that is in communication with said piston, said movable driver including at least one protrusion” and “(b) a lifter that causes said driver and said piston to move through a return stroke, by a mechanical engagement between said lifter and said at least one protrusion of the driver.”

Saari/Entrom discloses a lifting mechanism with “a pair of coaxing helicoidal cams 18 and 20,” where the “[t]he lower cam 20 will be rotatably mounted within the housing and serves as the driving cam. Enstrom, 2:32–39, Figs. 1, 6–7. Saari/Entrom’s lifting structure (“cam 20”) moves a movable driver (“upper cam 18 and associated ram 26”), which is connected to the piston (“cup-like piston 40”), through a return stroke (“a purely axial rearwardly motion”). Enstrom, 2:55–59, Figs. 6–7; *see* Saari, 2:51–54, Figs. 1–2.

It was obvious to replace Saari/Enstrom’s helicoidal lifting mechanism with the claimed “lifter,” which is disclosed by Lai as explained above in relation to the combination of Haley with Lai. *See* §VII.A.2.

A POSITA was motivated to replace Saari/Enstrom’s helicoidal lifting mechanism with Lai’s lifter member. Saari/Entrom’s lifting mechanism had a known problem in that it was designed to be used in a corded tool with access to AC

power from an electrical outlet. Vallee, ¶112; *see* Enstrom, Fig. 1 (power cord 34). At the filing of the '007 patent, market forces and design needs favored a portable, battery-powered nailer. Vallee, ¶112. Artisans repeatedly noted over the years that corded power nailers (with a pneumatic air hose, an electrical power cable, or both) were not ideal because of their lack of portability. Vallee, ¶112; Lin, 1:21–26; Kondo, 1:9–29; Pedicini, ¶[0005].

Lai discloses a battery-powered nailer (*see* §VII.A.2) and expressly touts its electrical efficiency. Lai identifies an “ideal” electric stapling gun as being “energy saving” and explains that its disclosed lifter member can “provide the same hitting effect with less power consumption.” Lai, 1:9–10. 2:34–42. A POSITA would have replaced Saari/Enstrom’s helicoidal lifting mechanism with Lai’s lifter member in order to eliminate the electrical power cable and achieve a portable, battery-powered nailer. Vallee, ¶113.

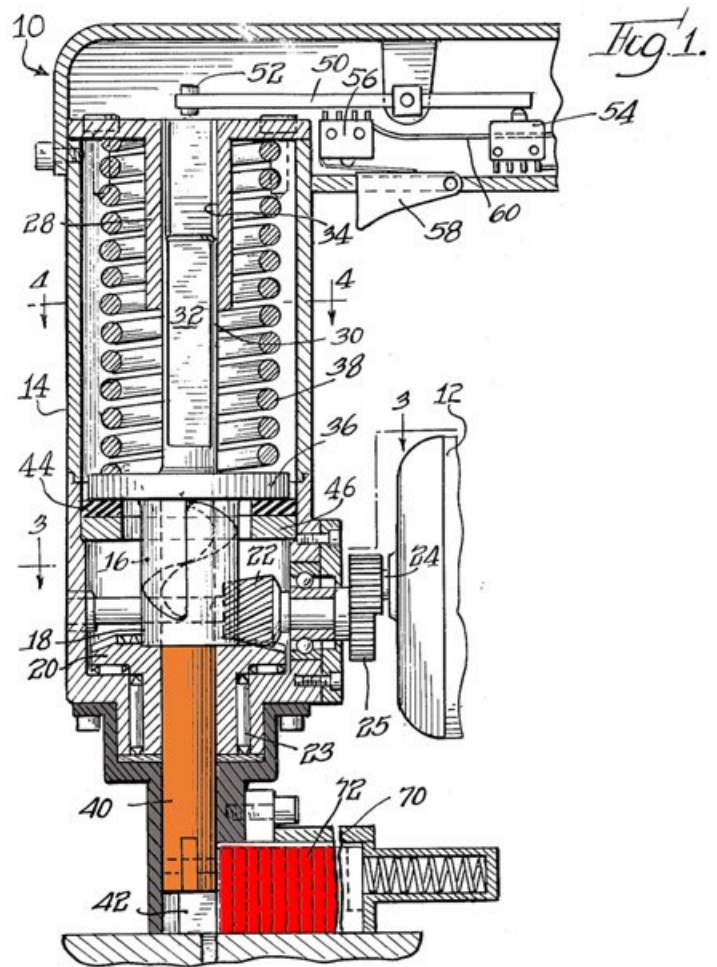
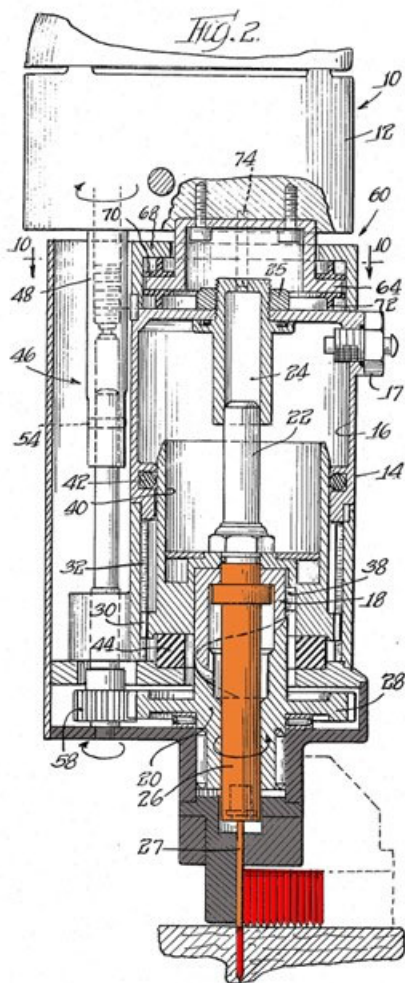
In this combination, a POSITA would modify Saari/Enstrom’s movable driver to include “at least one protrusion” to incorporate Lai’s lifter to move the driver and piston through a return stroke by “mechanical engagement between said lifter and said at least one protrusion of the driver.” Lai teaches adding a “U-shaped member 61” with protrusions to a protrusion-less driver blade so that it can be engaged by pins 52A and 52B of Lai’s lifter member. Lai, 2:4–7. In the same way, POSITA would have understood that by adding protrusions to Saari/Enstrom’s driver blade it

could be lifted by Lai's lifter member and would have achieved the same results predicted by Lai. Vallee, ¶114.

3. Claim 3

Element [3.1]

Saari/Enstrom discloses “a guide body with a linear passageway for said driver.” Saari/Enstrom's guide body (grey) has a linear passageway for the driver (26/40, orange). Enstrom, Fig. 2; Saari, Fig. 1.



Element [3.2]

The combination discloses “said lifter moves in a rotational motion and causes said driver to move in a linear motion.” In that combination, Lai’s lifter is a rotatable cam 5 (yellow) that moves in rotational motion (curved arrows) to cause the driver (light orange) to move in a linear motion (straight arrow). Lai, Figs. 4A–D, 1:62–63, 2:14–25.

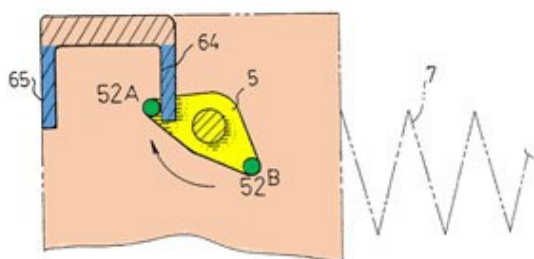


Fig. 4A.

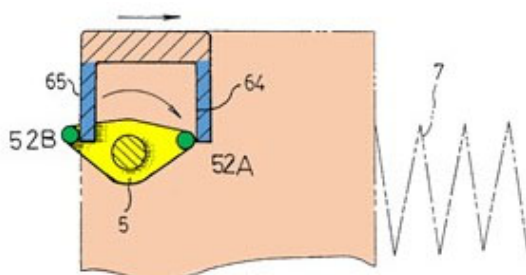


Fig. 4B.

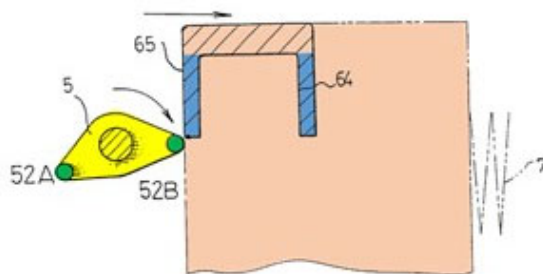


Fig. 4C.

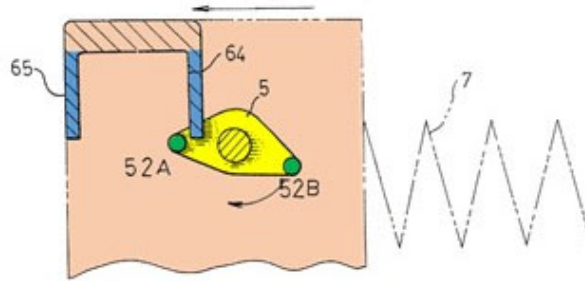
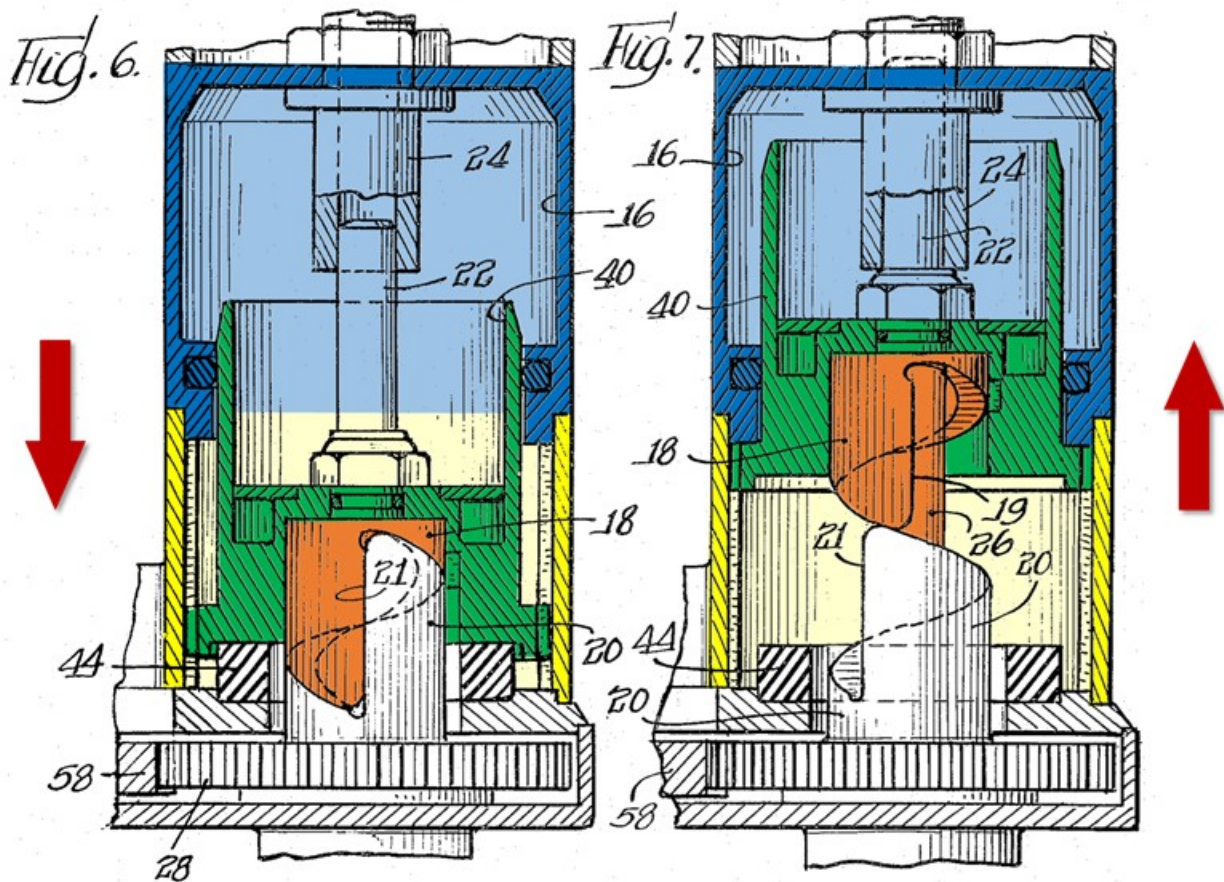


Fig. 4D.

4. Claim 4

Element [4.1]

Saari/Enstrom discloses “said cylinder and piston act as a gas spring during said drive stroke.” In Saari/Enstrom, the cylinder (yellow) and piston (“cup-like piston 40,” green) act as a gas spring during the drive stroke. When the cup-like piston 40 is raised, the gas in the displacement volume of the cylinder within the cup of piston (yellow) and the gas in chamber 16 (blue) are compressed, and the ram is then “driven downwardly under the bias of the compressed gas.” Vallee, ¶117; Enstrom, 2:45–46, Figs. 6–7; Saari, Fig. 10.



Element [4.2]

The combination discloses “said lifter does not engage said driver during said drive stroke.” Lai’s lifter (cam 5) does not engage (“is separated from”) the protrusions of the driver (U-shaped member 61 on hammer 6) during the drive stroke. Lai, 2:22–25, Fig. 4D. Vallee, ¶118.

5. Claim 5

The combination discloses “a motor and an on-board electrical power source, wherein said motor provides motive power for said lifter.” Lai’s lifter is provided with motive power by a motor (“motor 3”), which is powered by an on-board

electrical power source (battery 2). Lai, Figs. 1–2, 1:25–35, 1:44–54, 1:60–62, 2:2, 2:14–16; Vallee, ¶119.

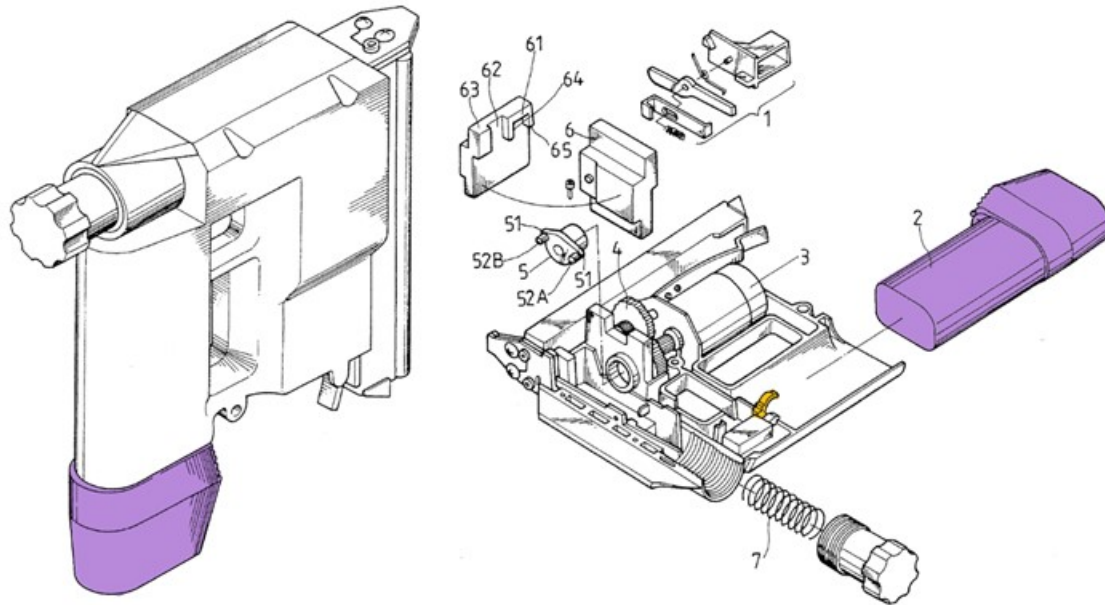


Fig. 1.

F I G. 2

6. Claim 6

The combination discloses “(a) said on-board electrical power source comprises a detachable battery; and (b) said motor comprises an electric motor.”

Lai’s on-board electrical power source (battery pack, purple) is attached and detached using an internal attachment clip (orange). Lai, Figs. 1–2; Vallee, ¶120.

Lai’s motor (“motor 3”) is an electric motor. Lai, 1:25–35, 1:44–54, 1:60–62, 2:2; Vallee, ¶120.

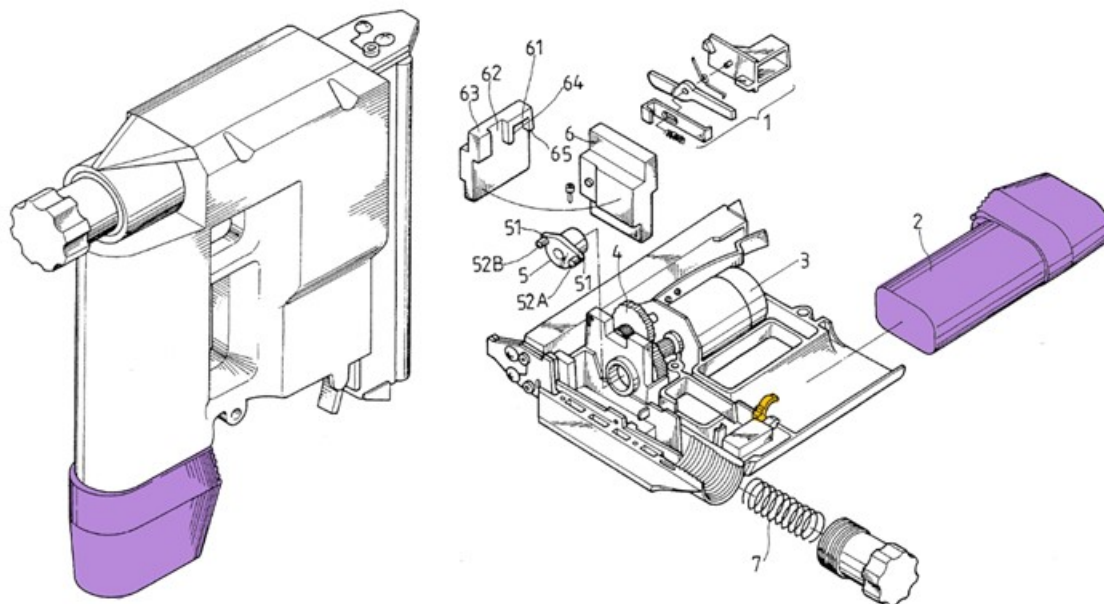


Fig. 1.

F I G. 2

7. **Claim 7**

Saari/Enstrom discloses “said movable piston moves through a pathway through said hollow cylinder between a higher pressure position and a lower pressure position.” Saari/Enstrom’s movable piston (“cup-like piston 40,” green) moves through a pathway along the axis of the hollow cylinder (yellow) between a higher pressure position (Fig. 7) and a lower pressure position (Fig. 6). Enstrom, 2:35–45, Figs. 6–7; Saari, 4:1–11, Fig. 10; Vallee, ¶121.

storage chamber and a valve for “selectively charging the chamber” means that the chamber will “remain above atmospheric pressure during all portions of an operating cycle,” since a charging valve would have no use if the chamber is allowed to reach atmospheric pressure. Vallee, ¶¶122-123. Saari/Enstrom explicitly denigrate pneumatic devices that “require[] convenient sources of compressors and air hoses which makes a tool undesirable for the various remote locations required on a construction site.” Saari, 1:9–15; Enstrom, 1:7–13.

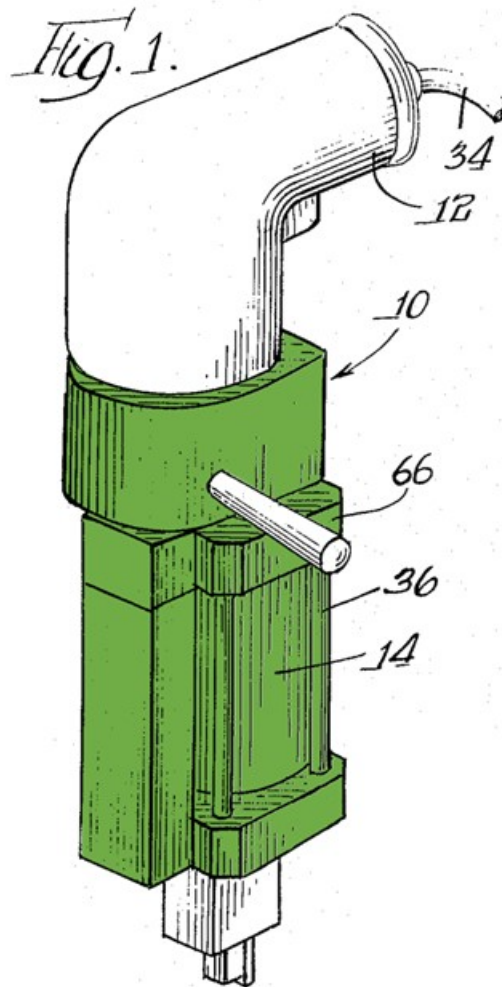
9. Claim 9

Element [9.P]

Saari/Enstrom discloses “[a] portable fastener driving tool.” Saari/Enstrom disclose a “driving tool” with a spring (including a compressed gas spring) to “provide the actual driving force to seat the fastener.” Saari, 1:27–33; Enstrom, 1:27–32.

Element [9.1]

Saari/Enstrom discloses “a housing with a storage chamber that contains a pressurized gas.” Saari/Enstrom’s housing (green) has the storage chamber containing pressurized gas (“chamber 16,” blue). Saari, Fig. 1; Enstrom, Fig. 1; *see* Element [1.2].



Saari/Enstrom discloses “a hollow cylinder that includes a movable piston.”

See Element [1.1].

Saari/Enstrom discloses “a driver that is in communication with said piston at least during a drive stroke.” *See* Element [2.1].

The combination discloses “a lifter that is in communication with said driver at least during a return stroke.” As explained above, it was obvious to replace Saari/Enstrom’s lifting mechanism with the claimed “lifter,” which is disclosed by Lai. *See* §VII.B.2; Vallee, ¶129. In the combination, Lai’s lifter (cam 5) is in

communication with the driver during the return stroke. Lai, 2:13–21, Figs. 4A–4D; Vallee, ¶129.

The combination discloses “a prime mover” and “a source of energy.” See Claims 5–6.

Element [9.2]

Saari/Enstrom discloses “said pressurized gas is used as a gas spring to propel said piston during said drive stroke.” See Element [4.1].

Element [9.3]

The combination discloses “said prime mover causes said lifter to mechanically engage said driver during said return stroke.” See Elements [2.2], [5].

Element [9.4]

The combination discloses “said housing has no external energy source cable and no external hose attached thereto.” That combination is spurred on by the need for a portable, battery-powered nailer, and Lai both teaches and encourages its energy-efficient and compact lifting mechanism powered by its portable battery pack. See Element [2.2]. Accordingly, in that combination, Saari/Enstrom’s electrical cable is replaced with Lai’s portable battery (battery 2), and there is no external cable or hose. Vallee, ¶ 133.

Element [9.5]

Saari/Enstrom discloses “said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber.” *See* Element [1.5].

10. Claim 10

Saari/Enstrom discloses “said storage chamber and said hollow cylinder are always in fluidic communication.” *See* Element [1.2].

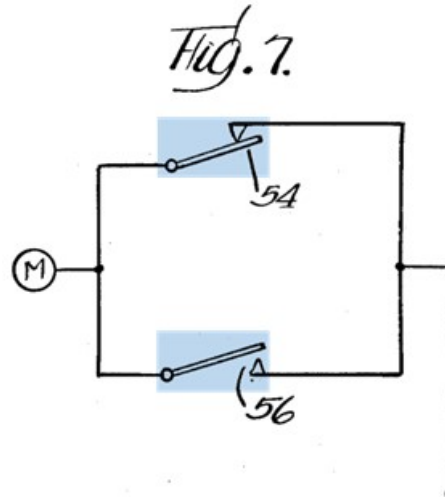
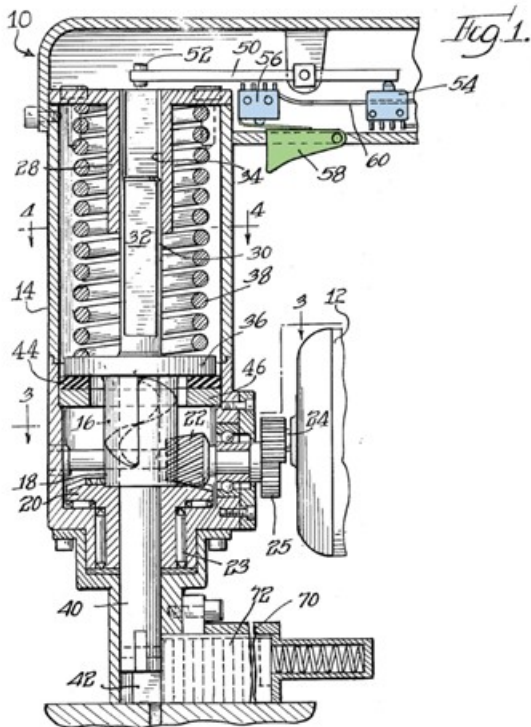
11. Claim 11

Saari/Enstrom discloses “said pressurized gas is re-used for a plurality of operational cycles that each include said drive stroke and said return stroke.” *See* Element [1.4].

12. Claim 12

Saari/Enstrom discloses “said piston has a rest position between operational cycles; and said rest position is achieved after said return stroke.” Saari/Enstrom discloses a circuit that supplies power to the motor (“M” in Fig. 7) based on input from “switch 54” (which is opened by guide shaft 30 engaging pivot arm 50 when driving ram 40 is raised to its cocked position) and “switch 56” (which is closed by actuation of trigger 58). Saari, 3:19–63, Figs. 1, 7–9; *see* Enstrom, Fig. 2 (guide shaft 22). Switches 54 and 56 are wired in parallel between the motor and power supply, meaning that the motor will be actuated so long as either switch is closed. Vallee, ¶139; Saari, Figs. 7–9. Switch 54 is “normally closed”—and thus allowing

power to be supplied to the motor, but is opened when actuated by the driving ram 40 being raised to its cocked position after a return stroke. Saari, 3:29–31, Figs. 1 and 7–9; Vallee, ¶139. Switch 56 is closed when a user actuates the trigger 58. Saari, 3:19–20, Figs. 1, 7–9; Vallee, ¶139. The driving cycle thus begins with the driving ram 40, and its connected piston (“cup-like piston 40”), resting in its upper, cocked position and both switches open. Vallee, ¶139; Saari, Fig. 8.



13. Claim 13

The combination discloses “said prime mover comprises an electric motor; and said source of energy comprises a detachable battery.” See Claims 5–6.

14. Claim 14

Elements [14.P]–[14.5]

Elements [14.P]–[14.4] are identical to Elements [9.P]–[9.4], respectively, and are met as described above. Element [14.5] is substantially the same as Element [7] and is met as described above.

Element [14.6]

Saari/Enstrom discloses “said piston has a rest position between operational cycles; and a location of said rest position is proximal to said higher pressure position.” As discussed above, Saari/Enstrom discloses a rest position at its upper, cocked position. *See* §VII.B.12. This rest position is between operational cycles and at a location proximal to the higher pressure position.

15. Claims 15–16

Claims 15–16 are identical to Claims 10–11, respectively, and are met as described above.

16. Claim 17

Elements [17.P]–[17.4]

Elements [17.P]–[17.4] are identical to Elements [1.P]–[1.4], respectively, and are met as described above.

Element [17.5]

Saari/Enstrom discloses “said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber of the gas pressure system.” *See* Element [1.5].

17. Claims 18–20

Claims 18–20 are identical to Claims 2, 5 and 8, respectively, and are met as described above.

C. Ground 3: Claims 1–20 are Obvious based on Kondo

Kondo was considered during prosecution, and in fact was “the primary reference being relied upon by the Examiner” when the claims were initially rejected. Ex. 1002 [March 24, 2021 Amendment], 7. The claims were specifically allowed over Kondo based on the “sole” piston limitation in claims 1, 9, and 17, and the “higher pressure” rest position limitation in claim 14. *See* Ex. 1002 [March 24, 2021 Amendment], 7; Ex. 1002 [April 26, 2021 NOA], 2. But the Examiner was not privy to the expert testimony from Dr. Vallee relied on in this Petition. Dr. Vallee explains why it was obvious to a POSITA to omit Kondo’s second piston, which is part of an optional gas replenishment feature, and describes the market forces and design incentives that would have motivated a POSITA to omit that piston. Vallee, ¶157. Dr. Vallee also explains why it was obvious to a POSITA to have a higher pressure rest position (such as those taught by Haley and

Saari/Enstrom), and describes why this was a simple choice from two identified and predictable solutions, *i.e.*, either a higher pressure rest position or a lower pressure rest position. Vallee, ¶187.

1. Claim 1

Element [1.P]

U.S. Patent No. 5,720,423 (“Kondo”) discloses “[a] gas pressure system for a portable power tool.” Kondo “provide[s] a fastener driving tool which is operable to drive fasteners,” Kondo, 1:48–49.

Element [1.1]

Kondo discloses “a hollow cylinder having a movable piston therewithin.” Kondo refers to its hollow cylinder (yellow) as “cylindrical main body 11a,” refers to the movable piston (green) within that hollow cylinder as “drive piston 12,” and says that the piston is “disposed within the main body 11a of the cylinder 11,” and “is moved vertically within the main body 11a of the cylinder 11.” Kondo, 4:45–46, 5:9–11, Figs. 1–2.



Kondo discloses “a storage chamber that is in fluidic communication at all times with said cylinder.” Kondo’s storage chamber is the “air chamber 14” of its “auxiliary cylinder portion 11b” (blue), which is in fluidic communication at all

times with said displacement volume of the cylinder (“cylindrical main body 11a,” yellow). Kondo, 4:37–40, Figs. 1–2.

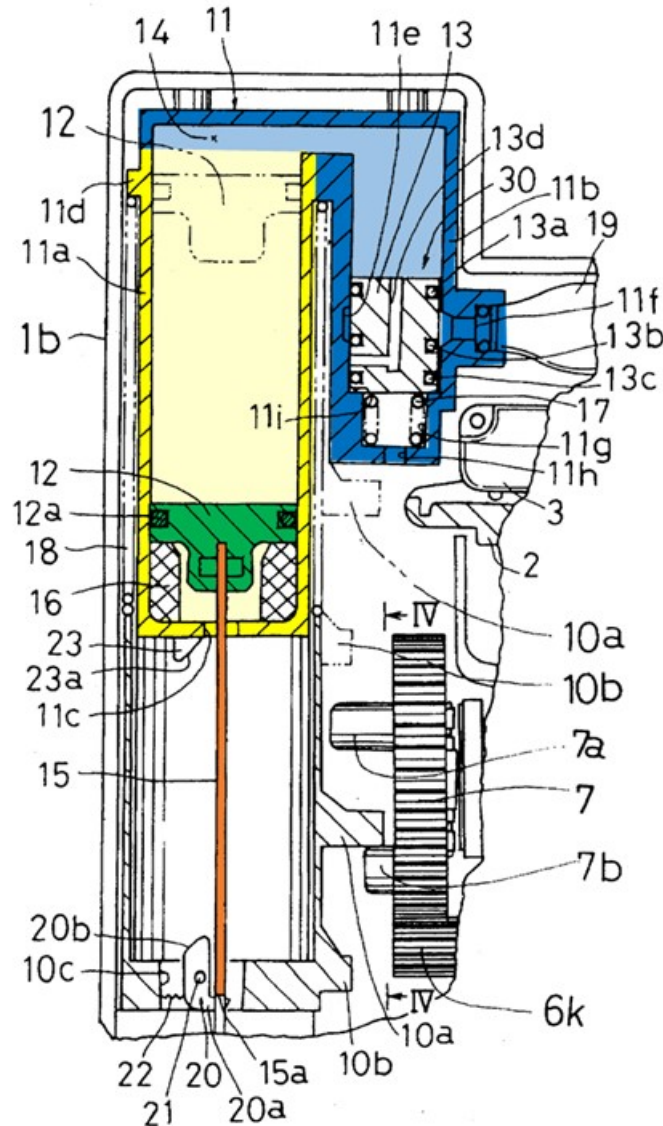


FIG. 2

Kondo’s storage chamber (“air chamber 14” of “auxiliary cylinder portion 11b”) is distinct from the cylinder (“cylindrical main body 11a”). While Kondo generally refers to a “cylinder 11,” it also distinctly references “cylindrical main

body 11a” and “auxiliary cylinder portion 11b” of cylinder 11. Kondo, 4:35–40. A POSITA would consider Kondo’s cylinder (“cylindrical main body 11a,” yellow) to be distinct from the portion of the “air chamber 14” above and beside it, because that portion of the chamber is surrounded by a structure with a different arrangement, radius, and alignment than the “cylindrical main body 11a.” Vallee, ¶¶150-152; Kondo, Figs 1–2.

Kondo discloses “said storage chamber being charged with a pressurized gas.” The design of the “auxiliary piston 13” shows that Kondo’s storage chamber is charged with a pressurized gas. Vallee, ¶153. Because the “compression coil spring 17” and atmospheric pressure (through “communication hole 11h) are collectively acting upon the bottom of “auxiliary piston 13” (Kondo, 6:31–39) and because Kondo’s “air replenishing tank 19” is meant to be used only after “the use of the nailer for a long time” (Kondo, 7:63–67), Kondo’s pressure must remain, during all portions of the operating cycle, above the combined pressures of atmospheric pressure plus the pressure of “compression coil spring 17,” which by definition will be higher than atmospheric pressure alone. Vallee, ¶153.

Element [1.3]

Kondo discloses “said movable piston moves in a reciprocating pattern during an operating cycle, including moving through a drive stroke that is caused by said pressurized gas.” In Kondo, the pressurized gas of both the storage chamber (“air

chamber 14” of “auxiliary cylinder portion 11b”) and the displacement volume (in “cylindrical main body 11a”) move the piston (“drive piston 12”) through a drive stroke. Kondo, 4:58–62, 7, 20–26, Figs. 1–2; Vallee, ¶154.

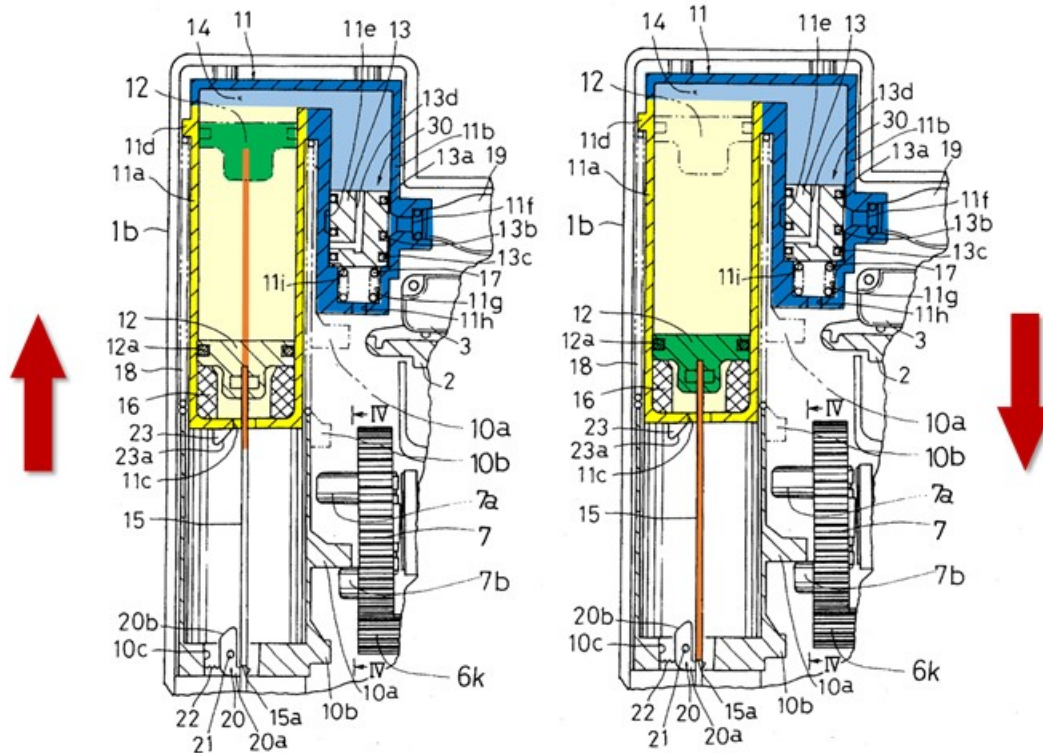


FIG. 2

FIG. 2

Kondo’s movable piston is then lifted during the operation cycle in preparation for another drive stroke, and thus moves in a reciprocating pattern. Kondo, 3:1–4:32, Fig. 2.

Element [1.4]

Kondo discloses “said pressurized gas is not vented to atmosphere after said drive stroke, but instead said pressurized gas is re-used for a plurality of said operating cycles.” The design of the “auxiliary piston 13” shows that Kondo’s

pressurized gas is not vented to the atmosphere after a drive stroke. Vallee, ¶156. While Kondo discloses a gas replenishment system, that system is only meant to be used after “the use of the nailer for a long time” (Kondo, 7:63–67), *i.e.*, after the pressurized gas is re-used for a plurality of operating cycles. Vallee, ¶156.

Element [1.5]

Kondo’s discloses a separate “air replenishing piston 13” and thus does not expressly meet the requirement of “said movable piston is the sole movable piston in the gas pressure system.” It was obvious to omit Kondo’s gas replenishment system and therefore satisfy this claim limitation. Kondo’s own claims relegate the gas replenishment system to dependent claims, clearly establishing that it is an optional feature that can be excluded. *See* Kondo, Claims 1–3. A POSITA would understand that Kondo’s gas replenishment system is an optional feature because it is not used during normal operation, but rather is intended to recharge the storage chamber when the pressure level eventually degrades due to minor leaks of pressurized gas after “the use of the nailer for a long time.” Vallee, ¶¶157-158; Kondo, 7:62–8:1. Furthermore, a POSITA would understand that Kondo’s gas replenishment system adds weight, cost, and complexity to the tool in exchange for an improvement in longevity, and that the decision as to whether to include it would be a simple design choice with predictable results. Vallee, ¶158. A POSITA was motivated to not include Kondo’s gas replenishment system due to market and

design pressures favoring compact, lightweight, and less expensive tools. Vallee, ¶158; *see* Lai, 1:9–10 (“As we know, the ideal electric stapling gun should be energy saving, strong in hitting force and compact in size.”). Kondo’s “air replenishing piston 13” is only used as part of its gas replenishment system, thus without that system the tool would satisfy the limitation that “said movable piston is the sole movable piston in the gas pressure system.” Vallee, ¶158. Accordingly, this claim limitation is rendered obvious by Kondo alone.

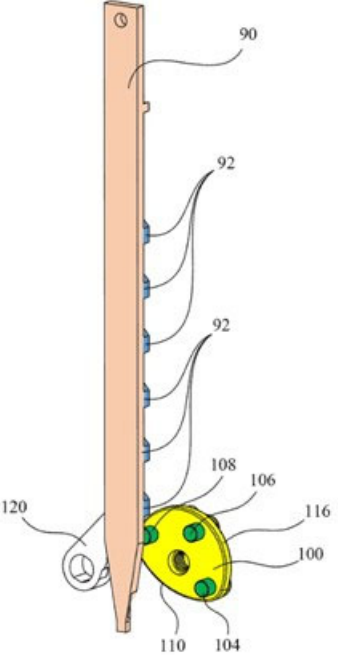
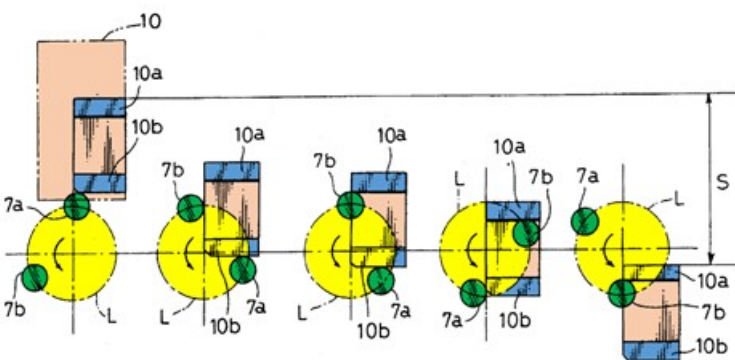
2. Claim 2

Elements [2.1]– [2.2]

The elements of claim 2 require: “(a) a movable driver that is in communication with said piston, said movable driver including at least one protrusion” and “(b) a lifter that causes said driver and said piston to move through a return stroke, by a mechanical engagement between said lifter and said at least one protrusion of the driver.”

Kondo discloses an electrically-powered, mechanical lifting mechanism with a structure that is nearly identical (with only insignificant differences) to that of the “lifter” disclosed by the ’007 patent. *Compare* ’007 patent, Fig. 12 with Kondo, Figs. 1–4. The “lifter member” of the ’007 patent includes a rotatable cam lifter 100 (yellow, below left), with pin 104, 106, and 108 (green) on its face surface that engage protrusions 92 (blue) on the driver member 90 (orange). ’007 patent, 9:36–

52, 16:39–53, Fig. 12. The '007 patent also discloses two-pin variants: lifter members 465 and 480 in Figs. 31 and 33. '007 patent, 32:23–35, 32:56–33:4. Kondo discloses a rotatable drive gear 7 (yellow, below right), with crank pins 7a and 7b (green) on its face surface that engage two protrusions 10a and 10b (blue) on an intermediate member 10 (orange) that contains the driver member (“driver 15”). Kondo, 3:1–4:32, Figs. 1–4.³ Kondo’s lifter member is moved by a prime mover (“motor 4”). Kondo, 3:1–10, Fig. 2.

'007 Patent Lifter Member	Kondo Lifter Member
 Fig. 12	 FIG. 4(E) FIG. 4(D) FIG. 4(C) FIG. 4(B) FIG. 4(A)

³ Figs. 4A–E are illustrated from right-to-left, rather than left-to-right.

Kondo differs slightly from the '007 patent in that the pins of the lifter member (crank pins 7a and 7b) engage protrusions on an intermediate member (protrusions 10a and 10b on an intermediate member 10) rather than protrusions on the driver blade itself. However, a POSITA would consider this difference to be insignificant, because Kondo's actual lifting structure is still the same as that of the "lifter member" in the '007 patent and the intermediate member simply channels the lifting force from that lifter member to the driver blade 15. Vallee, ¶161.

Kondo has a "movable driver" ("driver 15," orange) that is in communication with its piston ("piston 12," green). Kondo, 4:66–67, Figs. 1–2. As noted above, Kondo's movable driver 15 is lifted via protrusions 10a and 10b (light blue) on intermediate member 10 (light orange). Kondo, 3:39–52, Figs. 2, 4A–4E. While protrusions 10a and 10b are not located on driver 15, a POSITA would understand that these protrusions are included as part of the driver because they are what the driver uses to engage with the lifter. Vallee, ¶162. To the extent that this claim is interpreted to require the "at least one protrusion" to be physically located on the driver itself, it was obvious to a POSITA to modify Kondo to have protrusions 10a and 10b be on the driver 15. Vallee, ¶163. Kondo itself discloses, in its third embodiment, a driver ("driver 52") with a protrusion ("stepped portion 52a") that is directly engaged by the lifter. Vallee, ¶163; Kondo, 8:62–67, Fig. 8. It was a simple design choice as to whether or not to have the protrusion on the driver itself (as in

Kondo's third embodiment) or on an intermediate member (as in Kondo's first embodiment), and that a POSITA would have been motivated to have the protrusion on the driver for a less complex design when possible, *i.e.*, for nailers designed to drive higher gauge nails and thus requiring a thicker driver that would be strong enough to have protrusions. Vallee, ¶163.

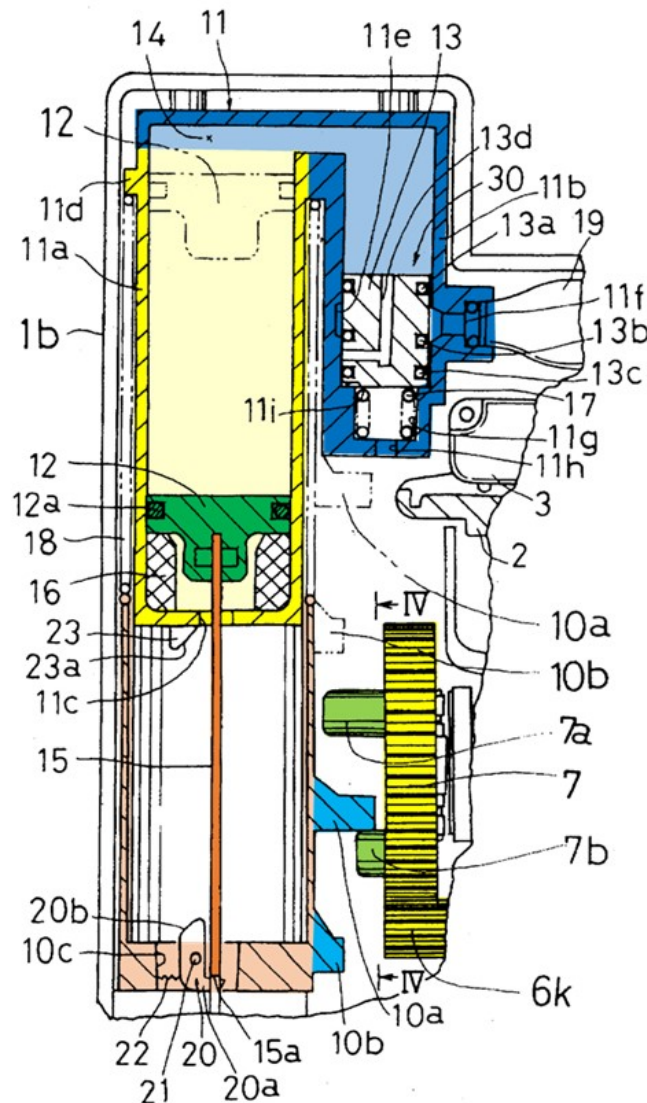


FIG. 2

3. Claim 3

Element [3.1]

Kondo discloses “a guide body with a linear passageway for said driver.”

Kondo discloses a guide body (“driver guide 8,” grey) with a linear passageway (“guide hole 8a”) for the driver (“driver 15,” orange). Kondo, 5:7–11, Figs. 1–2.

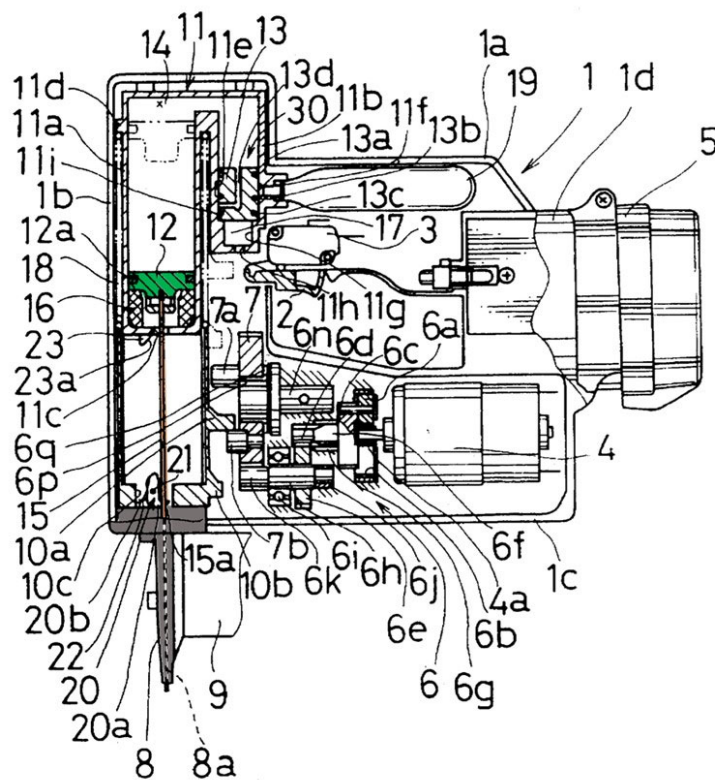


FIG.1

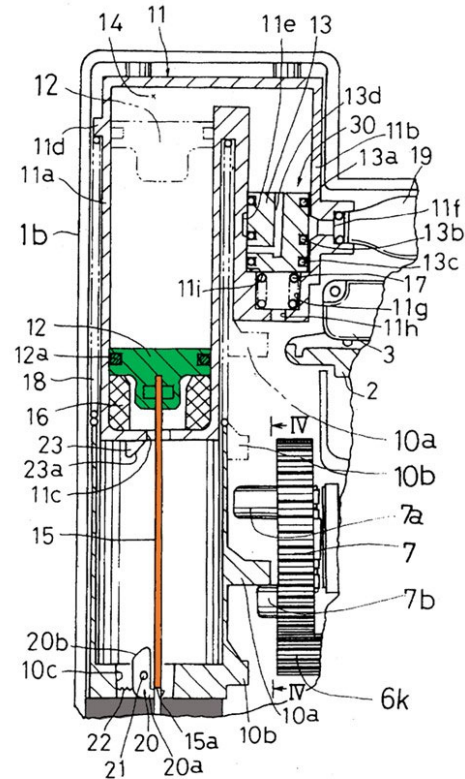
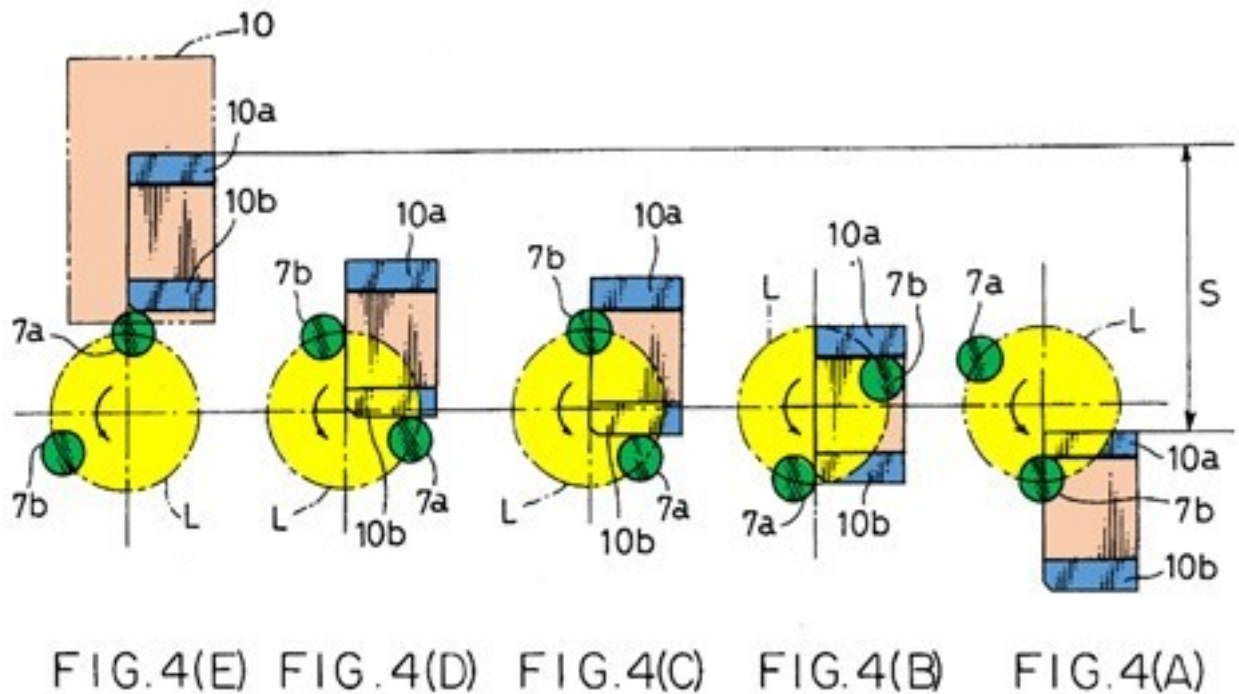


FIG.2

Element [3.2]

Kondo discloses “said lifter moves in a rotational motion and causes said driver to move in a linear motion.” Kondo’s lifter (drive gear, yellow) moves in rotational motion (curved arrows) to cause the driver (via the intermediate member

10, light orange) to move in a linear motion (upward from right to left in Figs. 4A–4E). Kondo, Figs. 4A–E, 3:64–4:25.



4. Claim 4

Element [4.1]

Kondo discloses “said cylinder and piston act as a gas spring during said drive stroke.” In Kondo, the pressurized gas of the storage chamber (“air chamber 14”) and the cylinder (“cylinder 11”) act on the piston (“drive piston 12”) to form a gas spring for driving a nail during a drive stroke. Kondo, Figs. 1, 2, 4A–4E; 5:53–55, 6:1–7. When the driver 15 is released, “the drive piston 12 is forced downwardly by the expanding force of the air compressed within the air chamber 14.” Kondo, 6:1–7.

Element [4.2]

Kondo discloses “said lifter does not engage said driver during said drive stroke.” Kondo’s lifter does not engage (“brought to be free from”) the intermediate member or the driver during the drive stroke. Kondo, Fig. 2, 4:25–32; 6:1–7.

5. *Claim 5*

Kondo discloses “a motor and an on-board electrical power source, wherein said motor provides motive power for said lifter.” Kondo’s lifter is provided with motive power by a motor (“motor 4”). Kondo, 3:35–38, 4:1–6, Figs. 4A–E. Kondo discloses an on-board electrical power source (“battery 5”) as the “power source for driving the motor 4” such that “it is not necessary to be connected to an external power source by means of a cord.” Kondo, 7:51–55, Fig. 1. Kondo notes that “[t]his means that the nailer of this embodiment is hoseless and cordless.” Kondo, 7:54–55.

6. *Claim 6*

Kondo discloses “(a) said on-board electrical power source comprises a detachable battery; and (b) said motor comprises an electric motor.” Kondo’s battery 5 is a detachable battery that “is set into the battery housing portion 1d” and “can be removed from the battery housing portion 1d for charging purposes.” Kondo, 2:61–65. Kondo’s motor 4 is powered by the battery and therefore is an electric motor. Kondo, 7:51–55, Fig. 1; Vallee, ¶170.

7. Claim 7

Kondo discloses “said movable piston moves through a pathway through said hollow cylinder between a higher pressure position and a lower pressure position.”

In Kondo, the movable piston (“piston 12,” green) moves through a pathway along the axis of the hollow cylinder (“cylinder 11,” yellow) between a higher pressure position (shown in dashed-lines in Fig. 2, below left) and a lower pressure position (shown in solid lines in Fig. 2, below right). Kondo, Fig. 2, 4:15–17, 7:26–32; Vallee, ¶171.

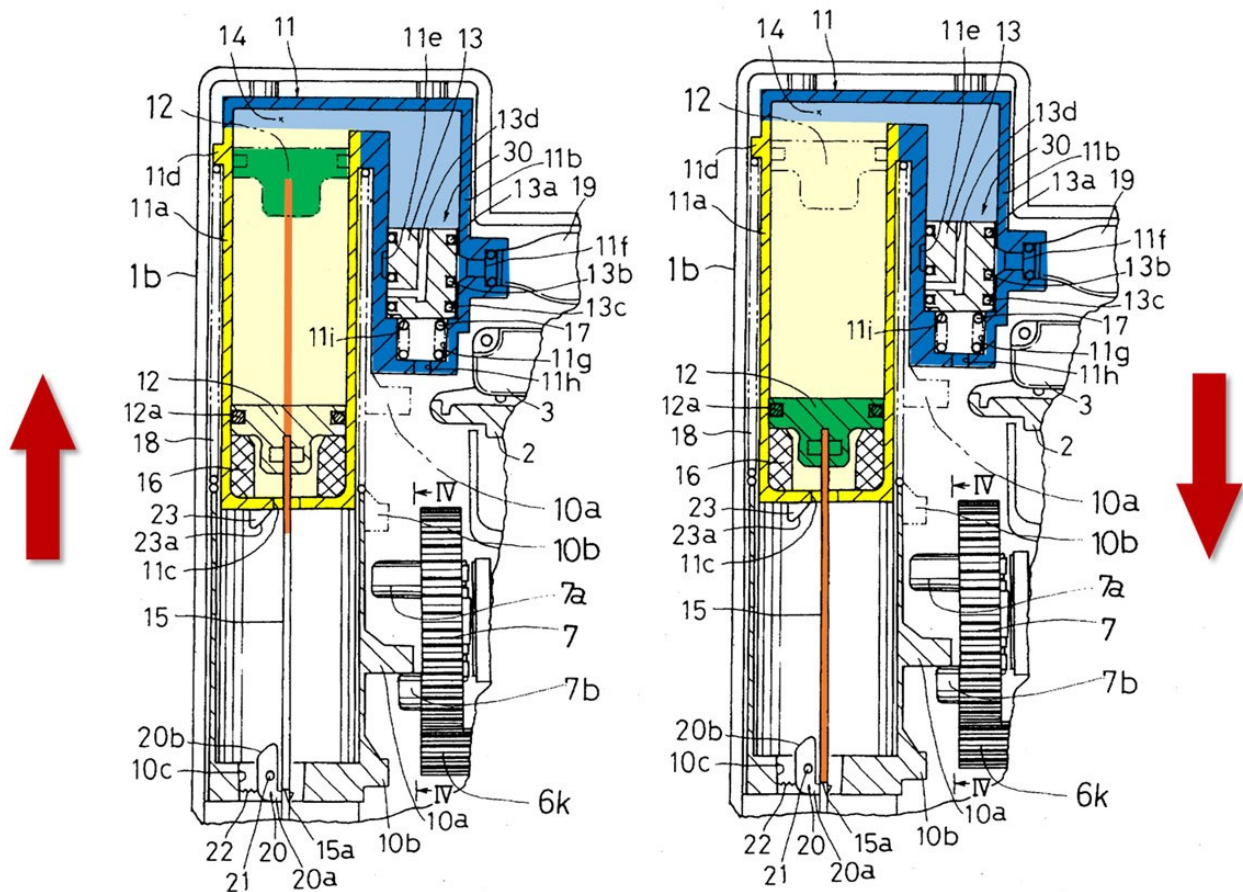


FIG. 2

FIG. 2

8. Claim 8

Kondo discloses “said pressurized gas in the storage chamber remains above atmospheric pressure during all portions of an operating cycle.” The design of the “auxiliary piston 13” shows that Kondo’s storage chamber remains above atmospheric pressure during all portions of an operating cycle. Vallee, ¶172. Because the “compression coil spring 17” and atmospheric pressure (through “communication hole 11h) are collectively acting upon the bottom of “auxiliary piston 13” (Kondo, 6:31–39) and because Kondo’s “air replenishing tank 19” is meant to be used only after “the use of the nailer for a long time” (Kondo, 7:63–67), Kondo’s pressure must remain, during all portions of the operating cycle, above the combined pressures of atmospheric pressure plus the pressure of “compression coil spring 17,” which by definition will be higher than atmospheric pressure alone. Vallee, ¶172.

9. Claim 9

Element [9.P]

Kondo discloses “[a] portable fastener driving tool.” Kondo “provide[s] a fastener driving tool which is operable to drive fasteners,” Kondo, 1:48–49.

Element [9.1]

Kondo discloses “a housing with a storage chamber that contains a pressurized gas.” Kondo’s housing (“housing 1,” green) has the storage chamber (“air chamber

14," blue) that contains pressurized gas. Kondo, 2:50–53, 4:37–40, Figs. 1, 2; Vallee, ¶174; see Element [1.2].

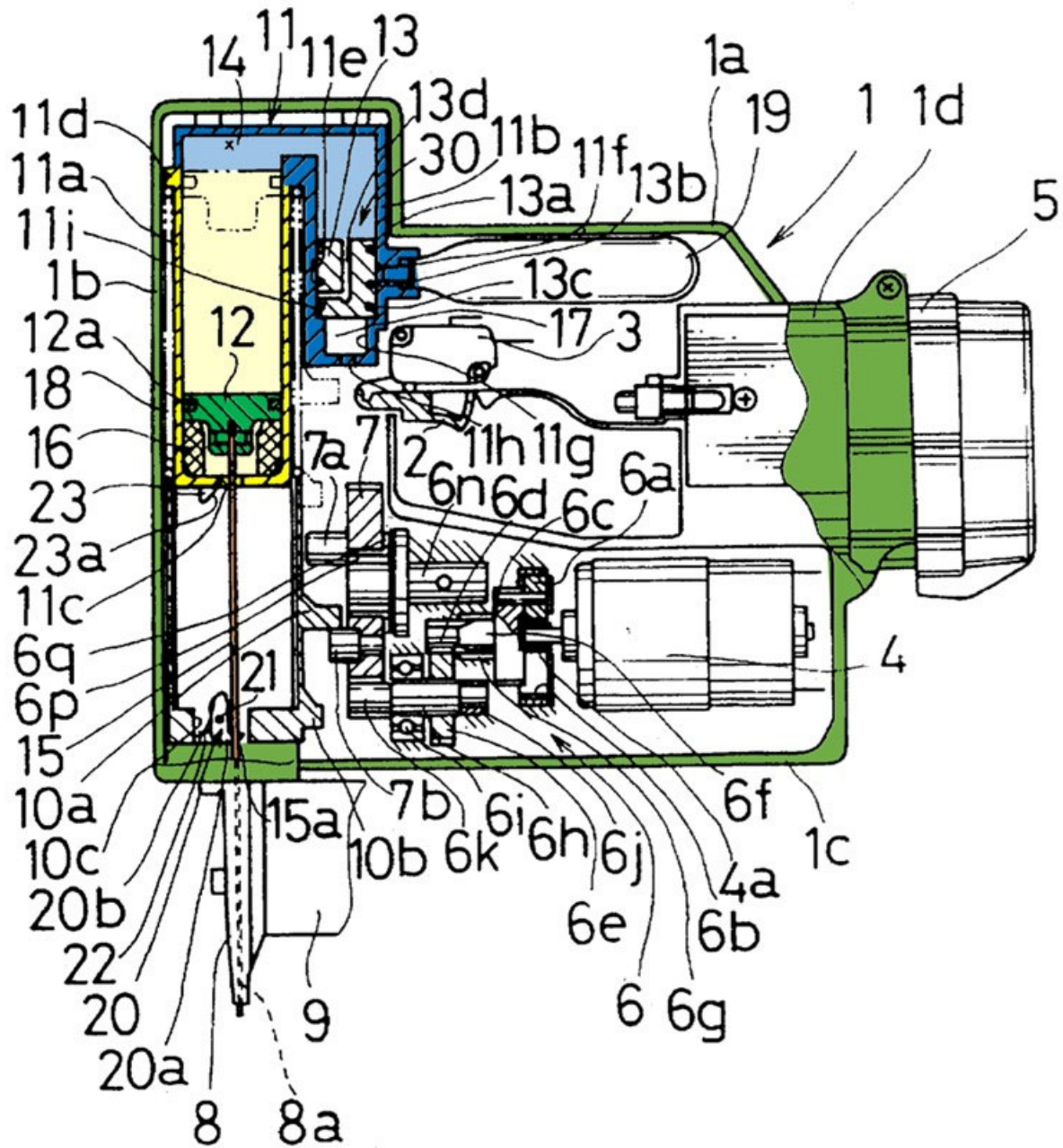


FIG.1

Kondo discloses “a hollow cylinder that includes a movable piston.” *See* Element [1.1].

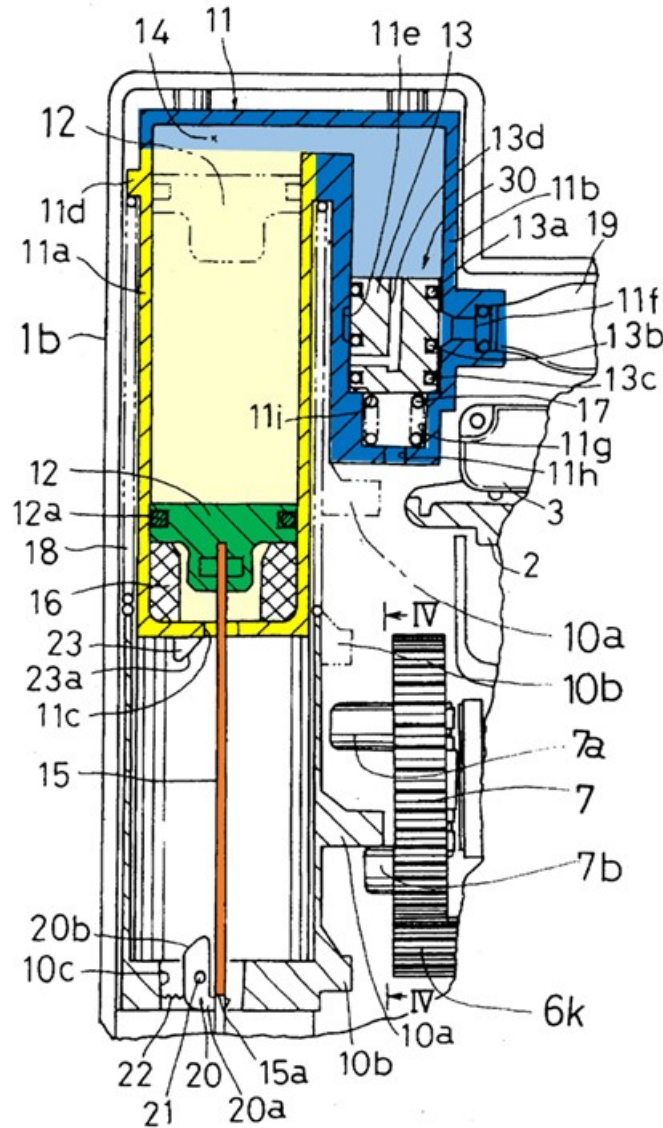


FIG. 2

Kondo discloses “a driver that is in communication with said piston at least during a drive stroke.” *See* Element [2.1].

Kondo discloses “a lifter that is in communication with said driver at least during a return stroke.” As explained above, Kondo discloses the claimed “lifter.” See §VII.C.2; Vallee, ¶177. Kondo’s lifter is in communication with its driver 15, via intermediate member 10, during a return stroke. Kondo, Fig. 1–2, 4A–E, 3:39–4:32, 4:66–5:14.

Kondo discloses “a prime mover” and “a source of energy.” See Claims 5–6.

Element [9.2]

Kondo discloses “said pressurized gas is used as a gas spring to propel said piston during said drive stroke.” See Element [4.1].

Element [9.3]

Kondo discloses “said prime mover causes said lifter to mechanically engage said driver during said return stroke.” See Elements [2.2], [5].

Element [9.4]

Kondo discloses “said housing has no external energy source cable and no external hose attached thereto.” Kondo discloses “battery 5 as a power source for driving the motor 4” such that “it is not necessary to be connected to an external power source by means of a cord.” Kondo, 7:51–55, Fig. 1. Kondo notes that “[t]his means that the nailer of this embodiment is hoseless and cordless.” Kondo, 7:54–55.

Element [9.5]

As discussed above, Kondo does not expressly meet the requirement of “said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber,” but it was obvious to omit Kondo’s gas replenishment system and therefore satisfy this claim limitation. *See* Element [1.5].

10. Claim 10

Kondo discloses “said storage chamber and said hollow cylinder are always in fluidic communication.” *See* Element [1.2].

11. Claim 11

Kondo discloses “said pressurized gas is re-used for a plurality of operational cycles that each include said drive stroke and said return stroke.” *See* Element [1.4].

12. Claim 12

Kondo does not explicitly disclose “said piston has a rest position between operational cycles; and said rest position is achieved after said return stroke.” It was obvious to have a rest position at Kondo’s higher pressure position. A POSITA would understand that there are generally two potential rest positions for the piston between operational cycles—the higher pressure position after the return stroke and the lower pressure position after the drive stroke—both of which were identified and predictable solutions. Vallee, ¶¶186-187. For example, Haley, Saari/Enstrom, and Pedicini all disclose a higher pressure rest position after the return stroke (with Pedicini teaching both positions). *See* §VII.A.12, §VII.B.12, §VII.D.12. A POSITA

would have understood that there was a simple design choice with a well-understood tradeoff, that is, having the rest position at the higher pressure position will achieve “essentially instantaneous driving” (Saari, 3:21–24) in exchange for “losing the benefit of the heat of compression of the air thus reducing the overall efficiency” (Pedicini, ¶[0080]). Vallee, ¶187. By the filing of the ’007 patent, advancements in portable battery power lessened the importance of the incremental efficiency gain provided by the lower pressure rest position, such that market forces and design incentives favored the high pressure rest position, *i.e.*, after said return stroke. Vallee, ¶187. Accordingly, this claim limitation is rendered obvious by Kondo alone, or in view of Haley, Saari/Enstrom, or Pedicini.

13. Claim 13

Kondo discloses “said prime mover comprises an electric motor; and said source of energy comprises a detachable battery.” *See* Claims 5–6.

14. Claim 14

Elements [14.P]–[14.5]

Elements [14.P]–[14.4] are identical to Elements [9.P]–[9.4], respectively, and are met as described above. Element [14.5] is substantially the same as Element [7] and is met as described above.

Element [14.6]

Kondo does not explicitly disclose “said piston has a rest position between operational cycles; and a location of said rest position is proximal to said higher pressure position.” However, as discussed above, it would have been obvious to have a rest position proximal to the higher pressure position. *See* §VII.C.12. Accordingly, this claim limitation is obvious for the reasons discussed above.

15. Claims 15–16

Claims 15–16 are identical to Claims 10–11, respectively, and are met as described above.

16. Claim 17

Elements [17.P]–[17.4]

Elements [17.P]–[17.4] are identical to Elements [1.P]–[1.4], respectively, and are met as described above.

Element [17.5]

As discussed above in relation to claims 1 and 9, Kondo does not expressly meet the requirement of “said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber of the gas pressure system,” but it was obvious to omit Kondo’s gas replenishment system and therefore satisfy this claim limitation. *See* Element [1.5].

17. Claims 18–20

Claims 18–20 are identical to Claims 2, 5 and 8, respectively, and are met as described above.

D. Ground 4: Claims 1–20 are Obvious based on Pedicini

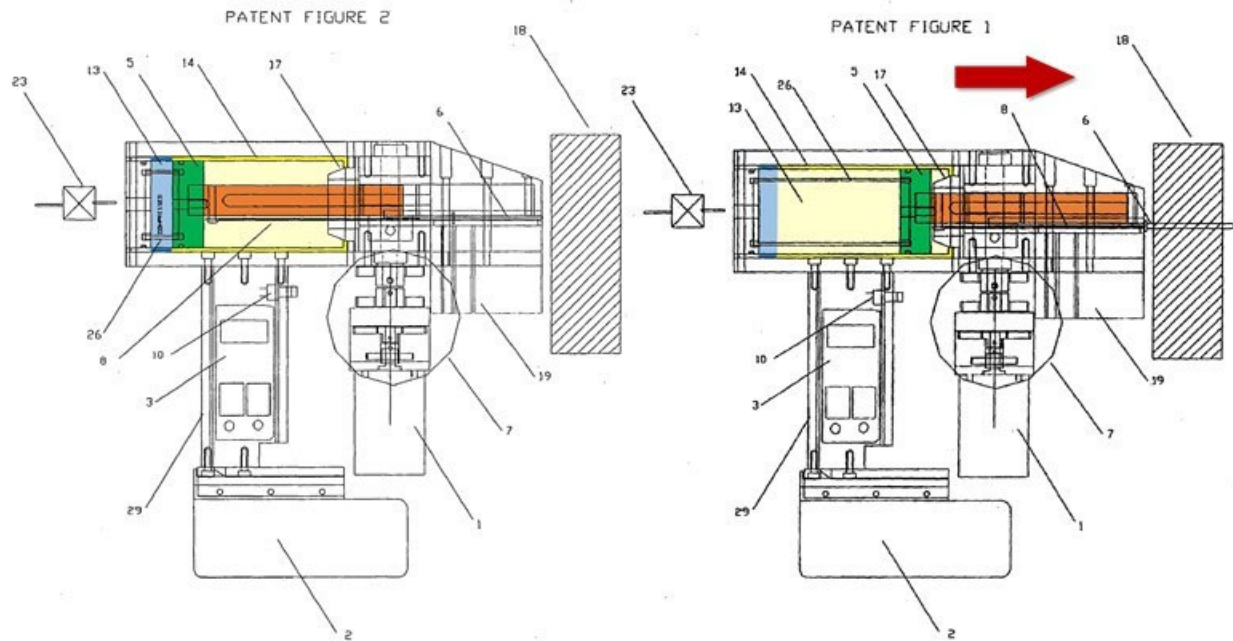
1. Claim 1

Element [1.P]

U.S. Patent Publication No. 2006/0180631 (“Pedicini”) discloses “[a] gas pressure system for a portable power tool.” Pedicini discloses a fastener driving tool (“fastener device 100”). Pedicini, Figs. 1–4; ¶ [0077].

Element [1.1]

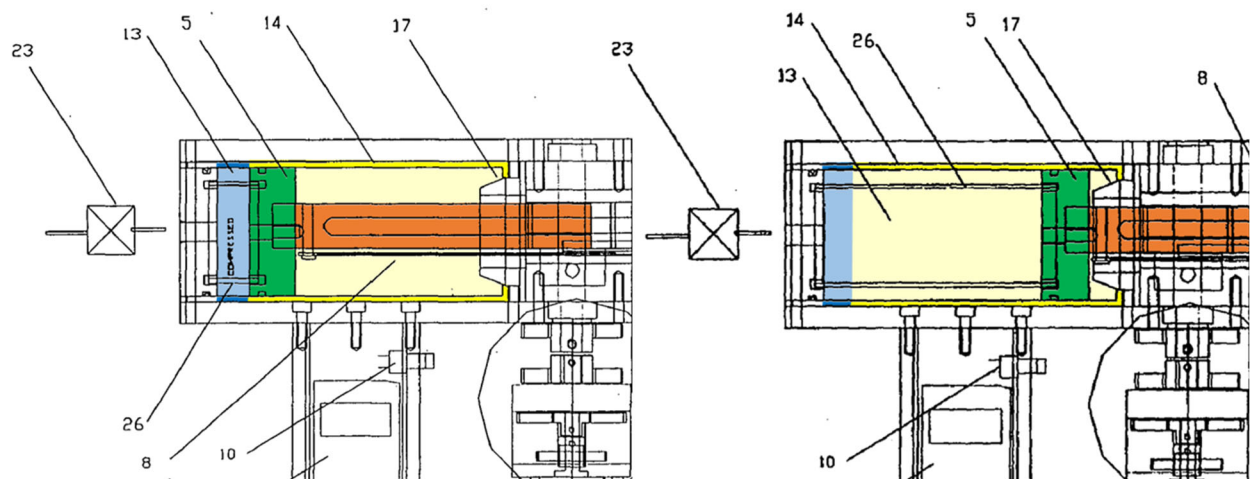
Pedicini discloses “a hollow cylinder having a movable piston therewithin.” Pedicini’s hollow cylinder (“cylinder (14),” yellow) includes a piston (“piston (5),” green) that can “move within the cylinder (14).” Pedicini, ¶¶[0077]–[0078], Figs. 1–4. The hollow cylinder has a displacement volume created by the stroke of the piston (yellow), which is reflected by the piston illustrated at its raised position in Fig. 2 and at its lower position in Fig. 1. Pedicini, Figs. 1–3.



Element [1.2]

Pedicini discloses “a storage chamber that is in fluidic communication at all times with said cylinder.” Pedicini’s storage chamber is the overhead portion of the “chamber (13)” within “cylinder 14,” *i.e.*, the volume above the piston (blue).

Pedicini, Figs. 1–2.



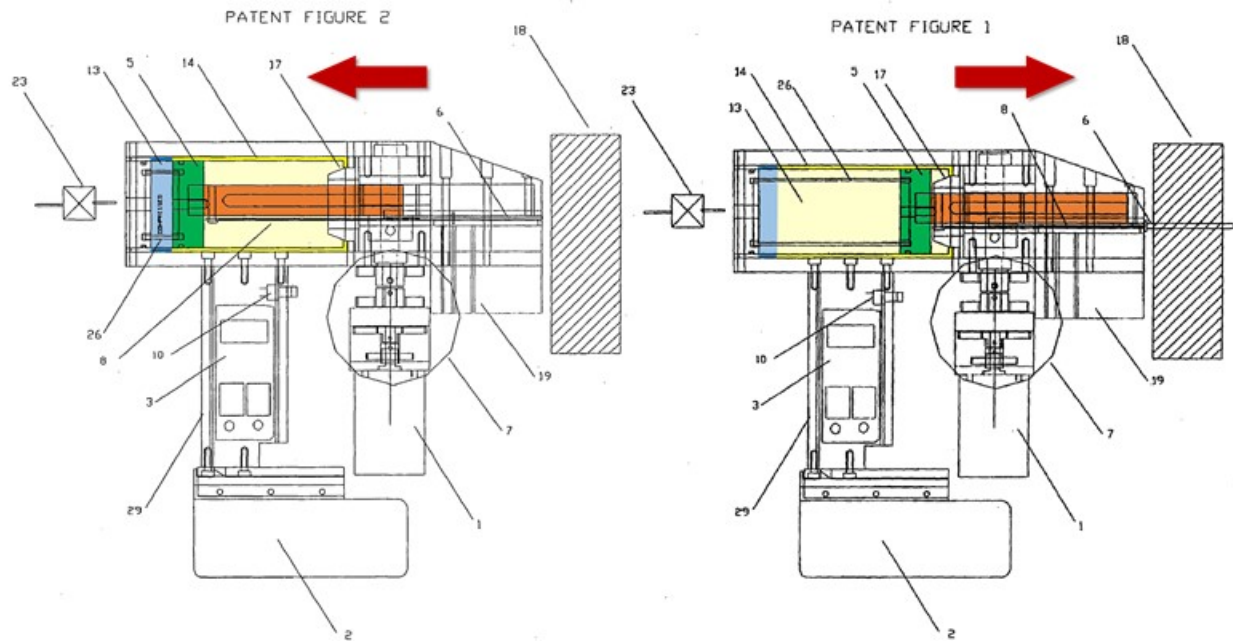
Pedicini's storage chamber (blue) is distinct from the displacement volume (yellow) of cylinder 14 and remains in fluidic communication at all times with the cylinder and its displacement volume, which is shown in Figures 1–2 where the storage chamber is directly adjacent to the displacement volume. As explained above, the ITC's decision regarding "main storage chamber" was based on Patent Owner's post-agreement argument that the agreed construction required the "main storage chamber" to be distinct from *any* region within the "hollow cylinder," and not—as Petitioner understood the agreement—distinct from the "displacement volume" recited in the claims, which is the region "created by a stroke of said piston." '007 patent, 10:22–25. The region annotated above in blue is above the travel path of the piston and thus is not part of the "displacement volume." Vallee, ¶199. Accordingly, that blue region is distinct from the claimed "displacement volume" and constitutes a separate volume that should satisfy the "storage chamber" limitation.

Pedicini discloses "said storage chamber being charged with a pressurized gas." Pedicini states that "[a] release valve (23) is used to replenish the air which may be lost between nail drives." Pedicini, ¶[0077], Figs. 1–2. Pedicini also states that "it is possible to precharge the air chamber (13) to eliminate the piston return spring (26)"—while Pedicini goes on to say that "this is not preferable since it complicates recovering from fastener jams," Pedicini includes an embodiment

(Figure 4) where the piston return spring 26 is indeed eliminated. Pedicini, ¶[0077], Fig. 4. A POSITA would understand the disclosure of a sealed storage chamber and a release valve for “replenishing the air” means that the chamber is “charged with a pressurized gas” and that it will remain above atmospheric pressure during all portions of an operating cycle, since a charging valve would have no use if the chamber is allowed to reach atmospheric pressure. Vallee, ¶201. Nor would a POSITA misinterpret the valve in Pedicini as a connection point for a pneumatic hose to attached and supply gas throughout operation (as opposed to only an initial charge), since Pedicini explicitly denigrates the “[n]on-portability” of “[t]raditional nail guns [that] are tethered to a fixed compressor.” Pedicini, ¶[0017].

Element [1.3]

Pedicini discloses “said movable piston moves in a reciprocating pattern during an operating cycle, including moving through a drive stroke that is caused by said pressurized gas.” Pedicini’s piston (“piston (5),” green) moves in a reciprocating pattern between its lower position after a drive stroke (Fig. 1) and its upper position after a return stroke (Fig. 2). Pedicini, Figs. 1–2, ¶¶[0077]–[0078], Claims 1, 8, 18.



Pedicini's compressed gas causes the piston to move through a drive stroke. When the piston is raised, the gas in the storage chamber and the displacement volume is compressed, and when decoupled from the "rack pinion (31)," the "piston (5)," along with its attached "rack (4)" and "anvil (8)," then "rapidly accelerate under the force of the compressed air." Vallee, ¶203; Pedicini, ¶[0078], Figs. 1–2.

Element [1.4]

Pedicini discloses "said pressurized gas is not vented to atmosphere after said drive stroke, but instead said pressurized gas is re-used for a plurality of said operating cycles." Pedicini states that "[a] release valve (23) is used to replenish the air which may be lost between nail drives." Pedicini, ¶[0077], Figs. 1–2. Pedicini also states that "it is possible to precharge the air chamber (13) to eliminate the piston return spring (26)"—while Pedicini goes on to say that "this is not preferable since

it complicates recovering from fastener jams,” Pedicini includes an embodiment (Figure 4) where the piston return spring 26 is indeed eliminated. Pedicini, ¶[0077], Fig. 4. A POSITA would understand the disclosure of a sealed storage chamber and a release valve for “replenishing the air” means that the pressurized gas is “not vented to atmosphere after said drive stroke,” but instead “is re-used for a plurality of said operating cycles,” since a charging valve would have no use if the chamber is allowed to reach atmospheric pressure. Vallee, ¶204. Nor would a POSITA misinterpret the valve in Pedicini as a connection point for a pneumatic hose to attached and supply gas throughout operation (as opposed to only an initial charge), since Pedicini explicitly denigrates the “[n]on-portability” of “[t]raditional nail guns [that] are tethered to a fixed compressor.” Pedicini, ¶[0017].

Element [1.5]

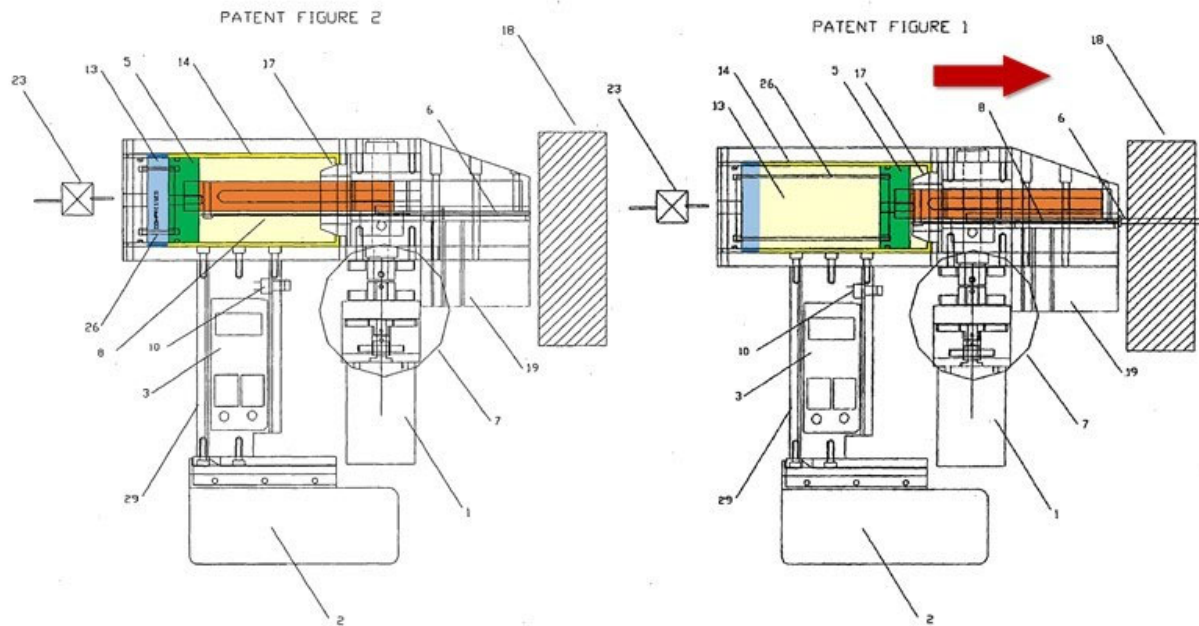
Pedicini discloses “said movable piston is the sole movable piston in the gas pressure system.” Pedicini’s movable piston is the sole piston in the gas pressure system. Pedicini, Figs. 1–4.

2. Claim 2

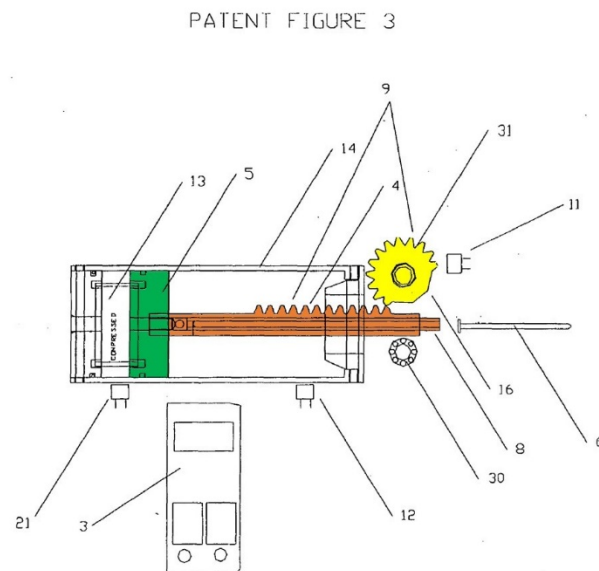
Element [2.1]

Pedicini discloses “(a) a movable driver that is in communication with said piston, said movable driver including at least one protrusion.” Pedicini’s movable driver (“rack (4)” and its “anvil (8),” orange) is in communication with the piston

(“piston (5),” green) and moves along with the piston through the drive and return strokes. Pedicini, Figs. 1–2, ¶¶[0077]–[0078].



Pedicini’s movable driver has numerous (thus “at least one”) protrusions, which are the gear teeth shown below in Fig. 3. Pedicini, Fig. 3, ¶[0078]; Vallee, ¶¶206-207.

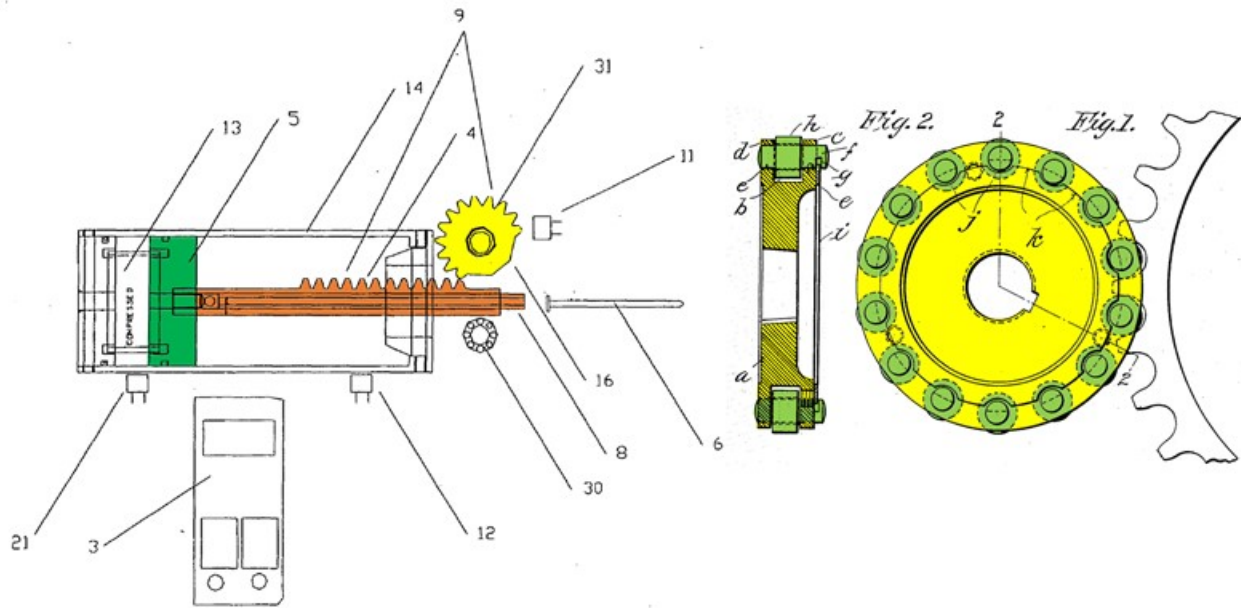


Element [2.2]

Pedicini discloses a rack-and-pinion gear with gear teeth on its outer perimeter (“rack pinion (31)”), and thus does not disclose the claimed “lifter.” Pedicini, ¶[0078], Figs. 3 (below left), 4; Vallee, ¶208. An obvious variant of Pedicini’s rack-and-pinion gear was to implement the well-known “roller” modification—where the gear teeth are replaced with rollers along the outer perimeter that can better handle friction and are thus less at risk to wearing down over time—to obtain a “roller pinion,” which is disclosed and touted by U.S. Patent No. 860,536 (“Ellingham”). Vallee, ¶208; Ellingham, 1:8–14, Figs. 1–2 (below right). The Patent Owner has accused such a “roller pinion” lifting mechanism in Petitioner’s products as being a “lifter member.” If such a lifting mechanism could constitute a “lifter,” then it would be rendered obvious by Pedicini in view of the well-known “roller pinion” such as that disclosed by (and whose use is encouraged by) Ellingham, for example.

Pedicini in view of Ellingham thus renders obvious Element [2.2]: “a lifter that causes said driver and said piston to move through a return stroke, by a mechanical engagement between said lifter and said at least one protrusion of the driver.”

PATENT FIGURE 3

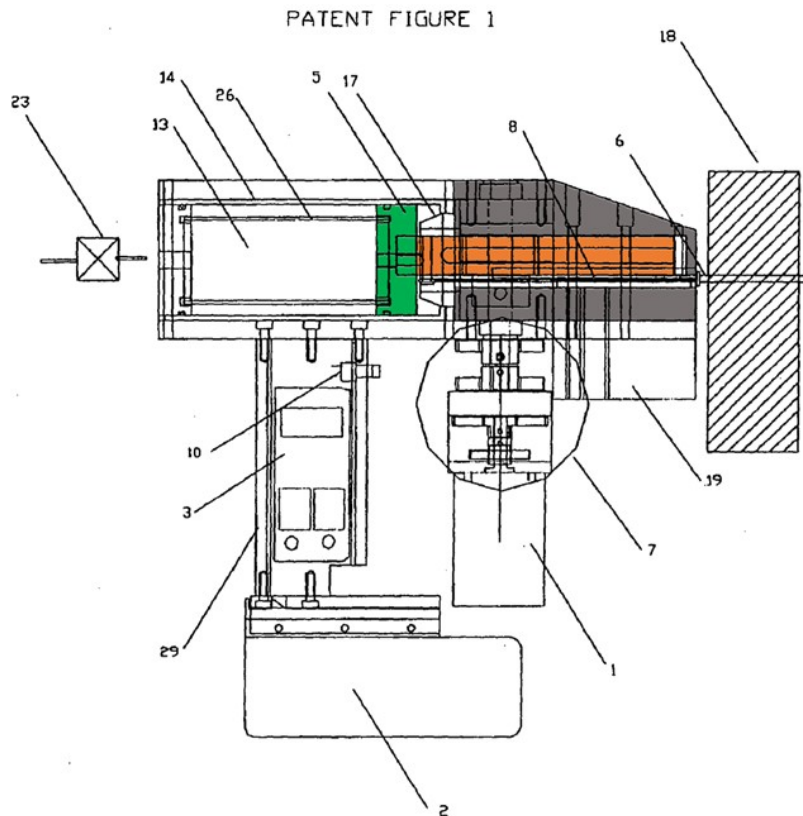


Pedicini’s modified roller pinion lifting mechanism causes the driver and piston to move through a return stroke by mechanical engagement between the rollers of the roller pinion and the gear teeth of the driver (“rack (4)”). Pedicini, ¶[0078], Fig. 3; Ellingham, 1:8–14, Figs. 1–2; Vallee, ¶209.

3. Claim 3

Element [3.1]

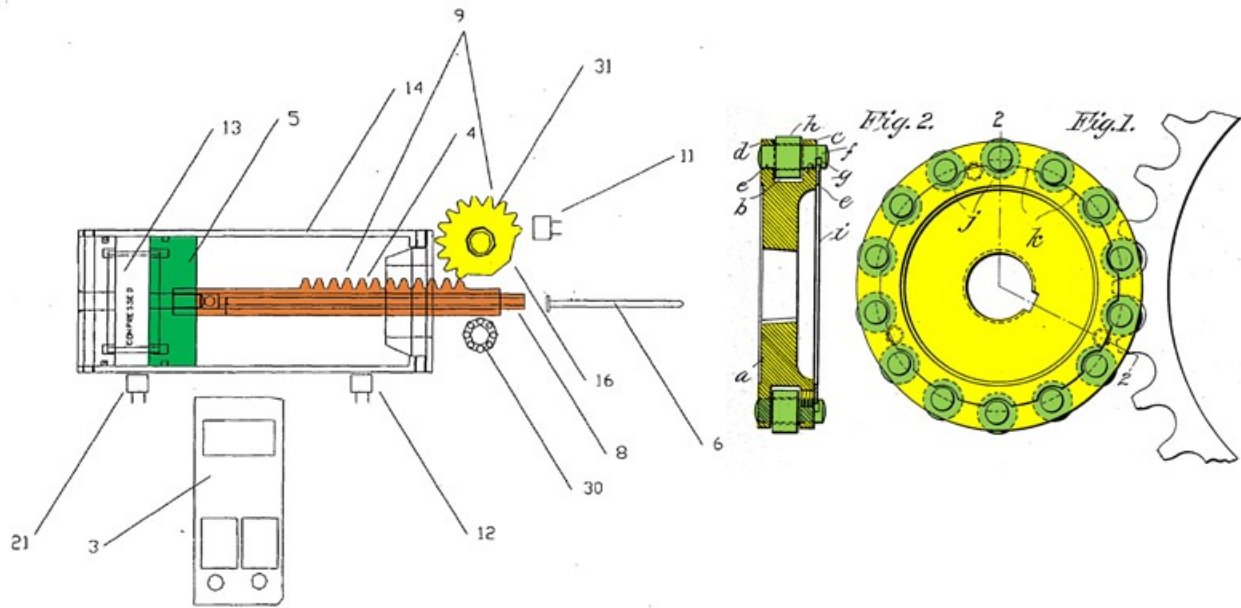
Pedicini discloses “a guide body with a linear passageway for said driver.” Pedicini discloses a guide body (grey) with a linear passageway for the driver (“rack (4),” orange). Pedicini, ¶[0078], Fig. 1.



Element [3.2]

Pedicini discloses “said lifter moves in a rotational motion and causes said driver to move in a linear motion.” Pedicini’s lifting mechanism is a rotatable pinion (“rack pinion (31),” below left) that moves in rotational motion (clockwise in Fig. 3) to cause the driver (orange) to move in a linear motion (leftward in Fig. 3). Pedicini, Fig. 3, ¶[0078]. This is not altered by the roller pinion modification. *See* Ellingham, Fig. 1 (below right); Vallee, ¶211.

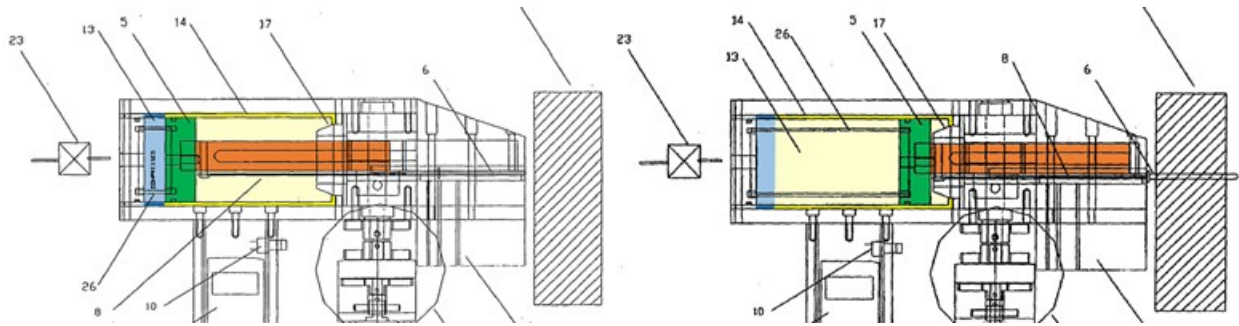
PATENT FIGURE 3



4. Claim 4

Element [4.1]

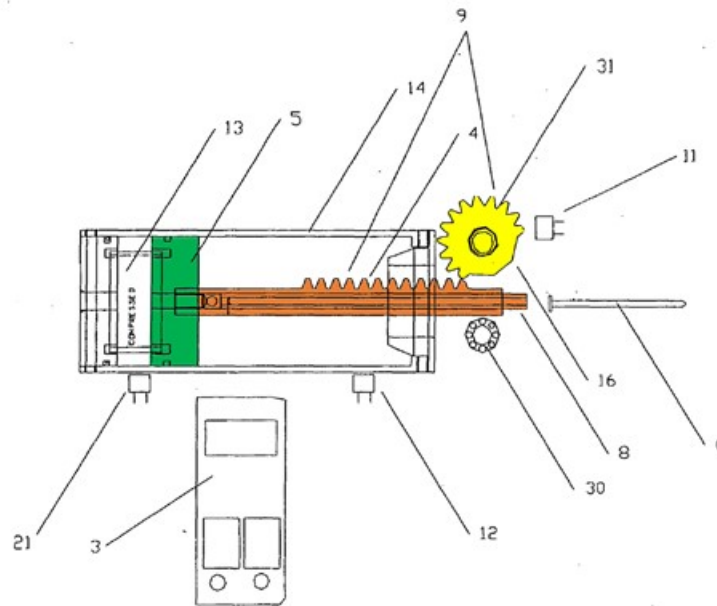
Pedicini discloses “said cylinder and piston act as a gas spring during said drive stroke.” In Pedicini, the pressurized gas of the storage chamber (the portion of “chamber (13)” above the piston, blue) and the displacement volume in the cylinder (the portion of “chamber (13)” within “cylinder (14)” through which the piston moves, yellow) act as a gas spring to drive the piston (“piston (5)”). When the piston is raised, the gas in the storage chamber and the displacement volume is compressed, and when decoupled from the “rack pinion (31),” the “piston (5),” along with its attached “rack (4)” and “anvil (8),” then “rapidly accelerate under the force of the compressed air.” Vallee, ¶212; Pedicini, ¶[0078], Figs. 1–2.



Element [4.2]

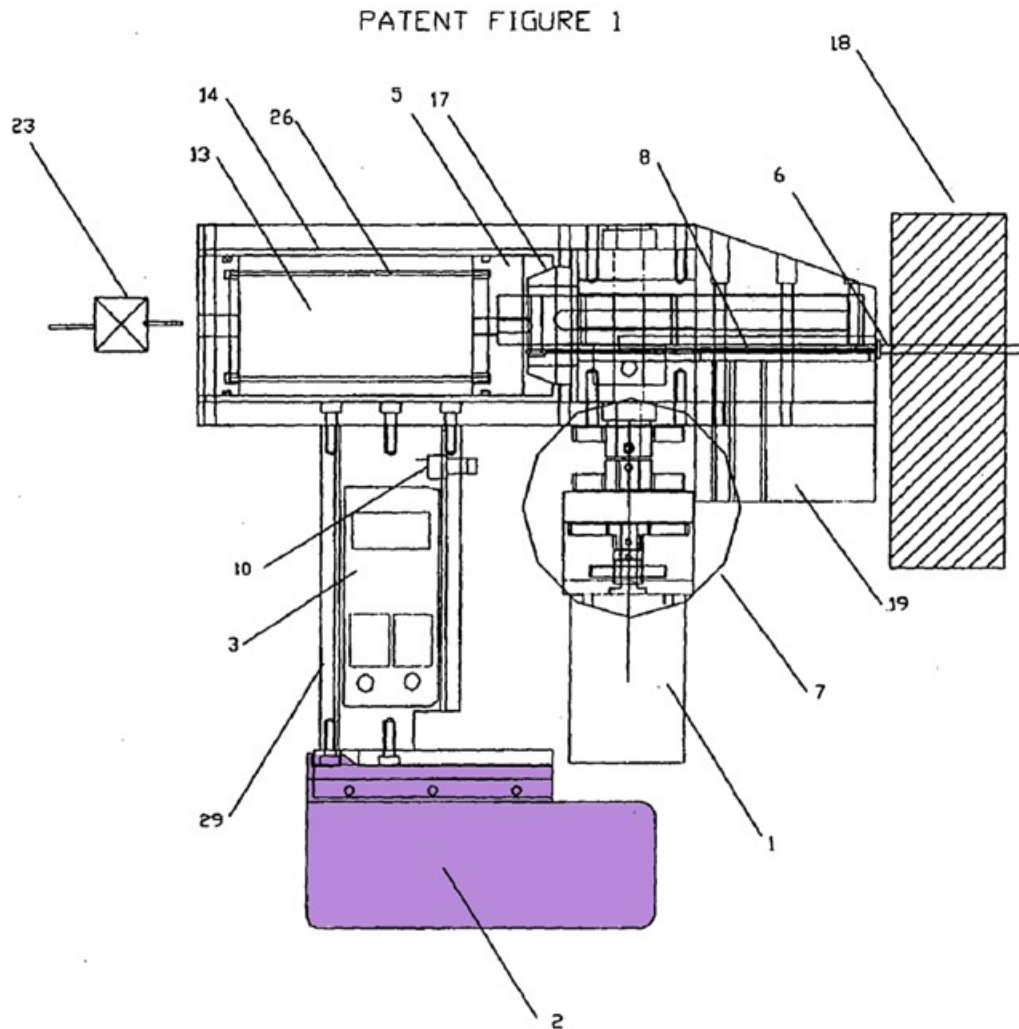
Pedicini discloses “said lifter does not engage said driver during said drive stroke.” Pedicini’s lifting mechanism includes “rack pinion cutaway teeth (16)” (i.e., a portion without teeth so as to not engage the driver during the drive stroke), such that “[w]hen the rack pinion cutaway teeth (16) are opposite the rack (4), the rack (4), piston (6) and anvil (8) are free to travel to the front of the fastener device (100) as a result of the compressed air force from the air chamber (13) and a lack of restraint from the pinion cutaway teeth (16).” Pedicini, ¶[0078], Figs. 3–4. This cutaway portion would be maintained by a POSITA when implementing the roller pinion modification. Vallee, ¶213.

PATENT FIGURE 3



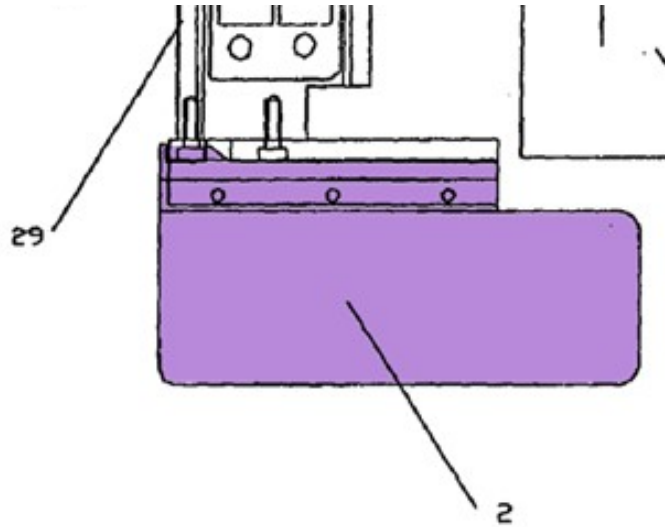
5. *Claim 5*

Pedicini discloses “a motor and an on-board electrical power source, wherein said motor provides motive power for said lifter.” Pedicini’s lifting mechanism is provided with motive power by a motor (“motor (1)”). Pedicini, ¶[0078], Figs. 1–2. Pedicini discloses an on-board electrical power source (“power source (2), purple below), which “may be a rechargeable battery to provide power to the motor (1).” Pedicini, ¶[0077], Fig. 1.



6. Claim 6

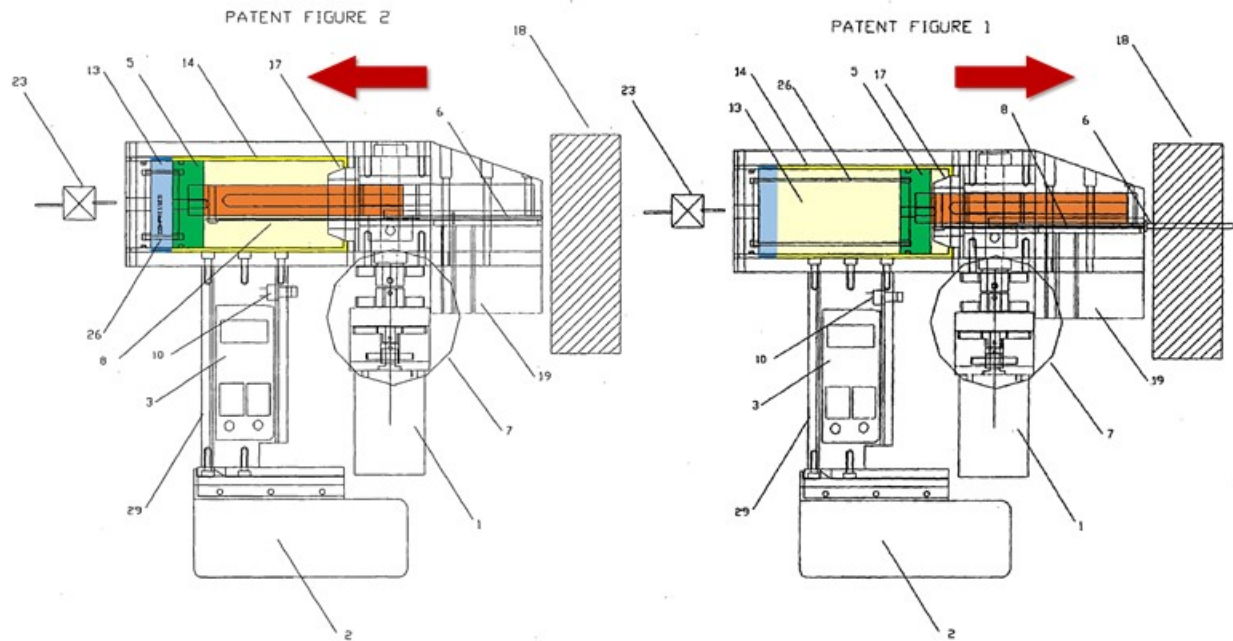
Pedicini discloses “(a) said on-board electrical power source comprises a detachable battery; and (b) said motor comprises an electric motor.” Pedicini discloses a “rechargeable battery” and refers to it as a “battery pack.” Pedicini, Abstract; ¶[0077], Fig. 1. A POSITA would understand based on its shape and appearance in the figures, and Pedicini’s characterization of it as a “battery pack,” that the rechargeable battery is a detachable battery. Vallee, ¶215.



Pedicini's motor ("motor (1)") is referred to as "electric motor" and is powered by an electrical power source. Pedicini, ¶¶[0033]–[0034]; Vallee, ¶216.

7. *Claim 7*

Pedicini discloses "said movable piston moves through a pathway through said hollow cylinder between a higher pressure position and a lower pressure position." In Pedicini, the movable piston ("piston (5)," green) moves through a pathway along the axis of the hollow cylinder ("cylinder (14)," yellow) between a higher pressure position (leftward position in Fig. 2, below left) and a lower pressure position (rightward position in Fig. 1, below right). Pedicini, Figs. 1–2, ¶¶[0077]–[0078]; Vallee, ¶217.



8. *Claim 8*

Pedicini discloses “said pressurized gas in the storage chamber remains above atmospheric pressure during all portions of an operating cycle.” Pedicini’s “release valve (23) is used to replenish the air which may be lost between nail drives.” Pedicini, ¶[0077], Figs. 1–2. Pedicini states that “it is possible to precharge the air chamber (13) to eliminate the piston return spring (26)” —while Pedicini goes on to say that “this is not preferable since it complicates recovering from fastener jams,” Pedicini includes an embodiment (Figure 4) where the piston return spring 26 is indeed eliminated. Pedicini, ¶[0077], Fig. 4. A POSITA would understand the disclosure of a sealed storage chamber and a release valve for “replenishing the air” means that the chamber is charged with a pressurized gas and then “remains above atmospheric pressure during all portions of an operating cycle,” since a charging

valve would have no use if the chamber is allowed to reach atmospheric pressure. Vallee, ¶219. Nor would a POSITA misinterpret the valve in Pedicini as a connection point for a pneumatic hose to attached and supply gas throughout operation (as opposed to only an initial charge), since Pedicini explicitly denigrates the “[n]on-portability” of “[t]raditional nail guns [that] are tethered to a fixed compressor.” Pedicini, ¶[0017].

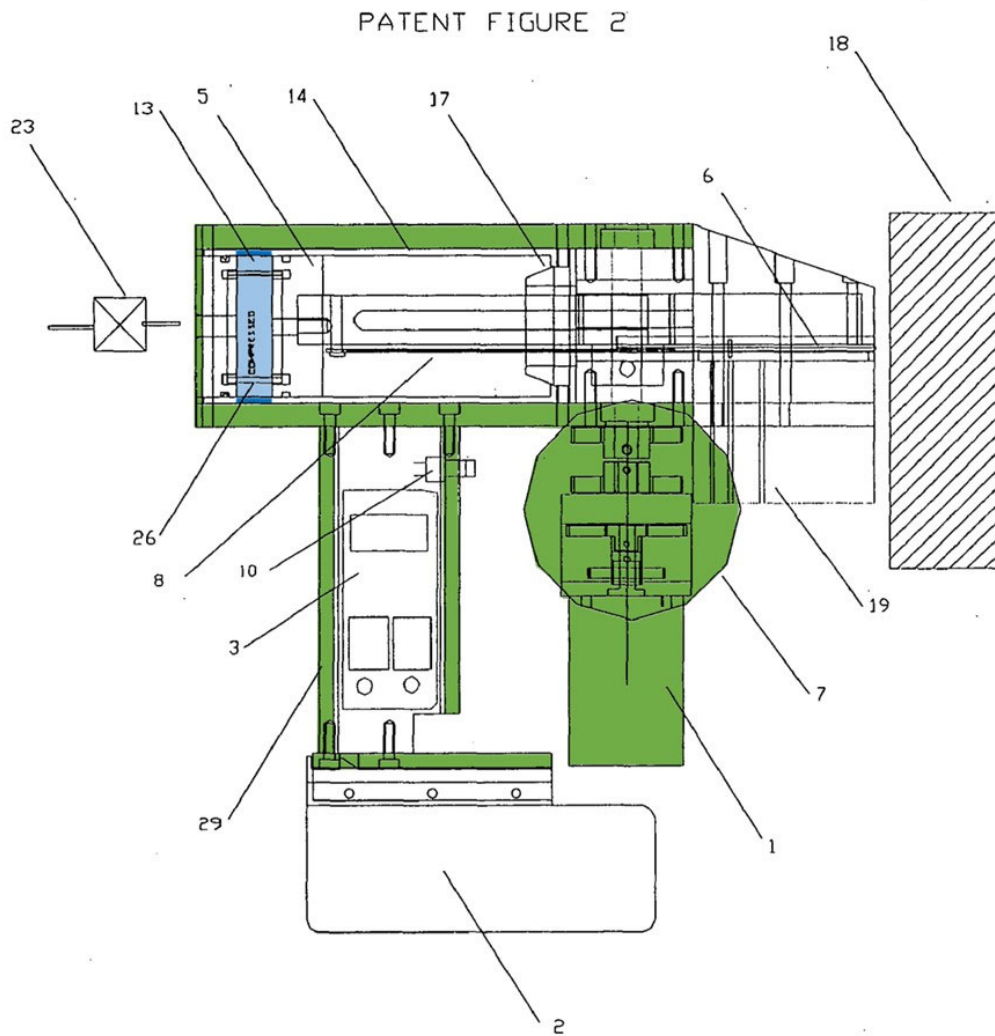
9. Claim 9

Element [9.P]

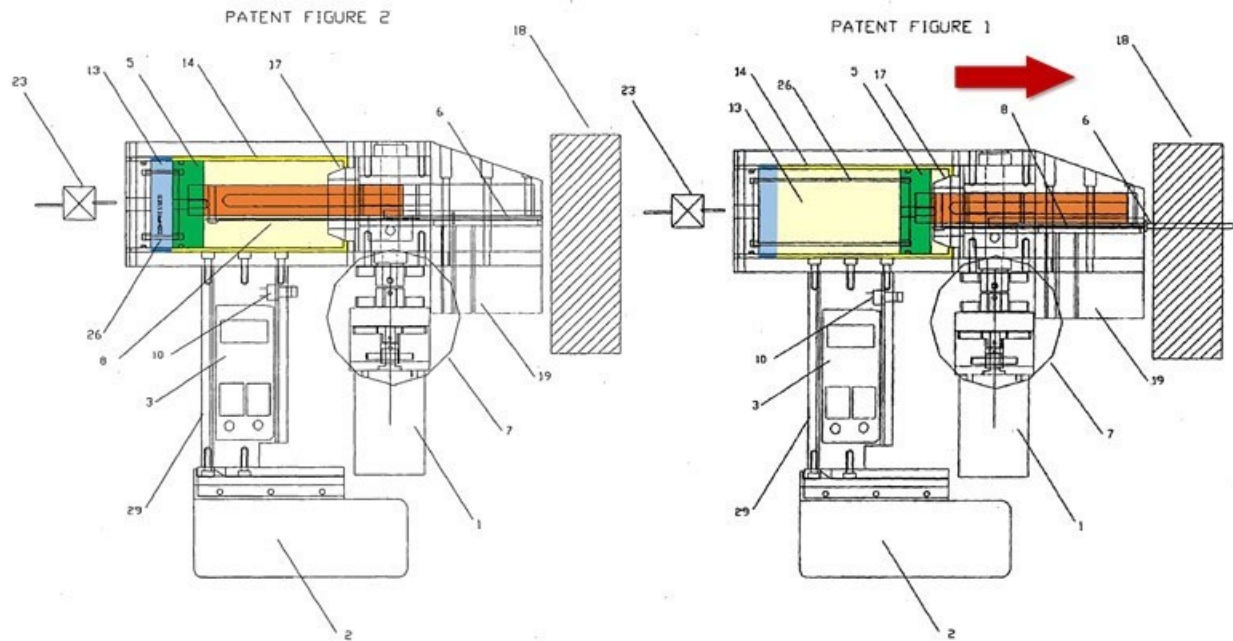
Pedicini discloses “[a] portable fastener driving tool.” Pedicini discloses a fastener driving tool (“fastener device 100”). Pedicini, Figs. 1–4; ¶ [0077].

Element [9.1]

Pedicini discloses “a housing with a storage chamber that contains a pressurized gas.” Pedicini’s housing (green) has a storage chamber (blue) that contains a pressurized gas. Pedicini, Figs. 1, 2; Vallee, ¶¶ 221-222; *see* Element [1.2].



Pedicini discloses “a hollow cylinder that includes a movable piston.” *See* Element [1.1].



Pedicini discloses “a driver that is in communication with said piston at least during a drive stroke.” *See* Element [2.1].

Pedicini discloses “a lifter that is in communication with said driver at least during a return stroke.” As explained above, according to the Patent Owner’s infringement allegations, the claimed “lifter” is met by the obvious “roller pinion” of Pedicini’s lifting mechanism. *See* §VII.D.2, Element [2.2]; Vallee, ¶225. That “lifter” is in communication with the driver during the return stroke. Pedicini, ¶¶[0078], Figs. 3–4; Vallee, ¶225.

Pedicini discloses “a prime mover” and “a source of energy.” *See* Claims 5–6.

Element [9.2]

Pedicini discloses “said pressurized gas is used as a gas spring to propel said piston during said drive stroke.” *See* Element [4.1].

Element [9.3]

Pedicini discloses “said prime mover causes said lifter to mechanically engage said driver during said return stroke.” *See* Elements [2.2], [5].

Element [9.4]

Pedicini discloses “said housing has no external energy source cable and no external hose attached thereto.” Pedicini discloses a “rechargeable battery” and thus has no external energy source cable. Pedicini, ¶[0077], Figs. 1–2. Pedicini also discloses a “sealed chamber” and thus has no external hose attached. Pedicini, Abstract, Figs. 1–4. While Pedicini discloses a “release valve (23),” a POSITA would not misinterpret that valve to be a connection point for a pneumatic hose to attached and supply gas throughout operation (as opposed to only an initial charge), since Pedicini explicitly denigrates the “[n]on-portability” of “[t]raditional nail guns [that] are tethered to a fixed compressor.” Pedicini, ¶[0017]; Vallee, ¶230.

Element [9.5]

Pedicini discloses “said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber.” *See* Element [1.5].

10. Claim 10

Pedicini discloses “said storage chamber and said hollow cylinder are always in fluidic communication.” *See* Element [1.2].

11. Claim 11

Pedicini discloses “said pressurized gas is re-used for a plurality of operational cycles that each include said drive stroke and said return stroke.” *See* Element [1.4].

12. Claim 12

Pedicini discloses “said piston has a rest position between operational cycles; and said rest position is achieved after said return stroke.” In particular, Pedicini discloses a further embodiment that “includes a sear pin or lever (28) which maintains the rack (4), piston (5) and anvil (80) in the energized state.” Pedicini, ¶[0080], Fig. 4, Claim 18. The energized state is the upper, high pressure position achieved after a return stroke. Pedicini, ¶[0080], Fig. 4.

13. Claim 13

Pedicini discloses “said prime mover comprises an electric motor; and said source of energy comprises a detachable battery.” *See* Claims 5–6.

14. Claim 14

Elements [14.P]–[14.5]

Elements [14.P]–[14.4] are identical to Elements [9.P]–[9.4], respectively, and are met as described above. Element [14.5] is substantially the same as Element [7] and is met as described above.

Element [14.6]

Pedicini discloses “said piston has a rest position between operational cycles; and a location of said rest position is proximal to said higher pressure position.” As discussed above, Pedicini discloses a further embodiment that “includes a sear pin or lever (28) which maintains the rack (4), piston (5) and anvil (80) in the energized state.” *See* §VII.D.12; Pedicini, ¶[0080], Fig. 4, Claim 18. The energized state is the upper, high pressure position achieved after a return stroke. Pedicini, ¶[0080], Fig. 4.

15. Claims 15–16

Claims 15–16 are identical to Claims 10–11, respectively, and are met as described above.

16. Claim 17

Elements [17.P]–[17.4]

Elements [17.P]–[17.4] are identical to Elements [1.P]–[1.4], respectively, and are met as described above.

Element [17.5]

Pedicini discloses “said movable piston of the hollow cylinder is the sole movable piston that is in fluidic communication with the storage chamber of the gas pressure system.” *See* Element [1.5].

17. Claims 18–20

Claims 18–20 are identical to Claims 2, 5 and 8, respectively, and are met as described above.

VIII. CONCLUSION

Accordingly, Petitioner requests *inter partes* review of claims 1–20 pursuant to Grounds 1–4 set forth above.

Date: December 13, 2024

Respectfully submitted,

/Amol A. Parikh/
Amol A. Parikh

Attorneys for Petitioner

CERTIFICATION UNDER 37 C.F.R. § 42.24

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter partes* Review totals 13,771 words, which is less than the 14,000 allowed under 37 C.F.R. § 42.24.

Date: December 13, 2024

/Amol A. Parikh/

Amol A. Parikh

Attorneys for Petitioner

CERTIFICATE OF SERVICE

I hereby certify that on this 13th day of December, 2024, a copy of this Petition, including all exhibits, has been served in its entirety by FedEx Express to the Patent Owner by serving the correspondence address of record as follows:

Gribbell Law Firm, LLC
5515 Timber Way Drive
Cincinnati , OH

/Amol A. Parikh/
Amol A. Parikh

Attorneys for Petitioner