

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AMERIFORGE GROUP, INC.,
Petitioner,

v.

WORLDWIDE OILFIELD MACHINE, INC.,
Patent Owner.

Case IPR2015-00998
Patent 6,684,897 B2

Before JOSIAH C. COCKS, JAMES A. TARTAL, and GARTH D. BAER,
Administrative Patent Judges.

BAER, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

Ameriforge Group, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting *inter partes* review of claims 7–9 and 11–18 of U.S. Patent No. 6,684,897 B2 (Ex. 1001, “the ’897 patent”). Patent Owner, Worldwide Oilfield Machine, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). Pursuant to 35 U.S.C. § 314(a), we determined the Petition showed a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of claims 7–9 and 11–18, and instituted an *inter partes* review of those claims. Paper 9 (“Inst. Dec.”). Patent Owner filed a Patent Owner Response (Paper 14, “PO Resp.”) and a Motion to Amend (Paper 15, “Mot.”). Petitioner filed a Reply to Patent Owner’s Response (Paper 17, “Reply”) and an Opposition to Patent Owner’s Motion to Amend (Paper 18, “Opp.”). Patent Owner then filed a Reply in support of its Motion to Amend. Paper 21 (“Mot. Reply”). An oral hearing was held before the Board. Paper 32 (“Tr.”).

We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. Having considered the record before us, we determine Petitioner has shown by a preponderance of the evidence that claims 7–9 and 11–18 of the ’897 patent are unpatentable. *See* 35 U.S.C. § 316(e). In addition, we determine Patent Owner has not shown that its proposed substitute claim 36 is patentable over the asserted prior art.

I. BACKGROUND

A. RELATED PROCEEDINGS

Patent Owner asserts the ’897 patent is the subject of *Worldwide Oilfield Machine, Inc. v. Ameriforge Group, Inc. d/b/a AFGlobal Corp.*, Civil Action No. 4:13-cv-3123 (S.D. Tex.). Pet. 1; Paper 5, 1. That case

also involves U.S. Patent No. 6,601,650, which is the subject of Case IPR2015-00233.

B. THE '897 PATENT

The '897 patent is directed to “gate valve actuators and, in a particular embodiment, to [an] apparatus and methods for a fail-safe hydraulic subsea actuator that reliably operates in deep water for extended time periods.”

Ex. 1001, 1:9–12. Figure 2 of the '897 patent is reproduced below.

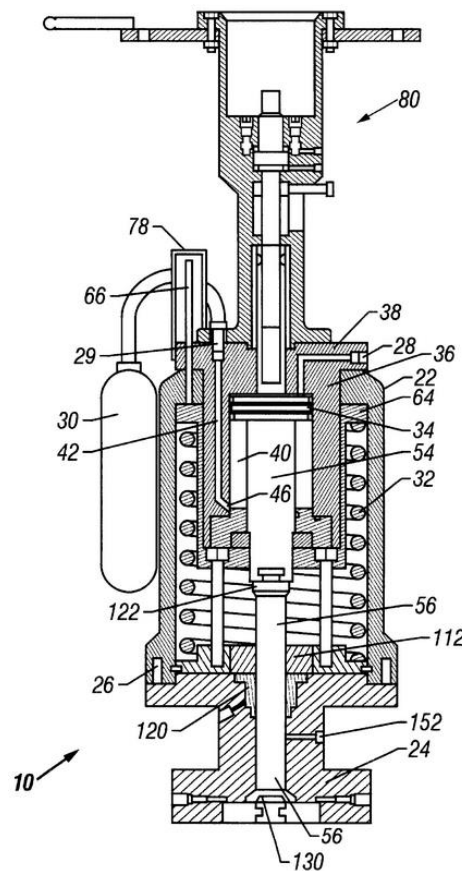


FIG. 2

Figure 2 depicts the assembled hydraulic actuator for operating a valve, including actuator housing 22, hydraulic cylinder 40 containing hydraulic piston 34, and manual override 80. The hydraulic actuator further includes accumulator 30, which provides hydraulic pressure to assist compressed

return spring 32 in moving the hydraulic piston. *Id.* at Fig. 2, 6:37–51, 8:52–55. The '897 patent notes several advantages of the disclosed actuator, including that the return spring is outside the hydraulic cylinder and isolated from the hydraulic fluid. *Id.* at 4:10–13. Separating the spring from the hydraulic fluid avoids damage to the spring and contamination of the hydraulic fluid, and also limits the hydraulic fluid required, without limiting the spring's size. *Id.* at 2:6–10, 5:42–48, 7:56–58, 9:59–63. In addition, the Specification notes that maintenance on the actuator is easier because the spring cartridge assembly “may be replaced as a unit without the need for compressing spring 32 in the field.” *Id.* at 9:30–34; *see id.* at 9:41–57.

C. ILLUSTRATIVE CLAIMS

Claims 7 and 12 (reproduced below) are independent, and are illustrative of the claimed subject matter. Challenged claims 8, 9, and 11 depend from claim 7, and challenged claims 13–18 depend ultimately from claim 12.

7. A method for assembly a valve actuator for a valve, said method comprising:

providing a hydraulic actuator housing attachable to said valve;

providing a return spring for placement within said hydraulic actuator housing;

engaging one end of said return spring with a first lip member;

engaging an opposite end of said return spring with a second lip member;

securing said first lip member and said second lip member together to thereby compress said return spring[;]

selectively adjusting tension on said return spring by adjusting a maximum length between said first lip and second lip; and

installing said first lip member, said second lip member, and said return spring simultaneously into said hydraulic housing as a unit.

12. A valve actuator for a valve, said actuator comprising:

a hydraulic actuator housing attachable to said valve;

a hydraulic piston slidably mountable within said hydraulic housing responsively to hydraulic pressure, said hydraulic piston being moveable to a first position for closing said valve and to a second position for opening said valve;

a cylinder member defining therein a piston chamber, said hydraulic piston being mounted for movement within said piston chamber, said cylinder member defining a first hydraulic fluid port into said piston chamber on a first side of said piston and a second hydraulic fluid port into said piston chamber on a second side of said piston;

a plurality of seals for limiting movement of hydraulic fluid within said hydraulic actuator housing to said piston chamber and said first hydraulic fluid port and said second hydraulic fluid port;

a manual override assembly for manually operating said hydraulic piston; and

a return spring chamber within said hydraulic actuator housing, said return spring chamber being fluidly isolated from said piston chamber; and

a return spring within said return spring chamber such that said return spring is isolated from said hydraulic fluid.

D. ASSERTED PRIOR ART

The instituted grounds rely on the following prior art references, as well as supporting Declarations of Glen Stevick, Ph.D. (Ex. 1016; Ex 1020):

U.S. Patent No. 6,182,678 B1 (issued Feb. 6, 2001) (Ex. 1002, “Ma”);

International Patent Application Publication No. WO 95/23937 A1
(published Sept. 8, 1995) (Ex. 1003, “Young”);

U.S. Patent No. 5,046,376 (issued Sept. 10, 1991) (Ex. 1004,
“Baker”);

U.S. Patent No. 4,777,800 (issued Oct. 18, 1988) (Ex. 1005, “Hay”);
and

U.S. Patent No. 6,352,239 B1 (issued Mar. 5, 2002) (Ex. 1006,
“McIntosh”).

E. INSTITUTED GROUNDS OF UNPATENTABILITY

We instituted *inter partes* review of the ’897 patent on the following
grounds of unpatentability asserted in the Petition. Inst. Dec. 26.

Claim(s)	Basis	Reference(s)
7–9	§§ 102(a), 102(e)	Ma
7–9 and 11	§ 103(a)	Ma and Young
12 and 14–18	§ 103(a)	Ma, Young, and Baker
13	§ 103(a)	Ma, Young, Baker, and Hay
12 and 15	§ 102(e)	McIntosh
13	§ 103(a)	McIntosh and Hay

II. ANALYSIS

A. CLAIM CONSTRUCTION

1. Applicable Standard

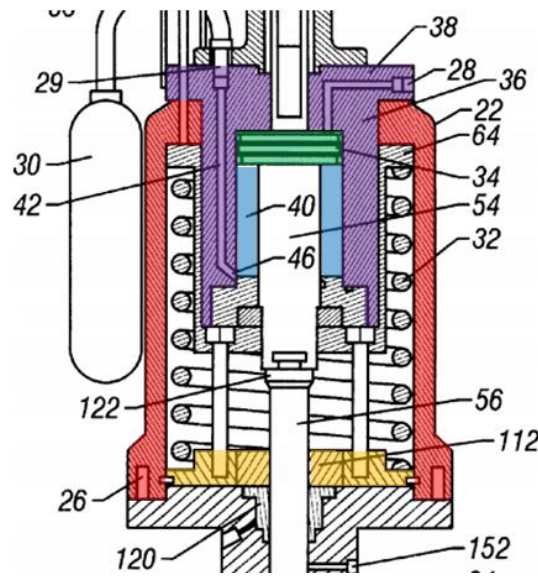
The Board interprets claims using the “broadest reasonable construction in light of the specification of the patent in which [they] appear[.]” 37 C.F.R. § 42.100(b). We presume a claim term carries its “ordinary and customary meaning,” which is “the meaning that the term would have to a person of ordinary skill in the art in question” at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A patentee may, however, act as their own lexicographer and give a term a particular meaning in the Specification, but must do so with

“reasonable clarity, deliberateness, and precision.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

2. “hydraulic actuator housing”

In the Institution Decision, we construed only one term: “hydraulic actuator housing” as “a case or enclosure for at least part of a hydraulic actuator.” Inst. Dec. 7–8. In its Response, Patent Owner does not disagree with our construction, but asserts that it “requires some clarification because a POSITA would not understand a housing that is part of an actuator to be a hydraulic actuator housing if that did not actually house the principal actuator hydraulics, *i.e. at least the piston contained in a hydraulic cylinder.*” PO Resp. 7 (citing Ex. 2001 ¶ 34). We agree. As Patent Owner’s expert, Mr. Perkin, explains, although “a ‘hydraulic actuator housing’ may contain additional pieces . . . for it to be considered a ‘hydraulic actuator housing,’ it must actually house the actuator’s principal hydraulics, *i.e. the piston in the hydraulic cylinder the piston moves and/or translates within.*” Ex. 2001 ¶ 38. Patent Owner’s proffered clarification to our earlier construction avoids a potentially absurd result—including within the definition of a hydraulic actuator housing a partial enclosure of *any* minor actuator part, no matter how peripheral.

Every depicted embodiment in the ’897 patent shows the actuator’s housing includes the piston and hydraulic cylinder. *See* Ex. 1001, Figs. 1, 2, 3, 3:24–28, 7:61–63. Even though, as Petitioner points out, in the figure below “the depicted hydraulic actuator housing 22 [red] does not itself fully enclose the [green] piston 34 and [blue] cylinder 40,” Reply 2, it plainly forms a case or enclosure for those two principal components.



We construe “hydraulic actuator housing” as a case or enclosure for at least the principal actuator hydraulics, i.e., the piston and hydraulic cylinder.

B. INSTITUTED GROUNDS OF UNPATENTABILITY

1. Anticipation of Claims 7–9 Based on Ma

Petitioner asserts that Ma anticipates claims 7–9. Pet. 18–21. Patent Owner responds, arguing that Ma does not disclose “providing a return spring for placement within said hydraulic actuator housing” as claims 7–9 require. Based on our review of the arguments and evidence in the Petition, Response, and Reply, we determine that Petitioner has not demonstrated, by a preponderance of the evidence, that Ma anticipates claims 7–9, as explained below.

a. Ma

Ma discloses an “[a]pparatus for safely installing and removing spring loaded failsafe valve actuators.” Ex. 1002, Abstract, 1:7–9.

Ma's Figure 4 is reproduced below.

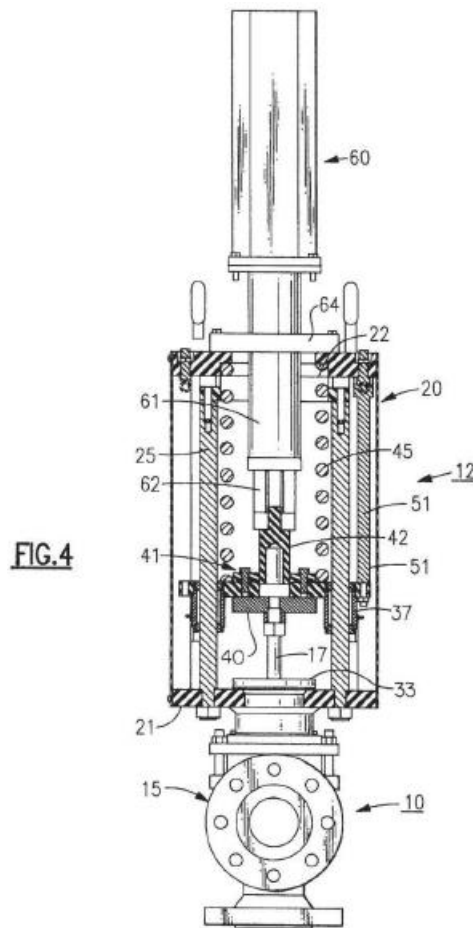
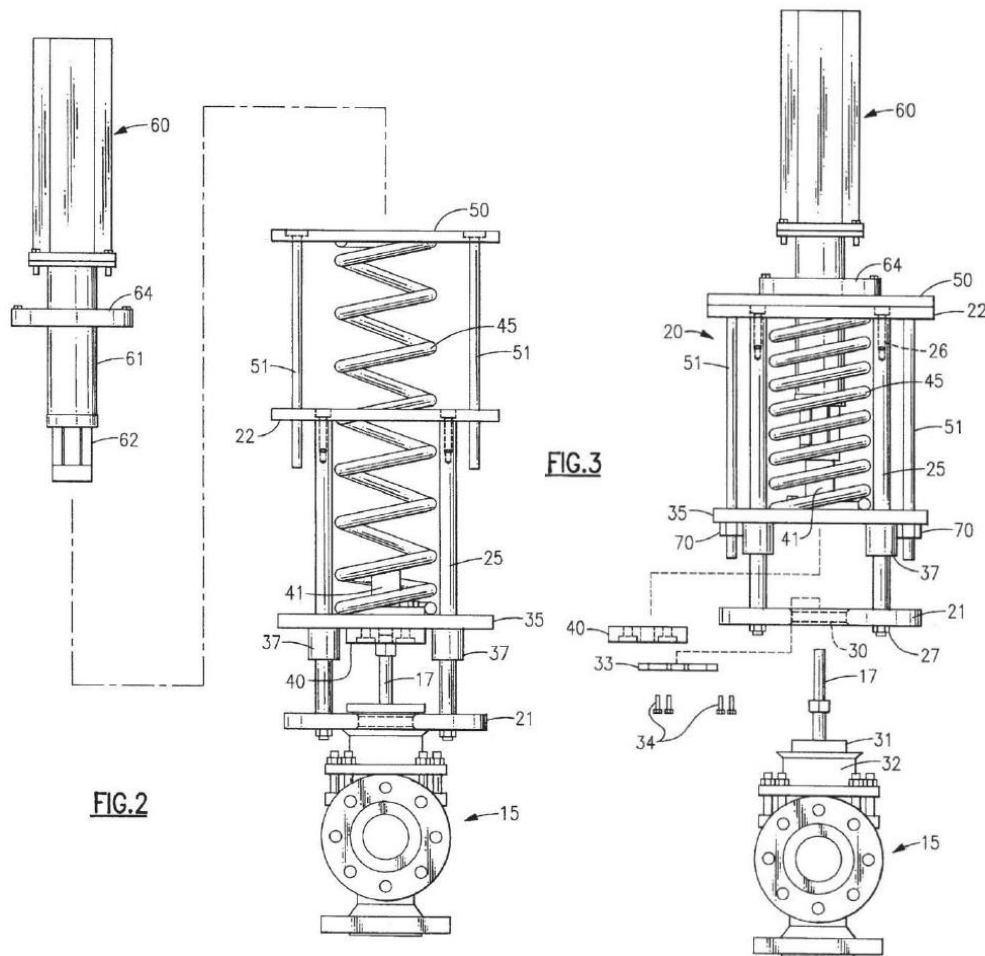


Figure 4 depicts “the component parts of the failsafe spring mechanism.” *Id.* at 2:30–32. According to Ma, open frame 20 “contains a bottom end wall 21 and a spaced apart top end wall 22 that are held apart in a spaced relationship by a number of columns 25 that are secured to the end walls by threaded member[s].” *Id.* at 2:54–58.

Ma's Figures 2 and 3 are reproduced below.



Figures 2 and 3 further depict the valve actuator in Ma as follows:

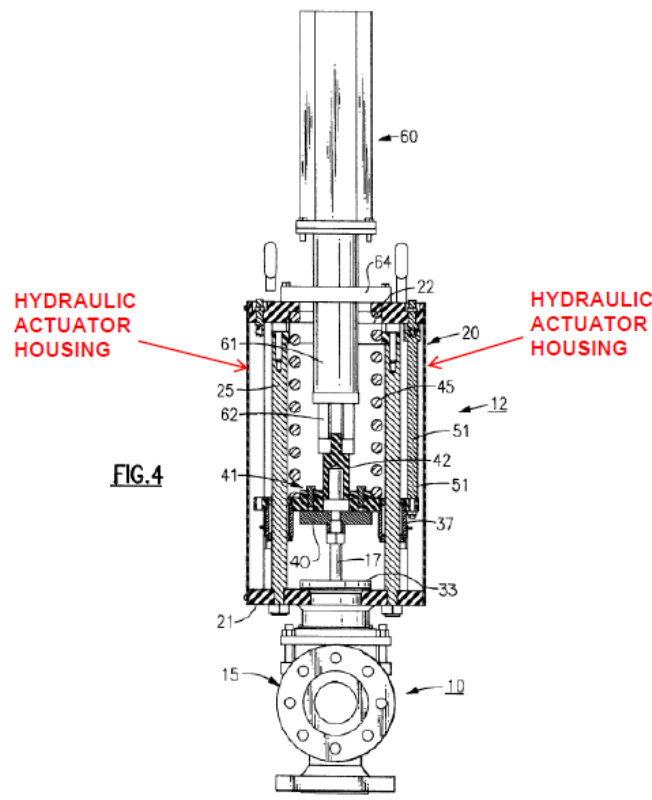
[A] coil compression spring 45 is passed downwardly through a hole provided in the top wall of the frame. The lower or proximal end of the spring is placed in seating contact with the spring seat. A cover plate 50 containing a plurality of elongated downwardly directed bolts 51 is placed over the top or distal end of the spring. The cover plate at assembly is forced downwardly into contact with the top wall of the frame by driving the bolts 51 which compresses the spring and forces the spring seat down closing the valve. The elongated bolts 51 are brought through clearance holes in the spring seat and this cover is moved down until such time as the valve closes and the cover plate is tightly secured against the top wall of the frame.

Id. at 3:9–22. Ma goes on to teach that “[a] linear actuator 60 is also mounted in the frame” “to raise or lower the spring seat and thus open and close the valve.” *Id.* at 3:23, 34–35. Although Ma’s preferred embodiment uses “an electromechanical actuator,” Ma teaches “[i]t should be clear . . . a hydraulic cylinder or the like may also be employed without departing from the teachings of the present invention.” *Id.* at 3:36–40.

b. Ma Does Not Teach a Return Spring Within the Hydraulic Actuator’s Housing

Claim 7 (and by dependency claims 8 and 9) requires “providing a return spring for placement within the hydraulic actuator housing.”

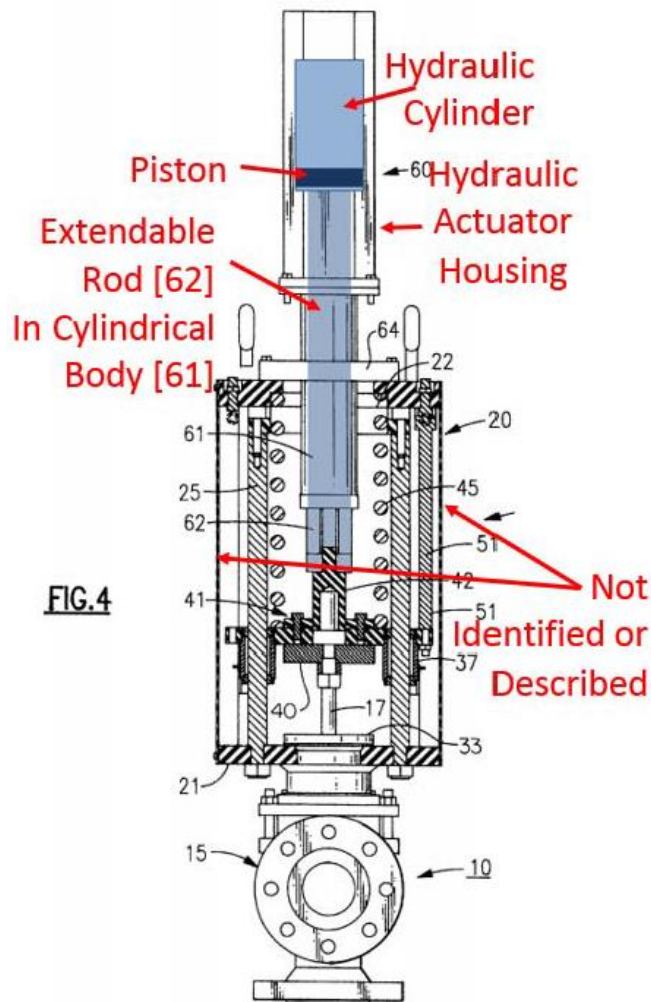
Petitioner contends that Ma’s unnumbered outer frame meets claim 7’s hydraulic actuator housing limitation as illustrated in Ma’s annotated Figure 4, reproduced below:



Pet. 18.

We do not agree with Petitioner’s contention because Ma does not disclose, either expressly or inherently, that its outer frame houses the actuator’s piston and hydraulic cylinder, as our claim construction requires. Ma’s figures do not depict a hydraulic actuator. Instead, Ma teaches that the disclosed preferred embodiment uses “an electro-mechanical actuator.” Ex. 1002, 3:36–37. Ma’s only explicit disclosure related to a hydraulic actuator is that the depicted electromechanical actuator may be replaced with “a hydraulic cylinder or the like.” Ex. 1002, 3:36–40. As for inherency, Ma’s figures do not show that the outer frame would *necessarily* house the piston and hydraulic cylinder. *See Rexnord Indus., LLC v. Kappos*, 705 F.3d 1347, 1355 (Fed. Cir. 2013) (explaining that “anticipation by inherent disclosure is appropriate only when the reference discloses prior art that must necessarily include the unstated limitation”). Instead, Petitioner’s expert, Dr. Stevick, explains that one skilled in the art would *likely* configure a hydraulic actuator for Ma in accord with the disputed limitation. *See* Ex. 1020 ¶¶ 23, 30 (describing what one skilled in the art would “want” and “expect”); *id.* ¶ 29 (asserting the prior art demonstrates that hydraulic cylinders “are *nearly* always (if not always) concentrically located within the return spring”) (emphasis added).

Against Petitioner’s evidence, Patent Owner’s expert, Dr. Perkin, asserts that one skilled in the art would understand that in a hydraulic version of Ma, the outer frame would not house the hydraulic cylinder and piston, as illustrated below.



Ex. 2001 ¶¶ 55, 58. Because we find Dr. Perkin’s configuration plausible, Petitioner has not shown that Ma inherently discloses “providing a return spring for placement within the hydraulic actuator housing,” as claims 7–9 require, and consequently has not met its burden to show that Ma anticipates claims 7–9.

2. Obviousness of Claims 7–9 and 11 over Ma and Young

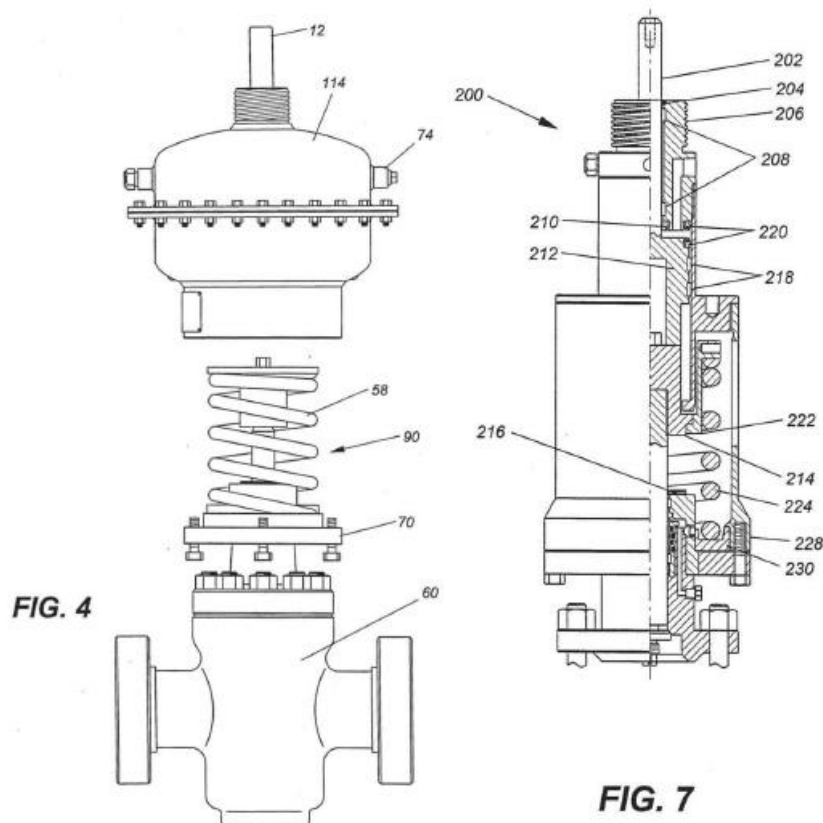
Petitioner asserts that claims 7–9 and 11 are invalid for obviousness based on Ma and Young. Pet. 21–27. Patent Owner responds, arguing that the references do not disclose “selectively adjusting the tension on the spring by adjusting the maximum length between the first lip and the second lip”

(PO Resp. 17–20, 34) and “installing said first lip member, said second lip member, and said return spring simultaneously into said hydraulic housing as a unit” (PO Resp. 20–24, 29–33), as required in independent claim 7 and, (by dependency) claims 8, 9, and 11. Patent Owner argues also that under the proper claim construction, the combination of Ma and Young does not teach “providing a hydraulic actuator housing attachable to said valve” as claims 7–9 and 11 require. PO Resp. 29–33. Last, Patent Owner contends that the combination of Ma and Young fails to teach “connecting a piston position indicator to said first lip,” as recited in claim 11. PO Resp. 35–37. Based on our review of the arguments and evidence in the Petition, Response, and Reply, we determine that Petitioner has demonstrated, by a preponderance of the evidence, that the subject matter of claims 7–9 and 11 would have been obvious over the combination of Ma and Young, as explained below.

a. Young

Young discloses “a valve actuator apparatus and method.” Ex. 1003, Abstract.

Young's Figures 4 and 7 are reproduced below.



“Fig. 4 discloses the relative ease with which various operators 114 may be changed out,” and “Fig. 7 discloses a hydraulic valve actuator 200 embodiment of the present invention.” *Id.* at 7:30–31, 9:1–2. In Fig. 7, a base plate ring “is bolted to housing 228 and provides support for lower spring retainer 230 as described with respect to diaphragm-type actuator.” *Id.* at 9:9–11. Young also discloses a “[c]lear stem protector” that “protects top shaft 12.” *Id.* at 8:6.

b. Ma Teaches Selectively Adjusting Tension on the Return Spring Before Installation

Patent Owner argues that Ma does not disclose “selectively adjusting the tension on the spring by adjusting the maximum length between the first lip and the second lip,” as claims 7–9 and 11 require. PO Resp. 17–20, 34.

According to Patent Owner, “[i]n Ma there is only one non-adjustable compression on the spring because the spring is always compressed to the same point; namely, to the point when the cover plate is tightly secured against the top wall of the frame 22.” PO Resp. 18.

We, however, agree with Petitioner that Ma teaches selectively adjusting spring tension by adjusting the length between the first lip and the second lip. See Pet. 19–20; Reply 9, 14. Even though, as Patent Owner notes, in Ma “the spring is always compressed to the same point; namely, to the point when the cover plate is tightly secured against the top wall of the frame” (PO Resp. 18), Ma teaches the disputed element because return spring tension is selectively increased as the bolts are tightened. Ex. 1020 ¶ 36. Nothing in the limitation at issue requires, as Patent Owner suggests, the spring to be adjustable after it is compressed such that the cover plate can be secured against the top wall of the frame. See *id.* ¶¶ 36, 37 (citing Ex. 1001 at 9:45–46 and explaining that “Ma’s return spring is adjustably pre-loaded to the same extent that the ’897 Patent’s return spring is adjustably pre-loaded”).

c. Ma Teaches Simultaneous Spring and Lip-Assembly Installation

Petitioner relies on Ma for teaching “installing said first lip member, said second lip member, and said return spring simultaneously into said hydraulic housing as a unit” as claims 7–9 and 11 require. Pet. 26; see Reply 13–14. In particular, Petitioner states that “Ma’s cover plate (50), top end wall (22), spring (45), and spring seat (35) would be installed simultaneously.” Pet. 26. We agree.

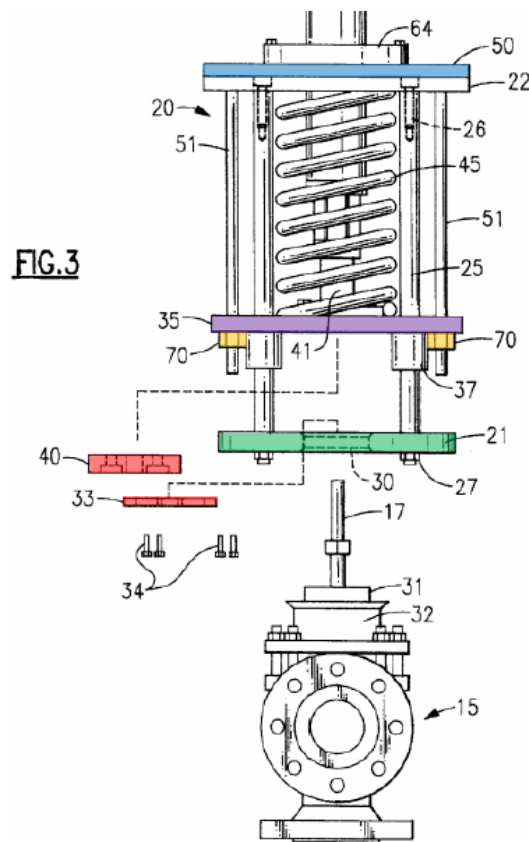
As Petitioner’s expert, Dr. Stevick, explains:

Ma first shows its assembly in an unassembled state in which the housing is *not* present. See Ex. 1002 at FIG. 2. Ma then

describes, in connection with FIG. 2, the compression of its spring 45 between cover plate 50 and spring seat 35. *See* Ex. 1002 at 3:9-22. Ma then shows, in FIG. 3, the spring in its compressed state with the housing still **not** present. *See* Ex. 1002 at FIG. 4. Finally, in FIG. 4, Ma shows the housing in place and attached to the cover plate 50 and bottom end wall 21, two components that move relative to each other during compression of the spring. . . . [T]he fact that “the housing cannot be connected to both of these structures [cover plate 50 and bottom end wall 21] before compression” indicates that the housing (or at least the part of the housing into which the spring, cover plate, and end wall are inserted) is attached to the cover plate 50 and bottom end wall 21 *after* the spring is compressed.

Ex. 1020 ¶ 42. The progression in Ma’s figures is not consistent with Patent Owner’s assertion that Ma’s spring, cover plate and end wall could “just as easily be installed” before compressing the spring. PO Resp. 29.

Petitioner’s argument finds additional support in Ma’s Fig. 3, which “shows a way its actuator can be removed from a valve and replaced as a unit.” Ex. 1020 ¶ 44 (citing Ex. 1002, Fig 3, 3:63–48). As Dr. Stevick notes, if the housing were in place and attached to cover plate 50 and bottom end wall 21 (as Patent Owner suggests, *see* PO Resp. 23–24), there would be no access to other components (adapter 40 and connector 33)—yet that access is needed for the actuator to be removed and replaced as a unit, as Ma indicates. *See* Ex. 1020 ¶¶ 44–45; Ex. 1002, Fig. 3 (reproduced below, color annotation added).



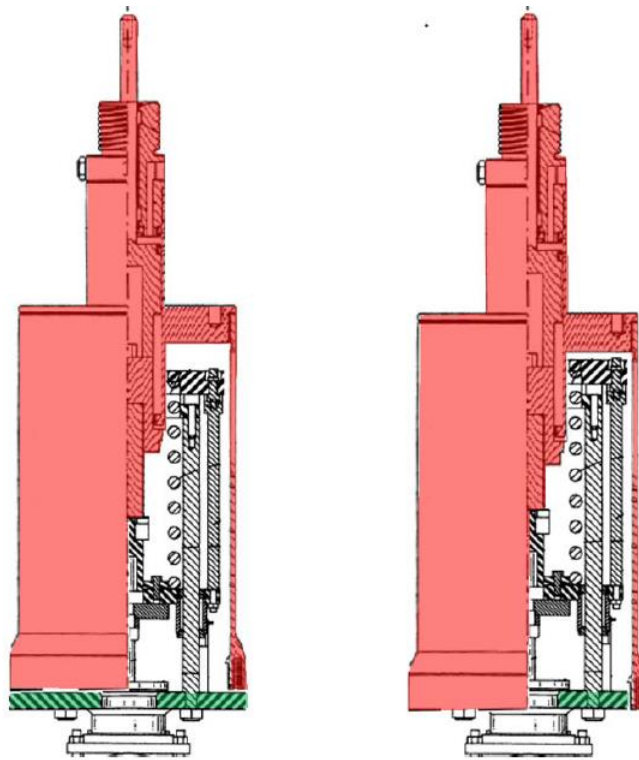
We find Dr. Stevick’s explanation persuasive. Even if Ma does not explicitly recite simultaneous installation of the spring and lip assembly, it is “the natural result flowing from the operation as taught,” and, thus, is enough to show inherency. *SmithKline Beecham Corp. v. Apotex Corp.*, 403 F.3d 1331, 1343–44 (Fed. Cir. 2005). Petitioner has met its burden to show that Ma inherently teaches “installing said first lip member, said second lip member, and said return spring simultaneously into said hydraulic housing as a unit,” as claims 7–9 and 11 require.

d. The Combination of Ma and Young Includes a Hydraulic Actuator Housing

Patent Owner asserts the combination of Ma and Young fails to teach “providing a hydraulic actuator housing attachable to said valve” as claims 7–9 and 11 require because in Petitioner’s combination, the hydraulic

actuator housing “does not include [the requisite] hydraulic components.”
PO Resp. 29. We disagree.

Young teaches a housing that encloses its actuator components, including the piston and hydraulic cylinder. *See* Ex. 1003, Fig. 7, 9:9–11; Reply. 13 (citing Ex. 1020 ¶¶ 55–57). Two of Petitioner’s proffered combinations include that teaching from Young, as illustrated in the figures below.



Reply 12; *see* Pet. 21–22 (asserting that “[t]o the extent Patent Owner may argue that Ma does not include . . . an actuator housing . . . it would have been obvious to a person of ordinary skill in the art at the relevant time to modify Ma in view of Young to include [it]”). Accordingly, based on Young’s disclosures, as well as Dr. Stevick’s testimony, we find that Petitioner’s proffered combination of Ma and Young teaches the disputed

hydraulic actuator housing limitation—i.e., a case or enclosure for at least the piston and hydraulic cylinder.

Petitioner also has articulated sufficient reasoning with some rational underpinning to support the legal conclusion that its proffered combination would have been obvious to one of ordinary skill in the art. *See KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007). Petitioner’s expert, Dr. Stevick, explains “[a] person of ordinary skill in the art at the relevant time would have been motivated to use an actuator assembly (200) of the type disclosed in Young—whether directly from Young or by modifying Ma’s housing to connect to actuator (60)—to increase structural support for the hydraulic actuator” and “to improve structural rigidity of the housing.” Pet. 22–23 (citing Ex. 1016 ¶ 43), 25 (citing Ex. 1016 ¶ 46). In addition, Petitioner explains, “in subsea applications, ambient water pressure can impart forces inward on the housing, and the proportions of Young’s housing . . . include a greater wall thickness and additional material at upper and lower ends of the sidewall, resulting in greater resistance to crushing due to water pressure.” *Id.* at 25 (citing Ex. 1016 ¶ 46). We find one skilled in the art would have had reason to combine Young’s and Ma’s teachings in the manner advanced by Petitioner.

e. The Combination of Ma and Young Includes a Piston Position Indicator

Claim 11 requires “connecting a piston position indicator to said first lip.” Patent Owner asserts that “[n]either Ma, nor Young make any mention of a piston position indicator connected to the first lip” and that “Petitioner employs hindsight to suggest” the combination of the two includes the disputed element. PO Resp. 35.

We find Petitioner has met its burden of showing Young discloses the as-claimed piston indicator. Young’s hydraulic cylinder includes a top shaft with a “clear” stem protector (Ex. 1003, 8:6–7), and as such, we agree with Petitioner that, in combining Ma and Young’s teachings, “Young’s top shaft 202, which would be connected to Ma’s spring seat (35) via the piston (212), is viewable outside the housing to indicate the position of piston (212).” Pet. 27; *see* Ex. 1020 ¶¶ 64–65; Reply 15–16. We also agree with Petitioner that “[t]he fact that Young’s stem protector is clear means that Young intended to permit its top shaft to function as a position indicator,” and that to do so, the shaft would have to be connected, even if indirectly, to the spring retainer. Ex. 1020 ¶¶ 65–66; Reply 16; *see also* Mot. Reply 11 (withdrawing argument related to Young’s position indicator).

Petitioner also has articulated sufficient reasoning with some rational underpinning to support the legal conclusion that its proffered combination would have been obvious to one of ordinary skill in the art. *See KSR*, 550 U.S. at 418. As discussed above, Petitioner explains why one skilled in the art would substitute Young’s hydraulic cylinder (which includes the position indicator) and housing in place of Ma’s outer housing and actuator—i.e., to improve Ma’s structural support and housing rigidity. *See* Pet. 22–23 (citing Ex. 1016 ¶ 43), 25 (citing Ex. 1016 ¶ 46). Petitioner additionally notes that its proposed modification to Ma “would have been a straightforward task” for one skilled in the art and “the combination would have yielded nothing more than predictable results.” Pet. 25–26. As the Supreme Court has explained, “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual

application is beyond his or her skill.” *KSR*, 550 U.S. at 417. Because Young’s known indicator technique would have provided the same visual feedback benefit for the Ma-Young combination as it does in Young, we conclude that Petitioner has met its burden to show that including a piston position indicator would have been obvious. *See* Pet. 25–26, 27.

f. The Combination of Ma and Young Includes the Remaining, Undisputed Limitations in Claims 7–9 and 11

Petitioner contends the combination of Ma and Young discloses the remaining limitations of claims 7–9 and 11. Pet. 21–22, 26–27. Patent Owner does not address the merits of Petitioner’s assertions regarding the remaining limitations. *See* PO Resp. 28–44. We agree with Petitioner’s assertions and adopt them as our own.

g. Conclusion

For these reasons, having considered the parties’ contentions and supporting evidence, we determine Petitioner has shown by a preponderance of the evidence the subject matter of claims 7–9 and 11 would have been obvious over Ma and Young.

3. Obviousness of Claims 12 and 14–18 over Ma, Young, and Baker

Petitioner asserts that claims 12 and 14–18 are invalid for obviousness based on Ma, Young, and Baker. Pet. 27–37. Patent Owner responds, arguing that the references do not disclose “a plurality of seals for limiting movement of hydraulic fluid within said hydraulic actuator housing” as claims 12 and 14–18 require. PO Resp. 46–47. Patent Owner also contends the references fail to disclose a return spring that is “preloaded for a desired tension when mounted between said base and lip section,” as claim 16 requires. *Id.* at 47–48. Based on our review of the arguments and evidence in the Petition, Response, and Reply, we determine that Petitioner has

demonstrated, by a preponderance of the evidence, that the subject matter of claims 12 and 14–18 would have been obvious over the combination of Ma, Young, and Baker, as explained below.

a. Baker

Baker discloses a “manual operating apparatus” or manual override for a valve. Ex. 1004, 1:7–8, 14–16. Baker’s Figure 12 is reproduced below:

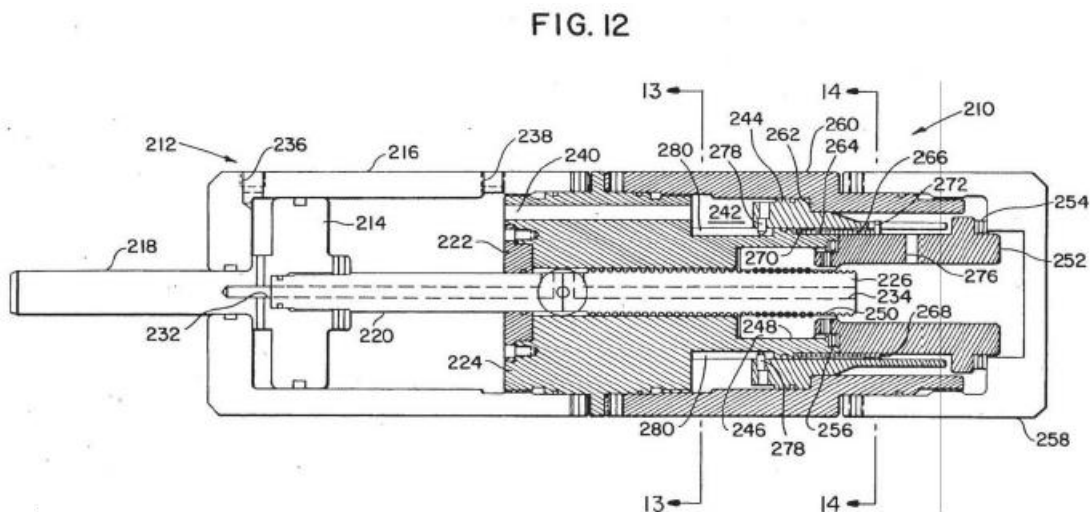
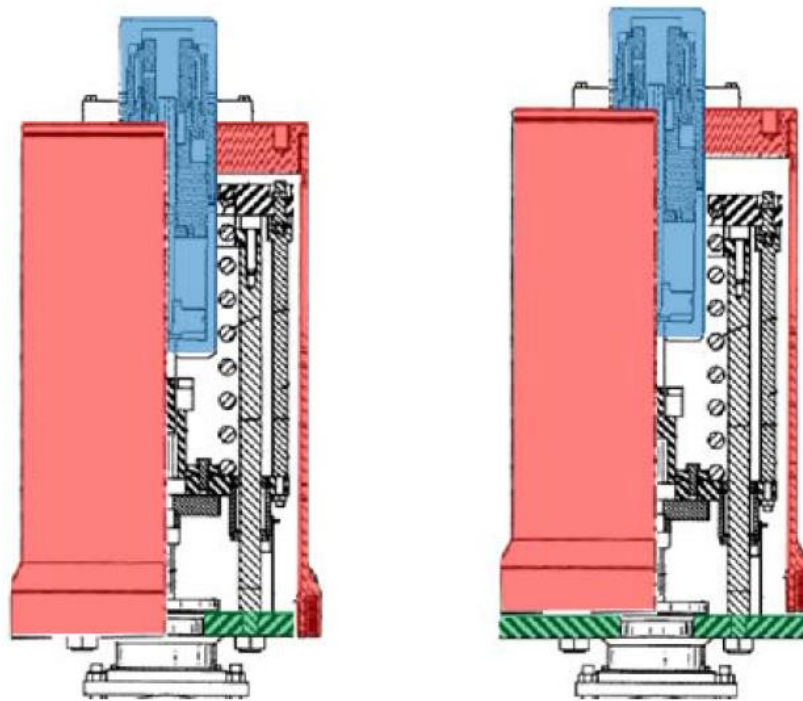


Figure 12 discloses an example of a valve with Baker’s manual override. Ex. 1004, 3:9–13.

b. The Combination of Ma, Young, and Baker Includes a Plurality of Seals Within Said Hydraulic Actuator Housing

Claim 12 (and by dependency claims 14–18) requires “a plurality of seals for limiting movement of hydraulic fluid within said hydraulic actuator housing.” Patent Owner asserts that “neither Ma, Young, nor Baker, taken separately or together in combination, show a hydraulic piston with outlets on either side of the piston mounted in a hydraulic actuator housing that also includes a spring chamber with a spring therein.” PO Resp. 46–47.

We disagree. Young teaches a housing that encloses all actuator components, including the piston and hydraulic cylinder. See Ex. 1003, Fig. 7, 9:9–11. Two of Petitioner’s proffered combinations include that teaching from Young, as illustrated in the figures below.



Reply 22; see Pet 28–29, 31–32; Ex. 1016 ¶¶ 54, 58; Ex. 1020 ¶¶ 80–82, 85–86. That is, as the figures illustrate, Petitioner’s proposed combination of Ma, modified to use Young’s housing, together with Baker’s manual override and hydraulic actuator, has a single housing enclosing the piston, hydraulic cylinder, outlets, and spring chamber. See Reply 12, 21–23 (citing Ex. 1016; Ex. 1021).

Petitioner also has articulated sufficient reasoning with some rational underpinning to support the legal conclusion that its proffered combination would have been obvious to one of ordinary skill in the art. See *KSR*, 550 U.S. at 418. Petitioner explains, with relevant support from Dr. Stevick,

several reasons why it would have been obvious for one skilled in the art to modify Ma’s hydraulic cylinder (as modified by Young) to include Baker’s manual override and other actuator components. Pet. 29–32 (citing Ex. 1016 ¶¶ 55–58). Those reasons include maintaining control of the valve in the event Ma’s spring cannot fully close the valve (e.g., after a loss of hydraulic pressure) and adding a bi-directionally controllable cylinder to assist Ma’s spring in closing the valve. Pet. 29–30. We find one skilled in the art would have had reason to combine the teachings of Ma, Young, and Baker in the manner advanced by Petitioner.

c. Remaining Elements in Claims 12 and 14–18

Incorporating its earlier argument made for a parallel limitation in claim 7, Patent Owner contends that the combination of Ma, Young, and Baker fails to disclose a return spring that is “preloaded for a desired tension when mounted between said base and lip section” as claim 16 requires. PO Resp. 47–48. For the reasons explained above in Section (II)(B)(2), we disagree with Patent Owner’s argument and find Ma teaches the disputed preloaded spring limitation.

Petitioner contends the combination of Ma, Young, and Baker discloses the remaining limitations of claims 12 and 14–18. See Pet. 27–37. Patent Owner does not address the merits of Petitioner’s assertions regarding the remaining limitations. See PO Resp. 44–48. We agree with Petitioner’s assertions and adopt them as our own.

d. Conclusion

For these reasons, having considered the parties’ contentions and supporting evidence, we determine Petitioner has demonstrated, by a

preponderance of the evidence, that the subject matter of claims 12 and 14–18 would have been obvious over Ma, Young, and Baker.

4. Obviousness of Claim 13 over Ma, Young, Baker, and Hay

a. Hay

Hay teaches employing hydraulic accumulators in subsea hydraulic actuators. Ex. 1005, 1:10–11, 43–44. In particular, Hay teaches that “operation of the actuator is delayed to such a time as the pressure can buildup with the fluid being pumped through the hydraulic line,” and recognizes that “[a] conventional method of avoiding this problem is to provide an accumulator near the hydraulic actuator.” *Id.* at 1:39–44.

b. Discussion

Petitioner asserts claim 13 is unpatentable for obviousness in view of Ma, Young, Baker, and Hay. Pet. 37–38. In its Response, Patent Owner does not address the merits of Petitioner’s assertions on this ground and, at the oral hearing, Patent Owner confirmed that it was “no longer contesting unpatentability” for claim 13. Tr. 61:21–23.

We agree with Petitioner’s assertions and adopt them as our own. In particular, we find Petitioner has met its burden to show that Hay teaches the accumulator recited in dependent claim 13, and that a person of ordinary skill would have had reason to combine Hay’s accumulator with prior-art hydraulic actuators—i.e. to assist with closing the valve in the event that hydraulic pressure is lost. *See* Pet. 37–38. Thus, in light of our obviousness determination for independent claim 12 in view of Ma, Young, and Baker (*see supra*, Section (II)(B)(3)), we determine Petitioner has shown by a preponderance of the evidence that claim 13 is unpatentable under 35 U.S.C. § 103(a) over Ma, Young, Baker, and Hay.

5. Anticipation of Claims 12 and 15 by McIntosh and Obviousness of Claim 13 over McIntosh and Hay

a. McIntosh

McIntosh discloses a “gate valve hydraulic actuator.” Ex. 1006, Abstract. McIntosh’s Figure 1 is reproduced below:

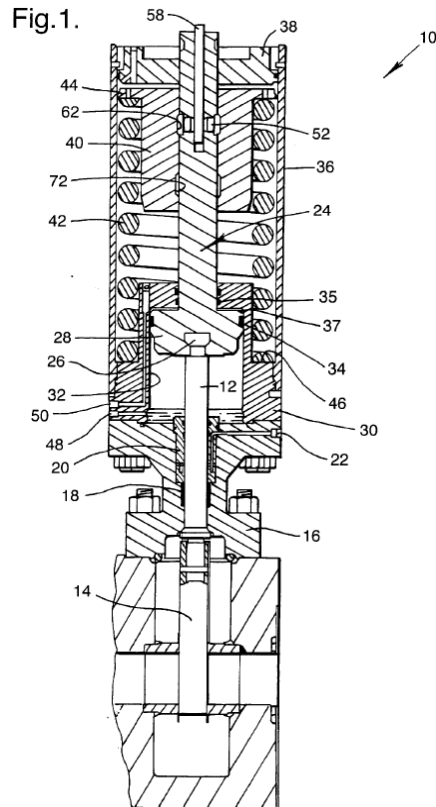


Figure 1 depicts hydraulic valve actuator 10, including housing 36, hydraulic cylinder 30, piston 28, two hydraulic ports 48 and 50, return spring 42 within the housing (but outside the hydraulic cylinder), and a hydraulic actuator override mechanism. Ex. 1006, Fig. 1, 2:7–49, 3:4–9.

b. Discussion

Petitioner asserts McIntosh anticipates claims 12 and 15 and that claim 13 would have been obvious over McIntosh and Hay. Pet. 40–47.

Patent Owner does not address the merits of Petitioner's assertions in its Response and, at the oral hearing, confirmed that it was "no longer contesting unpatentability" for claims 12, 13, and 15. Tr. 61:21–23.

We agree with Petitioner's assertions and adopt them as our own. In particular, we find that Petitioner has met its burden to show that McIntosh teaches all of the elements from independent claim 12 (i.e., a hydraulic actuator housing, hydraulic piston, cylinder housing, plurality of seals, hydraulic actuator override mechanism, and spring), as well as dependent claim 15's actuator shaft and return spring mounted between a spring pusher's base and lip. See Pet. 42–45. Thus, we determine Petitioner has shown by a preponderance of the evidence that claims 12 and 15 are unpatentable under 35 U.S.C. § 102(e) over McIntosh.

We find Petitioner has also met its burden to show that Hay teaches or suggests the accumulator recited in dependent claim 13, and that a person skilled in the art would have combined Hay's accumulator with McIntosh to supplement the force provided by McIntosh's spring, thus helping close the valve. See Pet. 46–47. Thus, we determine Petitioner has shown by a preponderance of the evidence that claim 13 is unpatentable under 35 U.S.C. § 103(a) over McIntosh and Hay.

III. PATENT OWNER'S MOTION TO AMEND

Because we determine that claim 7 is unpatentable, we turn to Patent Owner's contingent request to enter proposed substitute claim 36. Mot. 1. As the moving party, Patent Owner bears the burden of proof to show it is entitled to the relief requested. See 37 C.F.R. § 42.20(c). Before we enter a proposed amendment, the Patent Owner must demonstrate, by a preponderance of the evidence, the patentability of the proposed substitute

claims. 37 C.F.R. § 42.121; *Nike, Inc. v. Adidas AG*, 812 F.3d 1326, 1332–34 (Fed. Cir. 2016); *see Idle Free Sys., Inc. v. Bergstrom, Inc.*, IPR2012-00027, slip op. at 7–8 (PTAB June 11, 2013) (Paper 26) (informative).

Proposed substitute claim 36 recites follows:

36. A method for assembly a valve actuator for a valve, said method comprising:

- providing a hydraulic actuator housing attachable to said valve;

- providing a hydraulic cylinder for placement within said hydraulic actuator housing;

- providing a hydraulic piston for placement within said hydraulic cylinder;

- providing a return spring for placement within said hydraulic actuator housing;

- engaging one end of said return spring with a first lip member;

- engaging an opposite end of said return spring with a second lip member;

- securing said first lip member and said second lip member together to thereby compress said return spring[;]

- selectively adjusting tension on said return spring by adjusting a maximum length between said first lip and second lip; and

- installing said first lip member, said second lip member, and said return spring simultaneously into said hydraulic housing as a unit.

Mot. App’x A, 14–15.

Proposed substitute claim 36 adds two limitations to original claim 7: “providing a hydraulic cylinder for placement within said hydraulic actuator housing; [and] providing a hydraulic piston for placement within said hydraulic cylinder.” *Id.* Because we have construed a hydraulic actuator

housing in accord with Petitioner's amendment (i.e., such that it must house the piston and hydraulic cylinder, *see* Section (II)(A)(2)), Petitioner's proposed amendment does not further narrow claim 7. Like claim 7, proposed substitute claim 36 would therefore also have been obvious over Ma and Young, as explained in Section (II)(B)(2). Thus, Patent Owner has not met its burden of demonstrating the patentability of the proposed substitute claim.

IV. CONCLUSION

In conclusion, Petitioner has shown by a preponderance of the evidence that (1) claims 7–9 and 11 are unpatentable under 35 U.S.C. § 103(a) over Ma and Young; (2) claims 12 and 14–18 are unpatentable under 35 U.S.C. § 103(a) over Ma, Young, and Baker; (3) claim 13 is unpatentable under 35 U.S.C. § 103(a) over Ma, Young, Baker, and Hay; (4) claims 12 and 15 are unpatentable under 35 U.S.C. § 102(e) over McIntosh; and (5) claim 13 is unpatentable under 35 U.S.C. § 103(a) over McIntosh and Hay. Petitioner, however, has not demonstrated that claims 7–9 and 11 are unpatentable under 35 U.S.C. § 102(a) or 102(e) over Ma. As for Patent Owner's Motion to Amend, Patent Owner has not shown that its proposed substitute claim 36 is patentable over the asserted prior art.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has shown by a preponderance of the evidence that claims 7–9 and 11–18 of U.S. Patent No. 6,684,897 B2 are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is denied; and

FURTHER ORDERED that, because this is a Final Written Decision, the parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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