

APPENDIX

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APPENDIX

**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

05-1492

FESTO CORPORATION,

Plaintiff-Appellant,

v.

SHOKETSU KINZOKU KOGYO KABUSHIKI CO.,
LTD., (also known as SMC Corporation)
and SMC PNEUMATICS, INC.

Defendants-Appellees.

DECIDED: July 5, 2007

Before MICHEL, Chief Judge, NEWMAN, and
DYK, Circuit Judges.

Opinion for the court filed by Circuit Judge
Dyk. Dissenting opinion filed by Circuit Judge
Newman.

OPINION

DYK, Circuit Judge.

This case raises the question of whether an equivalent is foreseeable within the meaning of *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 740 (2001) (“*Festo VIII*”), and subject to surrender under the doctrine of prosecution history estoppel. We conclude that foreseeability does not require the applicant to be aware that a particular equivalent would satisfy the insubstantial differences test or the function/way/result test with respect to the claim as amended. We hold that Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd. and SMC Pneumatics, Inc.’s (collectively “SMC”) aluminum sleeve was a foreseeable alternative to Festo Corporation’s (“Festo’s”) magnetizable sleeve and that prosecution history estoppel applies. Accordingly, we affirm the district court’s judgment in favor of SMC of lack of infringement of U.S. Patent No. 4,354,125 (filed May 28, 1980) (“125 patent”). *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, No. 88-1814, slip op. at 2 (D. Mass. June 13, 2005) (“*Festo XI*”); *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, slip op. 88-1814, p.7 (D. Mass. Jan. 10, 2006) (“*Festo XII*”) (order denying motion to amend judgment).

BACKGROUND**I**

This case once again presents an issue concerning the scope of prosecution history estoppel under the doctrine of equivalents. The case has been pending for almost twenty years and has been before the Supreme Court twice and before us twice

en banc. The relevant history may be briefly summarized.

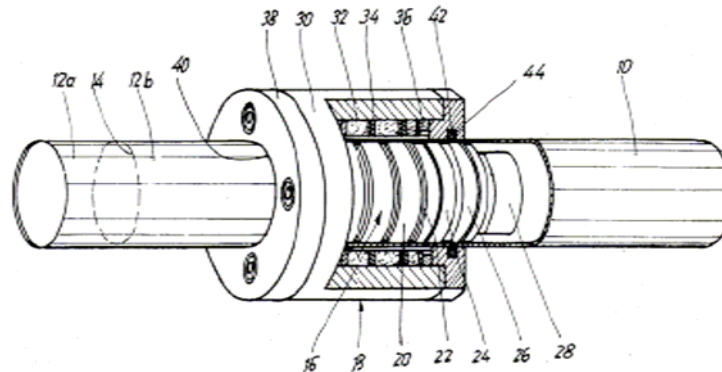
In August 1988, Festo sued SMC for infringement of the '125 patent.¹ The '125 patent, entitled "Magnetically Coupled Arrangement for a Driving and a Driven Member," claims a "small gap" magnetically coupled rodless cylinder. A "magnetically coupled rodless cylinder" is a previously known device that contains a piston that is forced through a cylinder and is magnetically coupled to a driven member or driven assembly (which is then attached to a carriage that can move goods). '125 patent Abstract; *id.*, col.1 ll.11-15. Thus, when the piston moves through the cylinder, the magnetic force moves the driven member, which moves the attached carriage. At the time of the invention, such conveyance machines were known in the art. The invention claimed in the '125 patent is a "small gap" magnetically coupled rodless cylinder, meaning that the gap between the piston and the driven member is kept as small as possible so that the magnetic coupling force is particularly strong. '125 patent Abstract.

The patent explains that the piston is encircled with magnets and is driven through the cylinder by liquid pressure. *Id.*, col.1 ll.56-58, col.2 ll.12-13. The driven member is outside the cylinder and contains magnets that are coupled by magnetic force with the magnets on the piston. *Id.*, col.3 ll.16-17, col.4

¹ Festo's original lawsuit also charged SMC with infringing U.S. Patent No. 3,779,401 (filed Feb. 17, 1972) ("the Carroll patent"). The Carroll patent was not at issue before the district court on remand and is not at issue in this appeal.

ll.25-29. The driven member is not physically attached to the piston, but, because it is magnetically coupled to the piston, the driven member follows the piston along the outside of the cylinder as the piston moves along the inside of the cylinder. A “sleeve” surrounds the outside of the driven member and is the casing that encloses the magnets. *Id.*, col.3 ll.60-65. Guide rings are located at each end of the piston. *Id.*, col.3 ll.24-30. The purpose of the guide rings is to guide the piston through the cylinder without the magnets on the piston touching the sides of the cylinder. The guide rings also wipe impurities from the inside of the cylinder. *Id.*, col.3 ll.41-48. The device also contains sealing rings at either end of the piston. *Id.*, col.3 ll.30-33. The purpose of the sealing rings is to align with separate wiping rings on the driven member to prevent “torsional deforming moments” that could cause the piston and the driven member to pinch the thin cylinder wall. *Id.*, col.1 ll.63-68. The sealing rings also wipe impurities from the inside of the cylinder. *Id.*, col.3 ll.41-48. The following figure, the only drawing in the patent, shows the cylinder (10), the piston (16), the driven member (18), the guide rings (24), the sealing rings (26), the wiper rings (44), and the sleeve (30):

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Dr. Kurt Stoll filed the application that became the '125 patent in the United States as the U.S. counterpart to a German patent application. The original U.S. application was filed with 12 claims. Claim 1 initially read:

1. A linear motor for use in a conveying system, said motor being operable by a pressure medium and comprising a tubular part connectible to a source of the pressure medium, a piston which is slidable in said tubular part and which has sealing means at each end for [w]iping engagement with an internal surface of the tubular part and so as to form a seal for the pressure medium, and a driven assembly which is slidable on the tubular part and which has means at each end for [w]iping engagement with an external surface of the tubular part, the piston and the driven assembly each carrying a drive magnet arrangement in the form of a

hollow cylindrical assembly, each magnet arrangement having radial play relative to the adjacent surface of the tubular part, and surfaces of the magnet arrangements which face the tubular part being closely adjacent to the respective surfaces of the tubular part.

Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 234 F.3d 558, 582 (Fed. Cir. 2000) (en banc) (vacated on other grounds, *Festo VIII*, 535 U.S. at 742).

The original application also included two relevant dependent claims: claims 4 and 8. Claim 4 read:

4. A linear motor according to any of claims 1 to 3, wherein the sealing means of the piston comprise sealing rings and the piston is provided with sliding guide rings near the sealing rings.

Id. at 583 (emphasis omitted). Claim 8 read:

8. A linear motor according to any of the preceding claims wherein the driven assembly is provided with a sleeve made of a magnetizable material, which encircles the hollow cylindrical assembly of the magnet arrangement.

Id. (emphasis omitted).

In 1981 the patent examiner rejected the initial application because the examiner could not determine whether the claimed device was a “true

motor or [a] magnetic clutch”² and because some of the claims were in improper multiple dependent form in violation of 35 U.S.C. § 112.

In response, on November 2, 1981, Dr. Stoll submitted two prior art German patents that claimed a “large gap” rodless cylinder, meaning that the gap between the magnets on the piston and driven member is larger than the gap claimed in the ‘125 patent. *See* German Offenlegungsschrift No. 27 37 924 (“the German patent”); German Gebrauchsmuster No. 19 82 379. These patents had been cited in the first office action in Dr. Stoll’s corresponding German application and were called to the examiner’s attention here as possibly relevant prior art. The German patent identified a sleeve “made of non-magnetic material.” The German patent also identified two sealing rings, one located at each end of the piston, but no guide rings. In an accompanying response, Dr. Stoll did not address the sleeve element but did state that “[i]t is clear that neither of these two references discloses the use of structure preventing the interference by impurities located inside the tube and on the outside of the tube while the arrangement is moved along the tube.”

² A “motor” is defined as a “prime mover,” which is “[a]n engine or mechanism converting a natural source of energy into mechanical power.” G.H.F. Nayler, *Dictionary of Mechanical Engineering* 252, 297 (4th ed. 1996). A “clutch” is “[t]he coupling of two working parts, for example two shafts, in such a way as to permit connection or disconnection at will without the necessity of bringing both parts to rest, and when connected to transmit the required amount of power without slip.” *Id.* at 78. A “magnetic clutch[]’ make[s] use of the attraction of a magnet for its armature.” *Id.*

Dr. Stoll also amended the patent application. He replaced independent claim 1 and dependent claims 4 and 8 with a new independent claim (now claim 1 of the '125 patent).³ The new independent

³ The full text of the new amended claim 1 reads:

In an arrangement having a hollow cylindrical tube and driving and driven members movable thereon for conveying articles, the improvement comprising wherein said tube is made of a nonmagnetic material, wherein said driving member is a piston movably mounted on the inside of said tube, said piston having a piston body and plural axially spaced, first permanent annular magnets encircling said piston body, said piston further including first means spacing said first permanent magnets in said axial spaced relation, the radially peripheral surface of said magnets being oriented close to the internal wall surface of said tube, said piston further including plural guide ring means encircling said piston body and slidably engaging said internal wall and first sealing rings located axially outside said guide rings for wiping said internal wall as said piston moves along said tube to thereby cause any impurities that may be present in said tube to be pushed along said tube so that said first annular magnets will be free of interference from said impurities, wherein said driven member includes a cylindrical sleeve made of a magnetizable material and encircles said tube, said sleeve having plural axially spaced second permanent annular magnets affixed thereto and in magnetically attracting relation to said first permanent annular magnets and second means spacing said second permanent annular magnets in said axially spaced relation, the radially inner surface of said magnets being oriented close to the external surface of said tube, said sleeve having end face means with second sealing rings located axially outside said second permanent annular magnets for wiping the external wall surface of said tube as said driven member is moved along said tube in response to a driving movement of said piston to thereby cause any impurities that may be present on said tube to be pushed along said tube so that said second permanent annular magnets will be free of interference from said impurities.

claim claims “a cylindrical sleeve made of a magnetizable material.” ‘125 patent col.6 ll.2-3. While the original claim did not refer specifically to a “sleeve,” the specification makes clear that a sleeve was part of the driven assembly. The specification explains that the sleeve “encloses” the magnets on the driven assembly and the magnets are “bolted to the sleeve by way of elastomeric thrust rings.” ‘125 patent col.3 ll.62-68. Thus the amendment adding “a cylindrical sleeve made of a magnetizable material” in claim 1 affected “the composition of the sleeve.” *Festo VIII*, 535 U.S. at 737.⁴ The amendments also replaced “sealing means” in the original claim with “first sealing rings located axially outside said guide rings.” ‘125 patent col.5 ll.37-38. The purposes of the amendments were not explained. After considering Dr. Stoll’s response, the examiner allowed the amended claims with minor changes that are not pertinent here.

SMC’s accused device is also a magnetically coupled rodless cylinder containing a piston, cylinder, and driven member. However, the SMC device contains two relevant differences. First, the sleeve on the driven member is made of a non-magnetizable material, aluminum alloy. Second, while the SMC device contains two guide rings (one on each end of the driven member), it only uses one sealing ring. The parties agreed that the accused device does not literally infringe the ‘125 patent

⁴ ‘125 patent col.5 l.23 – col.6 l.18 (emphases added).

⁴ Moreover, the sleeve is clearly depicted as part of the driven assembly in the only drawing in the patent. ‘125 patent FIGURE.

because it does not satisfy either of these two claim limitations. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, No. 88-1814, slip op. at *3, *6 (D. Mass. Feb. 3, 1994).

Festo argued, however, in a motion for summary judgment that the device infringed under the doctrine of equivalents. *Id.* SMC, in turn, argued in a cross-motion for summary judgment that the accused device did not infringe under the doctrine of equivalents because it did not satisfy the function/way/result test (i.e., that it was not insubstantially different) and because the two amendments to the claims invoked the doctrine of prosecution history estoppel. *Id.* The district court held that prosecution history estoppel did not apply because “there [was] nothing in the record . . . to indicate that the limitation of a magnetizable sleeve was necessary to distinguish the claimed invention over the prior art.” *Id.* at *4. At the same time the court concluded that whether there was infringement under the doctrine of equivalents was a question of fact to be heard by a jury. *Id.* at *5. After hearing evidence on the function/way/result test, the jury found infringement of claim 1 of the ‘125 patent under doctrine of equivalents and awarded Festo \$4,322,456 in damages and \$416,727 in pre-judgment interest. The district court entered judgment accordingly. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, No. 88-1814 (D. Mass Oct. 27, 1994) (“*Festo I*”).

After an initial panel decision affirming the judgment, *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 72 F.3d 857 (Fed. Cir. 1995) (“*Festo II*”), the Supreme Court granted certiorari and remanded for consideration of the prosecution history estoppel question in light of *Warner-*

Jenkinson Co. v. Hilton Davis Chemical Co., 520 U.S. 17 (1997). *Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd. v. Festo Corp.*, 520 U.S. 1111 (1997) (“*Festo III*”). We considered the question en banc and held that the amendments were presumed to be related to patentability and therefore created an absolute bar to the invocation of the doctrine of equivalents. *Festo VI*, 234 F.3d at 574, 587-91.⁵ The Supreme Court again vacated and remanded, holding that an amendment did not raise a complete bar, and that there were three exceptions, namely that (1) the equivalent was “unforeseeable at the time of the application,” (2) “the rationale underlying the amendment [bears] no more than a tangential relation to the equivalent in question,” or (3) that “some other reason suggest[s] that the patentee could not reasonably be expected to have described the insubstantial substitute in question.” *Festo VIII*, 535 U.S. at 740-41.

In our second en banc, we held that rebuttal of the presumption of surrender was a question of law to be tried by a court and not a jury. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 344 F.3d 1359, 1367 (Fed. Cir. 2003) (en banc) (“*Festo X*”). We explained that the latter two exceptions were legal questions to be determined based on the prosecution history and that neither exception

⁵ On the first remand from the Supreme Court, a panel of this court vacated and remanded the district court’s judgment of infringement of the ‘125 patent under the doctrine of equivalents. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 172 F.3d 1361, 1381 (Fed. Cir. 1999) (“*Festo IV*”). We then granted SMC’s petition for rehearing en banc. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 187 F.3d 1381 (Fed. Cir. 1999) (“*Festo V*”).

applied. *Id.* at 1369-70. With respect to the first exception (foreseeability), we concluded that it too was a legal question but held that, because “[b]y its very nature[] objective unforeseeability depends on underlying factual issues,” district courts may hear expert testimony and consider other evidence relating to the foreseeability analysis. *Id.* at 1369. As no record on the issue of foreseeability had been made in the earlier district court proceeding, we remanded for the district court to determine: (1) “whether an ordinarily skilled artisan would have thought an aluminum sleeve to be an unforeseeable equivalent of a magnetizable sleeve in the context of the invention”; and (2) “whether a person of ordinary skill in the art would have considered the accused two-way sealing ring to be an unforeseeable equivalent of the recited pair of sealing rings.” *Id.* at 1371-72.

On remand, the district court received evidence on the foreseeability issue during a two-day bench trial. Festo argued that neither an aluminum sleeve nor a single two-way sealing ring was foreseeable on the date of the amendment, November 2, 1981. Festo urged that it was not foreseeable at the time of the amendments that the equivalents could perform the same function as the Festo device (even though Festo had successfully argued in the doctrine of equivalents trial that the equivalents in fact performed the same function). Festo Post Tr. Br. at 12, 32 (Jan. 7, 2005). Based on the patent specification, Festo argued that a purpose of the sleeve was to shield against magnetic field leakage; while aluminum was well known, its utility to provide magnetic field shielding was unknown and that its use for that purpose was unforeseeable at the time of the

amendment. Regarding the sealing rings, Festo argued that a person of ordinary skill in the art would not have foreseen the SMC structure as “a design option” because a skilled artisan would have thought that removing a ring would (1) allow impurities to enter the gap and (2) result in deformation of the tube.

After the trial, the district court issued an order dated June 13, 2005, finding that Festo failed to rebut the presumption for either the magnetizable sleeve or the sealing rings. *Festo XI*, at 2. The court then issued a subsequent January 10, 2006, order affirming its original decision and denying Festo’s motion to amend the judgment. *Festo XII*, at 7. Regarding the magnetizable sleeve, while the court stated that “no one disputes that the use of an aluminum alloy sleeve for purposes of shielding magnetic fields was not known at the time of amendment,” *Festo XII*, at 2, the court concluded that use of an aluminum alloy sleeve was foreseeable because the leakage fields on the Festo device were “very small.” *Id.* at 3. In other words, the district court appeared to find that use of an aluminum sleeve was foreseeable because containing the magnetic leakage fields was not necessary to serve the purposes of the invention. The court explained that “[t]he evidence suggests that a person of ordinary skill in the art, at most, would have considered a device with a non-magnetizable sleeve inferior. However, as with the single sealing ring, inferiority does not equate with unforeseeability.” *Festo XI*, at 20.

Regarding the sealing rings, in its June 13, 2005, opinion, the district court held that use of a single sealing ring was foreseeable relying primarily on its misunderstanding that the

German patent only claimed a single sealing ring. *Festo XI*, at 12. The court concluded that “[b]ecause a single sealing ring was known in the prior art in the field of the invention, it certainly should have been foreseeable.” *Id.* at 13 (internal quotation marks omitted).

On January 10, 2006, the district court denied Festo’s motion to amend but clarified its description of the German patent. *Festo XII*, at 4. While the court recognized that the German patent in fact claimed two sealing rings, the court nonetheless found that a single sealing ring was foreseeable. Festo had argued that use of a single sealing ring was not foreseeable at the time of amendment in 1981 because the strength of magnets at that time required the cylinder wall to be sufficiently thin to allow a strong magnetic connection. By 1988, Festo argued, magnet technology had improved which permitted the use of thicker cylinder walls. These thicker walls were not as susceptible to deformation if an asymmetrical set of sealing rings was used. Festo thus alleged that use of a single sealing ring was not foreseeable in 1981 because a person of ordinary skill in the art could not have foreseen the developments in magnet technology. The district court concluded that “Festo’s primary failing was the lack of data comparing the strength of the magnets in the art in 1981 (the time of amendment) vis-à-vis the magnets in the SMC device.” *Id.* at 6. The court reasoned that without this data it could not credit Festo’s expert testimony “concerning the [lack of] foreseeability of using one two-way sealing ring with two guide rings as an equivalent to the Festo combination to prevent tensional deformation in 1981.” *Id.* at 7.

Festo timely appealed to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1) (2006).

DISCUSSION

Prosecution history estoppel as a limit on the doctrine of equivalents is an issue of law which is reviewed without deference. *Festo X*, 344 F.3d at 1367-68. We review the resolution of underlying factual issues for clear error. *See id.* at 1369.

I

In *Graver Tank & Manufacturing Co. v. Linde Air Products Co.*, 339 U.S. 605 (1950), the Supreme Court stated that the doctrine of equivalents applies when the equivalent represents an “insubstantial” change from the claim language. *Id.* at 610. The Court also explained that “a patentee may invoke [the] doctrine [of equivalents] to proceed against the producer of a device ‘if it performs substantially the same function in substantially the same way to obtain the same result.’” *Id.* at 608 (quoting *Sanitary Refrigerator Co. v. Winters*, 280 U.S. 30, 42 (1929)). The Supreme Court in *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17 (1997), considered whether the test for the doctrine of equivalents should be the “insubstantial differences” test or the “triple identity” test, which focuses on “the *function* served by a particular claim element, the *way* that element serves that function, and the *result* thus obtained by that element.” *Id.* at 39 (emphasis in original). The Court declined to choose one test because “[d]ifferent linguistic frameworks may be more suitable to different cases, depending on their particular facts.” *Id.* at 40.

The doctrine of prosecution history estoppel acts as a “legal limitation on the doctrine of equivalents.” *Id.* at 30. “[P]rosecution history estoppel limits the range of equivalents available to a patentee by preventing recapture of subject matter surrendered during prosecution of the patent.” *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1579 (Fed. Cir. 1995). The burden is on the patentee to establish that the reason for the amendment was unrelated to patentability. *Warner-Jenkinson*, 520 U.S. at 33. If the patentee fails to meet this burden, the court must presume that the patentee “had a substantial reason related to patentability for including the limiting element added by amendment.” *Id.* If there is a substantial reason related to patentability “prosecution history estoppel would bar the application of the doctrine of equivalents as to that element.” *Id.* However, in *Festo VIII*, 535 U.S. at 740, the Supreme Court held that the patentee may prove that the amendment did not surrender the particular equivalent by demonstrating that one of three exceptions is met.

The Supreme Court’s decision in *Festo VIII* established that the purpose of the amendments to the original claims of the application ultimately issuing as the ‘125 patent was to overcome a Section 112 rejection, and therefore “the amendments were made for a reason relating to patentability.” *Id.* at 741. Our decision in *Festo X* also established that the “tangential” and “some other reason” exceptions are inapplicable. 344 F.3d at 1372-73. Here the sole question is whether the equivalent was “unforeseeable at the time of the application.” *Festo VIII*, 535 U.S. at 740-41. On remand from the Supreme Court, we concluded that “unforeseeable at the time of the amendment”

meant “whether the alleged equivalent would have been unforeseeable to one of ordinary skill in the art at the time of the amendment.” *Festo X*, 344 F.3d at 1369. We noted that later-developed technology or technology that was not known in the pertinent prior art was “usually” not foreseeable. *Id.* However, we explained that “old technology, while not always foreseeable, would more likely have been foreseeable. Indeed, if the alleged equivalent were known in the prior art in the field of the invention, it certainly should have been foreseeable at the time of the amendment.” *Id.*

We have explained that the Supreme Court in *Festo VIII* “ties foreseeability to whether the applicant would have been expected to know of, and thus properly claim, the proposed equivalent at the time of amendment.” *SmithKline Beecham Corp. v. Excel Pharms., Inc.*, 356 F.3d 1357, 1364 (Fed. Cir. 2004). Thus “the Supreme Court in *Festo* [does not] excuse[] an applicant from failing to claim ‘readily known equivalents’ at the time of application.” *Id.* Accordingly, we have consistently held that an equivalent is foreseeable when the equivalent is known in the pertinent prior art at the time of amendment. For example, in *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 457 F.3d 1293, 1313 (Fed. Cir. 2006), we found that the patentee failed to establish a lack of foreseeability where “the patentee admittedly knew about the . . . equivalent at the time of the . . . amendment” and informed the examiner of the equivalent during prosecution.⁶

⁶ See also, e.g., *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 480 F.3d 1335, 1342 (Fed. Cir. 2007) (“[T]he evidence of record clearly demonstrates that the use of

II

Previously both the Supreme Court and our court expressed skepticism that *Festo* could prevail on the issue of foreseeability. In remanding, the Supreme Court noted that “SMC may well prevail, for the sealing rings and the composition of the sleeve both were noted expressly in the prosecution history.” *Festo VIII*, 535 U.S. at 741. So too when we remanded to the district court we noted that “it seems unlikely that an aluminum sleeve would have been unforeseeable, as it was made of a commonly available metal.” *Festo X*, 344 F.3d at 1371.

an undercut or recess, the alleged equivalent here, is an old and well known fundamental of basic machining that was entirely foreseeable at the time of the amendment to one of ordinary skill in the art.”); *Research Plastics, Inc. v. Fed. Packaging Corp.*, 421 F.3d 1290, 1299 (Fed. Cir. 2005) (“[I]t was foreseeable at the time of issuance of the patent that [the equivalent] was a point of differentiation.”); *Glaxo Wellcome, Inc. v. Impax Labs., Inc.*, 356 F.3d 1348, 1355 (Fed. Cir. 2004) (finding that the patentee failed to rebut the presumption because “Glaxo was aware of these potential hydrogel equivalents at the time of submitting the ‘798 patent claims and later amending those claims to recite only HPMC”); *Ranbaxy Pharms. Inc. v. Apotex, Inc.*, 350 F.3d 1235, 1241 (Fed. Cir. 2003) (finding that the equivalent was foreseeable where the equivalent was “readily known by chemists”); *Talbert Fuel Sys. Patents Co. v. Unocal Corp.* 347 F.3d 1355, 1359 (Fed. Cir. 2003) (“When the prior art embraces the alleged equivalent, and a narrowing amendment was made to avoid that equivalent, that subject matter cannot be found to have been unforeseeable at the time of the amendment.”); *Pioneer Magnetics, Inc. v. Micro Linear Corp.* 330 F.3d 1352, 1357 (Fed. Cir. 2003) (holding that the patentee could not overcome the presumption of prosecution history estoppel because the equivalent technology was “known in the art and would have been foreseeable at the time of the amendment”).

Festo urges, however, that these suggestions are wide of the mark. Relying on language in *Festo X* that foreseeability must be determined “in the context of the invention,” *id.*, Festo contends that the equivalent must be foreseeable under the function/way/result test at the time of the amendment. In support of its position, Festo argues that

[t]he proper unforeseeability test is to determine whether the proven equivalent would have been foreseeable to a person of ordinary skill in the art to accomplish the claimed invention, i.e., perform the same function in substantially the same way to achieve the same result, looking only at the information available at the time of the amendment.

Appellant’s Reply Br. at 8.⁷ Festo argues that that use of an aluminum alloy sleeve was not foreseeable on November 2, 1981, the date of amendment, because it was not known that an aluminum alloy sleeve would perform the magnetic shielding function. Festo also alleges that use of one sealing ring was not foreseeable because in 1981 one would reasonably expect that a single sealing ring would result in deformation of the

⁷ Similarly Festo urges that “[t]he issue to be decided is whether a person of ordinary skill in the art could have foreseen the use of the SMC aluminum alloy sleeve in place of the claimed magnetizable sleeve to accomplish the same function, in substantially the same way to achieve the same result.” Appellant’s Reply Br. at 8-9.

cylinder and that, therefore, the sealing function could not be performed by a single sealing ring.

We disagree that the foreseeability test requires application of the function/way/result or insubstantial differences test. Rather, we find that an alternative is foreseeable if it is disclosed in the pertinent prior art in the field of the invention. In other words, an alternative is foreseeable if it is known in the field of the invention as reflected in the claim scope before amendment. We have no occasion here to determine in what other circumstances an equivalent might be foreseeable.

III

As an initial matter, we note that Festo's argument seems inconsistent with the basic concept of the doctrine of equivalents. Festo is effectively arguing that it should be able to capture the unclaimed equivalents here because at the time the patent was prosecuted those equivalents were unknown and the device incorporating those equivalents was thought to be substantially different from the device with the features claimed in the patent before the amendment. In other words, Festo argues that a patentee should be able to capture through equivalents a device that was novel, i.e. separately patentable, because of the novelty of the equivalent features. The theory of the doctrine of equivalents is that an applicant through the doctrine of equivalents should only be able to protect the scope of his invention, *Wilson Sporting Goods Co. v. David Geoffrey & Assocs.*, 904 F.2d 677, 684 (Fed. Cir. 1990), not to expand the protectable scope of the claimed invention to cover a new and unclaimed invention. We have not directly decided whether a device—novel and

separately patentable because of the incorporation of an equivalent feature—may be captured by the doctrine of equivalents, although we have held that when a device that incorporates the purported equivalent is in fact the subject of a separate patent, a finding of equivalency, while perhaps not necessarily legally foreclosed⁸ is at least considerably more difficult to make out.⁹ But there is a strong argument that an equivalent cannot be both non-obvious and insubstantial.¹⁰

⁸ See *Glaxo Wellcome, Inc. v. Andrx Pharms., Inc.*, 344 F.3d 1226, 1233 (Fed. Cir. 2003) (“Although this fact may be weighed by the district court, particularly if there is an issue of ‘insubstantial’ change with respect to equivalency, separate patentability does not automatically negate infringement.”); *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1582 (Fed. Cir. 1996); *Nat’l Presto Indus., Inc. v. West Bend Co.*, 76 F.3d 1185, 1191 (Fed. Cir. 1996) (“The grant of a separate patent on the accused device does not automatically avoid infringement, either literal or by equivalents.”); *Atlas Powder Co. v. E.I. DuPont de Nemours and Co.*, 750 F.2d 1569, 1580 (Fed. Cir. 1984) (rejecting the prima facie standard).

⁹ In *Hoganas AB v. Dresser Industries, Inc.*, 9 F.3d 948 (Fed. Cir. 1993), this court held that the accused product was not insubstantially *different* from the patented device. *Id.* at 954. In support of this holding, the court noted that the accused device was separately patented. *Id.* We explained that “the PTO must have considered the accused product to be nonobvious with respect to the patented composition. Accordingly, the issuance of that patent is relevant to the equivalence issue.” *Id.* Likewise, in *Zygo Corp. v. Wyko Corp.*, 79 F.3d 1563 (Fed. Cir. 1996), we stated that the accused device is “presumed nonobvious” when it is patented, and “[t]he nonobviousness . . . is relevant to the issue of whether the change wherein is substantial.” *Id.* at 1570.

¹⁰ See *Roton Barrier, Inc. v. Stanley Works*, 79 F.3d 1112, 1128 (1996) (Nies, J., additional views) (“A substitution

Even if we were to assume that Festo's argument was consistent with the purpose of the doctrine of equivalents, we conclude that, contrary to Festo's argument, the foreseeability requirement does not require the knowledge that the equivalent would satisfy the function/way/result test or the insubstantial differences test.

IV

Neither the Supreme Court's *Festo VIII* decision nor our own 2003 en banc decision in *Festo X* in any way supports Festo's theory. To the contrary, both the Supreme Court's decision and our en banc decision make clear that an equivalent is foreseeable if the equivalent was generally known to those skilled in the art at the time of amendment as available in the field of the invention as defined by the pre-amendment claim scope. The applicant is charged with surrender of foreseeable equivalents known before the amendment, not equivalents known after the amendment. Thus, for example, the Supreme Court in *Festo VIII* noted that "[t]he patentee, as the author of the claim language, may be expected to draft claims encompassing readily known equivalents." 535 U.S. at 740. Similarly we stated in *Festo X* that "if the alleged equivalent were known in the prior art *in the field of the invention*, it certainly should have been foreseeable at the time of the amendment." 344 F.3d at 1369 (emphasis added).

in a patented invention cannot be both nonobvious and insubstantial.").

Festo also offers no persuasive theory as to why the function/way/result test applied to the claims as amended should be used to determine foreseeability. To adopt Festo's argument, in fact, makes no sense. First, the function/way/result or insubstantial differences test is designed to determine whether the alternative is sufficiently close to the claimed feature that the patentee should be able to capture the equivalent and bar its use by a competitor. The test is not designed to determine whether prosecution history estoppel applies as a result of a limiting amendment. Festo offers no rationale for importing a test designed for one purpose into an entirely different context.

Second, accepting Festo's view of foreseeability would likely eliminate prosecution history estoppel as a restriction on the doctrine of equivalents in most cases. *See Warner-Jenkinson*, 520 U.S. at 30. Prosecution history estoppel would apply only if the applicant in adopting the narrowing amendment was aware or should have been aware that the equivalent would be an equivalent to the claimed feature for purposes of the invention as defined by the amended claim. This in itself would be rare, and it would be rarer still that the applicant, aware of such an alternative, would have failed to claim it in the first instance. An alternative would be foreseeable only in the limited circumstances where the alternative was inadvertently omitted and was a candidate for a reissue patent. *See* 35 U.S.C. § 251.

Third, since the only difference between the function/way/result test for infringement and Festo's test for prosecution history estoppel is the difference in timing—the function/way/result test for infringement being applied at the time of

infringement and the function/way/result test for prosecution history estoppel being applied at the time of amendment—Festo’s proposed test would lead to endless bickering over whether the equivalent satisfied the function/way/result test. It would also lead to inconsistent arguments, as the record in this case amply attests. For purposes of infringement, the patentee would assert that it was clear beyond question that the unclaimed feature served the identical function in the same way and achieved the same result as the claimed feature, and the accused infringer would argue the opposite. The roles would then be reversed on the issue of prosecution history estoppel with the patentee arguing that no one skilled in the art could possibly have foreseen the alternative as equivalent, and the accused infringer arguing that it was clear at the time of amendment that the equivalent satisfied the function/way/result test. For example, here the district court did not credit one of Festo’s experts because he changed his testimony between the 1994 trial on infringement and the 2004 trial on foreseeability. *See Festo XI*, at 17 (“Dr. Wolf was not persuasive in his testimony that a two-way sealing ring would have rendered the Festo device a failure. Indeed, he testified to the contrary in the 1994 trial.” (internal citations omitted)).

Finally, and most important, Festo’s test focuses on the wrong claim. The question is not whether *after* the narrowing amendment the alternative was a known equivalent, but rather whether it was a known equivalent *before* the narrowing amendment. The purpose of an amendment typically is to avoid the prior art. If at the time of the amendment, the equivalent was known in the pertinent prior art, the applicant

should not be able to recapture it simply by establishing that a property of the equivalent—irrelevant to the broader claim before amendment—was relevant but unknown with respect to the objectives of the narrower amended claim. In other words, an equivalent that is foreseeable as an alternative to the broader claimed feature does not become unforeseeable simply because the claimed feature is narrowed. For example, if a claim before amendment broadly claimed a metal filament for a light bulb but was later amended to avoid prior art and to specify metal A because of its longevity, the equivalent metal B, known in the prior art to function as a bulb filament, is not unforeseeable even though its longevity was unknown at the time of amendment.

Adopting this standard for foreseeability is not unfair when a reasonable applicant at the time of the amendment would have been aware of the equivalent as an alternative under the broader claim before the amendment. Under such circumstances the applicant can properly be charged with surrender by narrowing the claim to exclude the alternative. The Supreme Court noted that a surrender is appropriate where “the inventor turned his attention to the subject matter in question, knew the words for both the broader and narrower claim, and affirmatively chose the latter.” *Festo VIII*, 535 U.S. at 734-35.

We thus conclude that the function/way/result test or insubstantial differences test is inapplicable to the question of foreseeability. An equivalent is foreseeable if one skilled in the art would have known that the alternative existed in the field of art as defined by the original claim scope, even if the suitability of the alternative for the particular

purposes defined by the amended claim scope were unknown.

V

The question then becomes whether the use of a non-magnetizable sleeve or a single sealing ring was known as an alternative in the prior art at the time of amendment. Because we conclude that use of non-magnetizable sleeves (including aluminum sleeves) was foreseeable under the original broader claim, we need not determine whether use of a single sealing ring was foreseeable.

Dr. Stoll's original claim 1 did not include a requirement for a magnetizable sleeve and the claimed sleeve (which could have been composed of any material) was not designed to shield the magnetic field but rather to enclose the magnets. The magnetic shielding function was pertinent only to dependent claim 8 which required "a sleeve made of a magnetizable material." In response to the examiner's rejection and in light of the prior art, Dr. Stoll withdrew original claims 1 and 8 and filed a new amended claim that included a requirement for a magnetizable sleeve. A non-magnetizable sleeve was clearly known as available to perform the magnet-enclosing objectives of the claims before the amendment. Indeed, as the Supreme Court noted in *Festo VIII*, 535 U.S. at 741, it was specifically disclosed in the prosecution history. In making his amendment, Dr. Stoll attached two German patents that were cited in the first office action in the German patent application. One prior art German patent disclosed a "guide tube [that] is surrounded by a carriage [sleeve], which has the shape of a slit ring and is also made from a non-magnetic material." Along with the

amended application, Dr. Stoll included the following statement:

These references were cited in the first Office Action received in the corresponding German application. These references are obviously clearly distinguishable over the subject matter of the claims now present in this application. Accordingly, further comment about the subject matter of these references is believed unnecessary.

Dr. Stoll did not expressly refer to the prior art non-magnetizable sleeve at the time of amendment, but, on cross-examination, Festo's expert, Dr. Wolf, was asked, "But there's no question that this is a prior art patent that shows a non-magnetizable material?" Remand Trial Tr. 58 (Dec. 16, 2004). He responded, "That's correct." *Id.* While the prior art does not specifically disclose an aluminum alloy sleeve, it is undisputed that aluminum alloy is a non-magnetizable material. *See* Appellant's Br., 20.

Not only was the use of a non-magnetic sleeve disclosed in the prior art, the '125 patent application itself clearly recognized the possibility of using a non-magnetic material for the sleeve. As noted, the broadest claim in the patent as originally drafted did not include a requirement that the sleeve be magnetizable, and it was viewed as a matter of "choice" as to whether to include such a magnetizable sleeve. *See* Festo's Pre-Trial Memorandum at 91 (May 4, 1994) ("It is possible to use a magnetizable sleeve or a non-magnetizable sleeve and the device will work no matter which sleeve material is chosen. . . . The choice of the

sleeve material is merely a matter of personal selection.”). The specification suggests only that the use of a magnetizable material for the sleeve would be desirable because it would reduce “undesirable braking forces,” which it characterizes as a “favorable development in the interests of increasing the drive force.” ‘125 patent col.2 ll.28-35. As the district court noted, “[T]he ‘125 patent describes the shielding benefit of a magnetizable sleeve as beneficial but not necessary to the operation of the device” covered by the broader claims before amendment. *Festo XI*, at 19.

We conclude that use of an aluminum alloy sleeve was foreseeable at the time of amendment because the pertinent prior art disclosed a non-magnetizable sleeve. Festo could have claimed use of a non-magnetizable sleeve but did not do so. Accordingly, we find that the equivalent was surrendered by amendment.

CONCLUSION

For the reasons stated herein, the district court’s judgment of non-infringement is

AFFIRMED.

COSTS

No costs.

**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

05-1492

FESTO CORPORATION,

Plaintiff-Appellant,

v.

SHOKETSU KINZOKU KOGYO KABUSHIKI CO.,
LTD., (also known as SMC Corporation)
and SMC PNEUMATICS, INC.

Defendants-Appellees.

NEWMAN, Circuit Judge, dissenting.

The only issue remaining in this case is the reapplication of the law of equivalency, as adjusted by the Supreme Court in *Festo VIII*, 535 U.S. 722 (2002), to the technological facts of the accused SMC rodless cylinder. However, this court has confounded the issue by creating a new and incorrect criterion for the measurement of “foreseeability,” the court now holding that an existing structure need not be recognized, or even recognizable, as an equivalent at the time of the patent application or amendment, in order to be “foreseeable” if it is later used as an equivalent. This is a significant departure from precedent, as

well as from the Court's guidance in understanding the estoppels that arise when claims are amended during prosecution. Today's new rule further erodes the residue of the doctrine of equivalents, for its foreseeable result is to deprive amended claims of access to the doctrine of equivalents.

The panel majority reviews only the magnetizable sleeve aspect of the district court's opinion, and I limit my remarks to that element. The question is the foreseeability of the SMC sleeve made of aluminum alloy, when the '125 patent specification describes only a sleeve made of magnetizable metal. The claims were all limited to the magnetizable metal sleeve by voluntary amendment, for there was no rejection related to this aspect.¹¹ The court now rules that the equivalency of the magnetizable and nonmagnetizable metal was foreseeable as a matter of law, because a nonmagnetizable sleeve previously was known although its technological equivalency was unknown. The panel majority holds that "An equivalent is foreseeable if one skilled in the art would have known that the alternative existed in the field of art as defined by the original claim scope, even if the suitability of the alternative for the particular purposes defined by the amended claim scope were unknown." That

¹¹ In *Festo VIII* the Court explained that "[a] rejection indicates that the patent examiner does not believe the original claim could be patented. While the patentee has the right to appeal, his decision to forgo an appeal and submit an amended claim is taken as a concession that the invention as patented does not reach as far as the original claim." *Festo VIII*, 535 U.S. at 734. Here there was no substantive rejection but only an objection due to claim form.

is, even if unforeseeable as a matter of fact, even if technologically unexpected or unlikely, the equivalent must be ruled to be foreseeable if the structure is later found to be a usable equivalent.

Festo's position throughout this litigation is that SMC's aluminum alloy sleeve actually provides sufficient shielding for the magnetic field leakage of the SMC device, thereby meeting the function/way/result criteria of equivalency as *Graver Tank*; and in response to the new issue of this remand, Festo points out that the use of aluminum alloy to this effect was not foreseeable when Festo's '125 patent application was filed and prosecuted. Thus Festo argues that it is not estopped to reach the SMC aluminum alloy sleeve under the doctrine of equivalents. However, the panel majority holds that this equivalent was foreseeable as a matter of law, and thus barred from access to the doctrine of equivalents.

This is not what the Court held. The Court held that an accused structure that is not within the literal scope of amended claims, but that is the technological equivalent thereof, cannot be captured under the doctrine of equivalents if the claims before amendment did not exclude that structure and the equivalency was "readily" foreseeable. My colleagues now hold that such structures can be foreseeable as a matter of law, although the equivalency was unknown in fact. My colleagues also deem it irrelevant whether the accused structure could have been included in allowable claims.

Although the technological equivalency of an accused structure is determined as of the time of the infringement, foreseeability is determined as of

the time of filing and amendment of the patent application. The Court so recognized in *Festo VIII*, in its remand for finding whether the assertedly equivalent aluminum alloy sleeve used by SMC was “unforeseeable at the time of the application.” 535 U.S. at 740. We then remanded to the district court with instructions to find “whether an ordinary skilled artisan would have thought an aluminum sleeve to be an unforeseeable equivalent of a magnetizable sleeve in the context of the invention.” *Festo X*, 344 F.3d at 1371-72.

The district court found that “any shielding capability of non-magnetizable aluminum alloy was unknown in the literature or to one of ordinary skill in 1981,” and that “no one disputes that the use of an aluminum alloy sleeve for purposes of shielding magnetic fields was not known at the time of amendment.” *Festo XI*, slip op. at 2. The district court nonetheless ruled that the use of aluminum alloy for shielding magnetic fields was foreseeable because the SMC magnetic leakage fields are “very small” and therefore little shielding is needed. The district court erroneously determined foreseeability based on the particular properties of the SMC device at the time of infringement, instead of on the knowledge at the time the ‘125 patent application was filed and presented.

My colleagues on this panel do not directly endorse the district court’s reasoning, although similar reasoning is subsumed in the panel majority’s holding that it is irrelevant whether the later-observed technologic equivalency was foreseeable at the time of the amendment. Instead, the panel majority rules that the aluminum alloy shield was retrospectively foreseeable at the time of the amendment because it later was used as an

equivalent, although it was not known to be equivalent and would not have been deemed equivalent at the time of the amendment. Hindsight is not foreseeability. No error has been shown in the district court's finding that persons of skill in the field of the invention would not have deemed magnetizable and non-magnetizable sleeves to be equivalent at the time the '125 patent application was filed and prosecuted. It cannot be irrelevant that the then-existing knowledge in the field of the invention would not have deemed an aluminum alloy sleeve equivalent to a magnetizable metal sleeve in shielding magnetic leakage fields.

Evidence of foreseeability must be limited to prior art, not future art. It is not the correct interpretation of foreseeability, to rely on SMC's later equivalent use of an aluminum alloy sleeve to prove that the nonmagnetizable aluminum alloy was a foreseeable equivalent of a magnetizable metal, "at the time of the application" for the '125 patent.¹² Foreseeability is determined as of the time of the application. The unforeseen does not become foreseeable after someone later discovers it. If the prior art does not support a finding of equivalency, the applicant cannot be charged with foreseeability of the equivalent.

My colleagues compound their error, in holding that "foreseeability does not require the applicant to be aware that a particular equivalent would satisfy the insubstantial differences test or the

¹² In using these words, the Court did not distinguish among the time of filing, amendment, or grant; such distinction need not be resolved on the facts of this case.

function/way/result test with respect to the claim as amended.” Maj. op. at 1. Indeed, if the particular technology is not recognized as equivalent at the time of the application -- whether recognized by the applicant or by others of skill in the field -- that technology cannot be foreseeable. Foreseeability cannot be found as fact if the equivalence of magnetizable metal and aluminum alloy sleeves was not reasonably known at the time of filing and prosecution. In *Graver Tank* the Court explained: “An important factor is whether persons reasonably skilled in the art would have known of the interchangeability of an ingredient not contained in the patent with one that was.” *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 609 (1950). The inquiry surrounding when one becomes “aware” of equivalence must focus on the era of the application. If persons of ordinary skill in this field cannot be charged with foreseeing that an aluminum alloy sleeve would be a technological equivalent to a magnetizable metal sleeve, then the aluminum sleeve does not meet the criterion of foreseeability. The panel majority is incorrect in ruling that “the foreseeability requirement does not require the knowledge that the equivalent would satisfy the function/way/result test or the insubstantial differences test.” Maj. op. at 18. How can a particular equivalent be foreseeable, if it was not known that the technology was equivalent in the context of the invention?

I also take note of the panel majority’s unnecessary obfuscation of the technological criteria of equivalency as founded on *Graver Tank*, where the Court explained that “What constitutes equivalency must be determined against the context of the patent, the prior art, and the

particular circumstances of the case,” 339 U.S. at 609, the Court defining an equivalent as one that “performs substantially the same function in substantially the same way to obtain the same result.” *Id.* at 608. The function/way/result test was endorsed by the court in *Festo VIII*, along with the insubstantial-differences test, and is no more susceptible to “endless bickering” as any other fact-dependent issue.

The panel majority states that it recognizes that the applicant can be charged with foreseeability only as to “[equivalents] known before the amendment, not equivalents known after the amendment,” but then contravenes this statement, for my colleagues hold that it suffices to estop access to the doctrine of equivalents if the then-believed to be non-equivalent structure was a known structure in the field of the invention. My colleagues rule that it is irrelevant that the structure was believed not to be equivalent, as long as an original claim before amendment could have generally included a device having that structure. Such a complete bar based on amendment revives the approach rejected by the Court when it called our previous assault on the doctrine of equivalents a “complete bar by another name,” *Festo VIII*, 535 U.S. at 741, the Court overturning the Federal Circuit’s holding in *Festo VI*.

The fact of whether technologic equivalency was known cannot be irrelevant to foreseeability, for the foreseeability bar is directed to subject matter that was foreseeably equivalent at the time of filing and amendment. This is evident from *Festo VIII*’s guidance to “readily known equivalents.” 535 U.S. at 740. If the equivalency of the accused technology would not have been “readily known” to

a person of ordinary skill in the field of the invention, under proper application of the Court's guidance the "foreseeability" bar does not arise. In *Festo VIII* the Court ratified the value of the doctrine of equivalents to "ensur[e] the appropriate incentives for innovation," *id.* at 732, by rejecting this court's ruling that had led to "excessive uncertainty and burdens legitimate innovation." *Id.* at 737. The panel's holding today strays from controlling precedent as well as from logic. I respectfully dissent.

**UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS**

FESTO CORPORATION,

Plaintiff,

v.

SHOKETSU KINZOKU KOGYO KABUSHIKI
CO., LTD., (a/k/a SMC Corporation) and
SMC PNEUMATICS, INC.

Defendants.

Civil Action No. 88-1814-PBS

MEMORANDUM AND ORDER

June 13, 2005

Saris, U.S.D.J.

I. INTRODUCTION

Ten years after trial, and following two sojourns to the Supreme Court, this seventeen-year-old suit is back on remand from the Federal Circuit. The sole issue on remand is whether

plaintiff Festo Corporation (“Festo”) can rebut the presumption of surrender by establishing that two equivalents of defendant SMC’s accused device would have been unforeseeable to one of ordinary skill in the art at the time of certain narrowing amendments to the application for the Stoll patent (United States Patent No. 4,354,125) held by Festo. The history of this case has been extensively reviewed in prior decisions and will not be repeated here. *See, e.g., Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 726-30 (2002); *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 344 F.3d 1359, 1364-65 (Fed. Cir. 2003).

Following a two-day bench trial,¹³ I find that both the single sealing ring and the non-magnetizable aluminum sleeve in the accused SMC device would have been foreseeable to one of ordinary skill in the art at the time of the narrowing amendments, that is November 1981. Because Festo has not rebutted the presumption of surrender for these asserted equivalents, it has not proven patent infringement under the doctrine of equivalents. The Court enters judgment for defendant.

¹³ The only witnesses at trial on remand were Festo’s experts Dr. Barry Wolf, a Ph.D. in mechanical engineering and a professor of mechanical engineering at New York University; and Dr. John Schroeder, a Ph.D. in physics and a magnetic properties expert. SMC introduced no expert testimony, but instead relied on statements made by Festo’s experts at earlier proceedings as well as cross-examination to undermine Festo’s position.

II. FINDINGS OF FACT

The Court presents here only those facts relevant to the issues on remand.

A. Festo Device

Festo holds United States Patent No. 4,354,125 (“the ‘125 patent”) of inventor Dr. Kurt Stoll entitled “Magnetically Coupled Arrangement for a Driving and Driven Member” (“the Festo device”).¹⁴ The Festo device includes a linear motor having a piston (also called a driving member), a cylinder (also called a tube or tubular part), and a driven member (also called a driven assembly or follower). ‘125 patent, col. 1, ll. 48-56. (See Wolf Direct at 3.)¹⁵ The piston is encircled by magnets and is driven along the inside of the cylinder by pressure applied at one end. ‘125 patent, col. 3, ll. 20-24; *id.* at col. 2, ll. 13-22. The driven member is external to the cylinder and contains magnets that are coupled by magnetic force to the piston magnets. See *id.* at col. 1, ll. 53-58; *id.* at col. 3, ll. 16-17. The “sleeve” is the element that surrounds the magnets on the driven member. *Id.* at col. 2, ll. 23-26; *id.* at col. 3, ll. 60-63. (Tr. at 11.) Thus, the driven member, which is not mechanically attached to the piston, is driven along the outside of the cylinder by the movement of the piston. Wherever the piston goes, the follower follows. (Tr. at 8.) This magnetically coupled rodless cylinder “has many

¹⁴ The other Festo patent at issue in earlier proceedings in this case, United States Patent No. 3,779,401 (“the Carroll patent”), is not at issue on remand. (See Tr. at 2/157-58.)

¹⁵ Festo submitted written direct testimony of Dr. Wolf and Dr. Schroeder prior to the trial on remand.

industrial uses” in conveying systems and “has been employed in machinery as diverse as sewing equipment and the Thunder Mountain ride at Disney World.” *Festo*, 535 U.S. at 728.

The ‘125 patent explains that the air gap between the magnets on the piston and the magnets on the driven member is kept “as small as possible” to maintain a strong coupling force. ‘125 patent, col. 1, l. 26; *see id.* at col. 4, ll. 16-29. This distance relates to the thickness of the cylinder. As the patent explains, “[T]he tubular part . . . should preferably have thin walls in order to ensure a small total air gap between the two magnet arrangements”. *Id.* at col. 1, l. 68-col. 2, l. 1; *see also id.* at col. 3, ll. 6-7 (“a relatively thin-walled and narrow tube”).

The *Festo* device includes guide rings at each end of the piston. *Id.* at col. 2, l. 5; *id.* at col. 3, ll. 24-30; *id.* at col. 5, l. 38. The purpose of the guide rings is to facilitate the movement of the piston through the cylinder by preventing the magnets on the piston from engaging the wall of the cylinder. (Tr. at 18-19.) The guide rings also serve to wipe impurities from the inside surface of the cylinder. *Id.* at 18-19, 2/14, 2/16-19.)

In 1981, Dr. Stoll amended his patent application for the *Festo* device and added two limitations. *See Festo*, 535 U.S. at 728 (describing limitations). The first limitation was a pair of sealing rings, one at each end of the piston. ‘125 patent, col. 5, l. 37.¹⁶ The purpose of the sealing

¹⁶ Courts have previously noted that each of the *Festo* sealing rings has a lip on one side, creating a seal in one direction. *See Festo*, 535 U.S. at 728 (“that the inventions

rings is to prevent impurities from penetrating the space between the piston and the cylinder. *Id.* at col. 3, 11. 43-55. (Tr. at 18-19.) Like the guide rings, the sealing rings also serve to wipe impurities from the inside surface of the cylinder. ‘125 patent, col. 3, 11. 43-55. (Tr. at 18-19.)

The sealing rings on the piston align with the wiping rings on the driven member in the same plane perpendicular to the axis of the tube. ‘125 patent, col. 6, 11. 24-27; *see id.* at col. 1, 11. 63-65 (“Preferably the wiping means of the driven assembly and the sealing means of the piston lie in the same plane transversal to the axis of the tubular part.”). (*See* Tr. at 20.) This alignment prevents “torsional deforming moments” that could result from relatively strong magnets causing the piston and driven member to pinch a relatively thin cylinder and deform it as the piston and driven member travel its length. *See*. ‘125 patent, col. 1, 1. 63-col. 2, 1. 2. (Tr. at 20-25.)

Torsional deforming moments may also be avoided by use of a relatively thicker cylinder. (Tr. at 39, 2/12, 2/31.) The ‘125 patent does not define the exact thickness of the cylinder in the Festo device.¹⁷ Moreover, Festo presented no empirical

contain a pair of sealing rings, each having a lip on one side”); *Festo*, 344 F.3d at 1372 (“Festo argues that SMC’s two-way sealing ring was an inferior and unforeseeable equivalent of the *one-way sealing rings* located at each end of the piston in the claimed invention.” (emphasis added)). This design is not specified in the ‘125 patent.

¹⁷ “THE COURT: Have you done experiments on the Stoll invention to see what would happen if you just used the one sealing ring? THE WITNESS: Well, you see, you really can’t, and the reason you can’t is because there’s no

evidence on remand regarding the thickness of the cylinder in the Festo device. (See Tr. at 2/22.)

The second limitation to the '125 patent added in the 1981 amendments was that the sleeve on the driven member be made of magnetizable material. '125 patent, col. 6, ll. 2-3; see *Festo*, 535 U.S. at 728 (describing limitations). The purpose of a magnetizable sleeve is to shield against magnetic leakage fields. '125 patent, col. 2, ll. 24-28. On a device such as the Festo device, significant magnetic leakage fields could cause undesirable braking forces due to the magnetic attraction between the device and proximate metallic machine parts. *Id.* (Tr. at 42-43, 79, 2/52-53.) The '125 patent explains:

If the driven assembly is provided with a sleeve made of a magnetisable material, which encircles the hollow cylindrical assembly of the magnet arrangement, magnetic leakage fields in the vicinity of the driven assembly can be kept to a minimum. In this way, undesirable braking forces, which would otherwise be generated while piston and driven assembly pass magnetisable machine components, are avoided.

'125 patent, col. 2, ll. 23-30.

Whereas minimal magnetic leakage fields do not cause braking forces (Tr. at 2/126-27), significant magnetic leakage fields in the Festo

specification in the patent." (Tr. at 39 (Testimony of Dr. Wolf).)

device would have required its re-design (*Id.* at 2/111). There was no empirical evidence at trial on remand as to the strength of any magnetic leakage fields from the Festo device. *See id.* at 93-94, 2/55-56, 2/130.) However, the Festo device was designed to minimize magnetic leakage fields. (*Id.* at 2/102-03, 2/110, 2/113.)

The prior art for the Festo device includes German patent 27 37 924 (“the German patent”) for an earlier rodless cylinder (“the German device”) that Dr. Stoll invented in 1977. (Tr. at 50-58; *see* Def. Ex. 7 (English translation of the German patent).) Significantly, unlike the Festo device, the German device uses only one sealing ring (an “o-ring”) that seals equally well from both sides. (Tr. at 52, 111, 2/22.) Additionally, the driven member in the German device has a non-magnetizable sleeve. *Id.* at 55-58; Def. Ex. 7 at SA22089.)¹⁸

B. SMC Device

The SMC device is also a magnetically coupled rodless cylinder, composed of a piston, a cylinder, and a driven member. (Wolf Direct at 11.) However, unlike the Festo device, the SMC device employs only one two-way sealing ring instead of two sealing rings. *See Festo*, 535 U.S. at 729. It also has a guide ring on each end. (Tr. at 32-33)¹⁹ Moreover,

¹⁸ “Q. But there’s no question that this is a prior art patent that shows a non-magnetizable material? A. That’s correct” (Tr. at 58 (Testimony of Dr. Wolf).)

¹⁹ Initially, SMC had a four-ring system identical to Festo’s, but it changed to the ring system at issue after Festo’s assertion of infringement. The jury found that the SMC device infringed the Stoll patent under the doctrine of equivalents.

the sleeve on the SMC driven member is made of a non-magnetizable aluminum alloy. (*See id.*) Aluminum alloy was a known material in 1981 and has some capability for shielding magnetic fields, although that capability was unknown at the time of the amendments to the Festo device patent application. (*Id.* at 2/86-87.) At trial on remand, Festo presented no empirical evidence as to the type of magnets used in the SMC device, the strength of those magnets, or the thickness of the SMC cylinder. (*Id.*, at 2/22, 2/39, 2/80.)

III. CONCLUSIONS OF LAW

A. Standards of Review

In *Festo*, 535 U.S. 722, the Supreme Court reexamined two patent concepts, the doctrine of equivalents and the rule of prosecution history estoppel. Adopting a “flexible bar,” the Supreme Court described the analytical framework for these concepts as follows:

Just as [*Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17 (1997),] held that the patentee bears the burden of proving that an amendment was not made for a reason that would give rise to estoppel, we hold here that the patentee should bear the burden of showing that the amendment does not surrender the particular equivalent in question. . . . The patentee, as the author of the claim language, may be expected to draft claims encompassing readily known equivalents. A patentee’s decision to narrow his claims through

amendment may be presumed to be a general disclaimer of the territory between the original claim and the amended claim. [*Exhibit Supply Co. v. Ace Patents Corp.*, 315 U.S. 126, 136-37 (1942)] (“By the amendment [the patentee] recognized and emphasized the difference between the two phrases and proclaimed his abandonment of all that is embraced in that difference”). There are some cases, however, where the amendment cannot reasonably be viewed as surrendering a particular equivalent. The equivalent may have been unforeseeable at the time of the application; the rationale underlying the amendment may bear no more than a tangential relation to the equivalent in question; or there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question. In those cases the patentee can overcome the presumption that prosecution history estoppel bars a finding of equivalence.

This presumption is not, then, just the complete bar by another name. Rather, it reflects the fact that the interpretation of the patent must begin with its literal claims, and the prosecution history is relevant to construing those claims. When the patentee has chosen to narrow a

claim, courts may presume the amended text was composed with awareness of this rule and that the territory surrendered is not an equivalent of the territory claimed. In those instances, however, the patentee still might rebut the presumption that estoppel bars a claim of equivalence. The patentee must show that at the time of the amendment one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent.

Id. at 740-41. Because the amendments in this case were made for a reason relating to patentability, the Supreme Court added:

[T]he question is not whether estoppel applies but what territory the amendments surrendered. While estoppel does not effect a complete bar, the question remains whether petitioner can demonstrate that the narrowing amendments did not surrender the particular equivalents at issue. On these questions, SMC may well prevail, for the sealing rings and the composition of the sleeve both were noted expressly in the prosecution history.

Id. at 741-42. The case was then remanded for further proceedings in the Court of Appeals or the District Court.

On remand, the Federal Circuit held that Festo could not rebut the presumption of surrender for

either accused equivalent under the “tangential relation” or “some other reason” criteria. *Festo*, 344 F.3d at 1371-72 (discussing sleeve); *id.* at 1373 (discussing sealing ring). The court held, however, that “[f]actual issues . . . exist as to whether an ordinarily skilled artisan would have thought an aluminum sleeve to be an unforeseeable equivalent of a magnetizable sleeve.” *Id.* at 1371. Similarly, the Federal Circuit concluded, “Factual issues . . . exist as to whether a person of ordinary skill in the art would have considered the accused two-way sealing ring to be an unforeseeable equivalent of the recited pair of sealing rings.” *Id.* at 1372. “[R]ebuttal of the presumption of surrender is a question of law,” *id.* at 1367, that “may be subject to underlying facts” properly decided by the court, not a jury, *id.* at 1368 n.3. Thus, the Federal Circuit remanded the case “to the district court to determine whether Festo can rebut the presumption of surrender by establishing that the equivalents in question would have been unforeseeable to one of ordinary skill in the art at the time of the amendments.” *Id.* at 1364; *see also Festo*, 535 U.S. at 740 (“[T]he patentee should bear the burden of showing that the amendment does not surrender the particular equivalent in question.”). The Court may “hear expert testimony and consider other extrinsic evidence relating to the relevant factual inquiries.” *Festo*, 344 F.3d at 1369.

The Federal Circuit defined unforeseeability as “an objective inquiry”:

Usually, if the alleged equivalent represents later-developed technology (e.g., transistors in relation to vacuum tubes, or Velcro® in relation to

fasteners) or technology that was not known in the relevant art, then it would not have been foreseeable. In contrast, old technology, while not always foreseeable, would more likely have been foreseeable. Indeed, if the alleged equivalent were known in the prior art in the field of the invention, it certainly should have been foreseeable at the time of the amendment. By its very nature, objective unforeseeability depends on underlying factual issues relating to, for example, the state of the art and the understanding of a hypothetical person of ordinary skill in the art at the time of the amendment.

Id. (internal citation omitted). These underlying factual issues are examined “in the context of the invention.” *Id.* at 1371 (“Factual issues thus exist as to whether an ordinarily skilled artisan would have thought an aluminum sleeve to be an unforeseeable equivalent of a magnetizable sleeve *in the context of the invention.*” (emphasis added)).

The Federal Circuit clarified that the relevant time for evaluating unforeseeability is when the narrowing amendment was made. *Id.* at 1365 n.2. The amendments at issue occurred in 1981. According to Festo’s un rebutted evidence, one of ordinary skill in the art in 1981 would be a person having a degree in mechanical engineering and/or several years of experience in developing fluid driven mechanical devices. (Wolf Direct at 12; Schroeder Direct at 10.)

B. Sealing Ring

The issue on remand is the objective unforeseeability of a single two-way sealing ring. The German device employed a single sealing ring that sealed in both directions. (Tr. at 52, 111, 2/22.) Therefore, as Festo's expert conceded at trial on remand, a single sealing ring does not constitute "later-developed technology" as the Federal Circuit described it *See Festo*, 344 F.3d at 1369 ("transistors in relation to vacuum tubes, or Velcro® in relation to fasteners").²⁰

Moreover, the use of a single sealing ring was "known in the relevant art" at the time of the 1981 amendments. *See id.* The German patent constitutes relevant art for the design of sealing rings in the Festo device because the basic purpose of the sealing ring in both devices is the same. *Cf. Bancorp Servs., L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1375 (Fed. Cir. 2004) ("In determining the relevant art for purposes of addressing issues of patent validity, the court must look to the nature of the problem confronting the inventor."); *In re Clay*, 966 F.2d 656, 658-59 (Fed. Cir. 1992) ("Two criteria have evolved for determining whether prior art is analogous [for purposes of determining obviousness]: (1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is

²⁰ "It turns out that . . . large-gap rodless cylinders were available at that time, but that was old technology." (Tr. at 35 (Testimony of Dr. Wolf).)

involved.”). Because a single sealing ring was “known in the prior art in the field of the invention, it certainly should have been foreseeable.” *Festo*, 344 F.3d at 1369.

Festo argues that the German patent is beyond the “context of the invention” of the ‘125 patent, *see id.* at 1371, because the German device is a “large gap” device. (Tr. at 111-12.)²¹ Specifically, Festo contends that use of a single sealing ring would have been unforeseeable in a “small gap” device because a “small gap” device, unlike the German device, requires a second sealing ring to prevent torsional deforming moments caused by the large magnetic coupling forces. (*Id.*, at 112, 2/13.) Festo points out that the only other “small gap” rodless cylinder existing at the time of the amendments was shown in United States Patent No. 4,488,477 (“the ‘477 patent”) owned by SMC, which discloses a symmetric system of rings (i.e., a sealing ring and guide ring on each end of the piston) to accomplish the wiping, guiding, and sealing functions as well as to avoid undesirable torsional deforming moments on the thin-walled tube. (Wolf Direct at 13-14.) Therefore, Festo argues, there was no

²¹ “The context of the invention is the following: [Stoll] knows he needs large coupling forces. He would like to keep this gap as small as possible. In order to have a very small gap, he has to have a very, very thin tube. It turns out that he was aware that if he had this thin tube, it would deform. He needed the sealing ring there to back up against the wiping ring on the driven member to prevent the deformation. That’s the context of the invention, a very, very thin tube, because otherwise he wouldn’t be doing what he’s trying to do, which is to get large coupling forces.” (Tr. at 112 (Testimony of Dr. Wolf).)

teaching regarding the use of an asymmetric ring arrangement, in the context of the Festo device, available to a person of ordinary skill in the art at the time of the 1981 amendments.

The viability of this argument depends on the distinction between “large gap” and “small gap” devices. However, Festo presented no empirical evidence on remand regarding the size of the respective gaps in the Festo device or the German device, or more specifically, the thickness of the cylinders in the two devices. (Tr. at 2/22.) Although Festo contends that such evidence is irrelevant because the ‘125 patent teaches that the context of the invention is a gap “as small as possible,”²² objective foreseeability analysis does not hinge on the terms of the patent itself. With no empirical evidence to distinguish between a “large gap” and “small gap” device, the single sealing ring in the prior art German patent is strong evidence that use of a single sealing ring would have been foreseeable, in the context of the Festo device, to one of ordinary skill in the art at the time of the 1981 amendments.

Moreover, as Festo’s experts themselves testified, the use of two sealing rings is not the only means to prevent torsional deforming moments. Torsional deforming moments could be avoided by use of a relatively thicker cylinder wall. (*Id.* at 39, 2/12, 2/31.) Again, Festo argues that any increase

²² “Q. Do you know how thick the walls of the tubes in Festo’s commercial product are? A. No, I don’t, and it doesn’t matter. Q. Do you know how thick the wall of the tubes in SMC’s commercial products are? A. No, I don’t, and it doesn’t matter.” (Tr. at 2/22 (Testimony of Dr. Wolf).)

in cylinder thickness would be outside the context of the '125 patent because of the need for a cylinder "as thin as possible" to maintain strong coupling forces. However, there was no evidence at trial on remand regarding how much thicker a cylinder would have to be, relative to the Festo device cylinder, to prevent torsional deforming moments. Likewise, there was no evidence regarding the rate at which increasing the thickness of a cylinder decreases the strength of the coupling forces.²³ Thus, Festo has not proven that use of a wall thick enough to prevent deformation would have been outside the context of the invention at the time of amendment, and therefore, has not proven that use of a single sealing ring would have been unforeseeable in the context of the invention.

Festo has also failed to prove why a single sealing ring was unforeseeable at the time of the 1981 amendments but a viable option in the SMC device. Festo argues that developments in magnet technology enabled the use of a single sealing ring in the later-invented SMC device. Festo contends that SMC achieved strong coupling forces despite using a thicker cylinder (which did not require a second sealing ring to prevent torsional deforming moments) because stronger magnets were developed after the 1981 amendments. (*See id.* at 39, 2/11-12, 2/34.)

²³ "THE COURT: Have you done experiments with how thin or thick a wall would have to be to only go with one sealing ring, whether that would affect the coupling between the magnets? THE WITNESS: Well, there are actually so many variables, you really can't do experiments." (Tr. at 40 (Testimony of Dr. Wolf).)

However, Festo presented no empirical evidence to support this argument. Festo presented no evidence regarding the type of magnets in the SMC device or the strength of those magnets, either independently or relative to the magnets in the Festo device. (*See id.* at 2/52, 2/77, 2/80, 2/88.) Festo also presented no measurements of the thickness of the SMC cylinder. (*See id.* at 2/22, 2/39.) Festo's only evidence regarding what changed between the 1981 amendments and the SMC device is expert assertions that the SMC cylinder is "much thicker" than the Festo cylinder and that the SMC magnets are "much stronger" than the Festo magnets. (*Id.* at 2/34-35.) Without testing or quantification, this testimony is insufficient to meet Festo's burden of proving the accused SMC device's single sealing ring unforeseeable.²⁴ Dr. Wolf was not persuasive in his testimony that a two-way sealing ring would have rendered the Festo device a failure. (*See id.* at 2/31-33.) Indeed, he testified to the contrary in the 1994 trial. (*See id.* at 2/16 ("In fact the [Stoll] patent says that a single ring is good enough."))

The fact that a single sealing ring may have been considered objectively inferior in a "small gap" device in 1981 is also insufficient to meet Festo's burden. *See Festo*, 344 F.3d at 1373. "[I]f the patentees knew of an inferior design and chose not to include it within the claims, then it cannot be said that they could not have been expected to describe that design." *Id.* Therefore, Festo has not

²⁴ Dr. Wolf's testimony did not clarify the ambiguity: "You know, the word 'thicker' is a funny word. Thicker, we don't mean a foot." (Tr. at 2/35.)

met its burden of proving the use of a single sealing ring objectively unforeseeable.

C. Sleeve

Non-magnetizable aluminum alloy was known and available at the time of the amendments to the '125 patent application. *See Festo*, 344 F.3d at 1371 (“[I]t seems unlikely that an aluminum sleeve would have been unforeseeable, as it was made of a commonly available metal . . .”). Significantly, Stoll’s German patent device used a non-magnetizable sleeve. (Def. Ex. 7 at SA22089; Tr. at 55-58.) Thus, like a single sealing ring, a non-magnetizable sleeve does not, in itself, constitute “later-developed technology,” *see Festo*, 344 F.3d at 1369, and was “known in the relevant art,” *see id.*

Festo argues that a non-magnetizable sleeve was unforeseeable because the '125 patent teaches the need to shield against magnetic leakage fields, and any shielding capability of non-magnetizable aluminum alloy was unknown in 1981.²⁵ As Dr. Schroeder testified, if one wants to prevent a magnetic field from attracting a nearby metallic object, the magnetic field lines must be channeled using a magnetizable material. (*See Tr.* at 2/66-68.) There is no dispute that magnetizable material shields against leakage fields, that significant leakage fields could cause undesirable braking forces, and that any shielding capability of non-magnetizable aluminum alloy was unknown in the literature or to one of ordinary skill in 1981. If

²⁵ “The context of the invention is that you want to provide shielding to prevent the braking forces.” (Tr. at 92 (Testimony of Dr. Wolf).)

significant leakage fields were a concern in the context of the invention at the time of the amendments, a non-magnetizable aluminum alloy sleeve, which provided no known shielding, would not have been a foreseeable equivalent of a magnetizable sleeve.

However, Festo has not proven that significant leakage fields, and therefore shielding, were an objective concern in the context of the invention at the time of the amendments. Festo emphasizes that leakage fields were a concern to Dr. Stoll and that the '125 patent teaches the need for shielding. Dr. Schroeder testified, "The small gap device, you want to concentrate the magnetic field lines in the gap to give you strong coupling forces, but the behavior of magnetic field lines is such that you cannot avoid leakage fields." (*Id.* at 2/114). However, Festo presented no empirical evidence as to the strength of leakage fields in the Festo device. Festo never measured the leakage fields for a Festo rodless cylinder without the sleeve. (*Id.* at 2/130.) Moreover, Dr. Schroeder testified that the Festo device is designed to minimize leakage fields. (*Id.* at 2/102-03, 2/110, 2/113.) If there had been significant leakage fields, according to Festo's expert, Festo would have had to redesign the whole device. (*Id.* at 2/111.)

Significantly, there was evidence that Stoll knew that the Festo device did not "need a magnetizable sleeve because [the] leakage field is very small." (*Id.* at 84; *see id.* at 82-83, 2/115.) Moreover, the '125 patent describes the shielding benefit of a magnetizable sleeve as beneficial but not necessary to the operation of the device. It states that "[i]f" a magnetizable sleeve is used, then "magnetic leakage fields in the vicinity of the

driven assembly can be kept to a minimum.” ‘125 patent, col. 2, 11. 23-27. The terms of the patent itself therefore suggest that a non-magnetizable sleeve was foreseeable because the magnetic fields are already minimized by the design of the device.

Festo is left with the argument that a non-magnetizable sleeve would have been unforeseeable at the time of the 1981 amendments because one of ordinary skill in the art would have provided shielding, and therefore a magnetizable sleeve, as a matter of course. However, as SMC points out, Festo not only submitted its original claim in the United States (and claims in seven foreign countries) that encompassed the non-magnetizable sleeve, but also advocated that the magnetizable limitation was an “unintentional limitation[] added incorrectly by an attorney.” (Def. Ex. 8 at SA22506.) The evidence that the Festo device, even without a magnetizable sleeve, was designed to minimize leakage fields indicates that use of a non-magnetizable sleeve was foreseeable. The evidence suggests that a person of ordinary skill in the art, at most, would have considered a device with a non-magnetizable sleeve inferior. However, as with the single sealing ring, inferiority does not equate with unforeseeability. *Cf. Festo*, 344 F.3d at 1372 (Festo’s “inferior” argument “suggests that Stoll could have described an aluminum sleeve but chose not to do so because that ‘inferior’ element was not a part of his invention.”).

D. Conclusion

This case has had as many twists and turns and ups and downs as the Thunder Mountain amusement park ride it facilitated. Both sides, unfortunately, had to bear extensive litigation costs

as the ground rules changed. Nonetheless, the (hopefully) final question before this Court is quite narrow.

Because both the single sealing ring and non-magnetizable sleeve were foreseeable to a person of ordinary skill in the art at the time of the 1981 amendments, Festo is unable to rebut the presumption of surrender of those two elements. *See Festo*, 344 F.3d at 1374. Therefore, “prosecution history estoppel bars Festo from relying on the doctrine of equivalents” for its claim that the SMC device infringes the ‘125 patent. *Id.* Because the jury at the first trial in this case found that the SMC device infringed the ‘125 patent based on the doctrine of equivalents, *id.* at 1364, that finding is vacated.

V. ORDER

The Court orders entry of judgment for defendant SMC on plaintiff’s claim of infringement of United States Patent No. 4,354,125.

PATTI B. SARIS
United States District Judge

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**UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS**

FESTO CORPORATION,

Plaintiff,

v.

SHOKETSU KINZOKU KOGYO KABUSHIKI
CO., LTD. (a/k/a SMC CORPORATION)
and SMC PNEUMATICS, INC.,

Defendants.

Civil Action No. 88-1814-PBS

ORDER

January 10, 2006

Saris, U.S.D.J.

Plaintiff Festo Corporation (“Festo”) moves, pursuant to Fed. R. Civ. P. 59(e), to alter or amend this Court’s June 2005 Memorandum & Order entering judgment for defendant SMC Corporation (“SMC”) on plaintiff’s claim of infringement of U.S.

Patent No. 4,354,125 (filed May 28, 1980) (“the ‘125 Patent”).

“Rule 59(e) allows a party to direct the district court’s attention to newly discovered material evidence or a manifest error of law or fact” *Aybar v. Crispin-Reyes*, 118 F.3d 10, 16 (1st Cir. 1997) (quoting *Moro v. Shell Oil Co.*, 91 F.3d 872, 876 (7th Cir. 1996)); *see also Hayes v. Douglas Dynamics, Inc.*, 8 F.3d 88, 90 n.3 (1st Cir. 1993) (“Rule 59(e) motions are granted for reasons such as the commission by the trial court of a manifest error of law or fact, the discovery of new evidence, or an intervening change in the law.”). Festo claims various manifest errors of law and fact, which I address below. The Court assumes familiarity with its earlier opinion and incorporates it herein. *See* 2005 WL 1398528, 75 U.S.P.Q.2d 1830 (June 10, 2005).

1. The Sleeve

With respect to the amendment adding the limitation that the sleeve on the driven member be made of magnetizable material, Festo argues that the Court erroneously focused on whether shielding was needed due to the strength of the braking forces. Instead, Festo claims that the proper question is whether it was foreseeable that the SMC aluminum alloy sleeve would provide shielding of magnetic leaks by creating a magnetic circuit:

In order to be equivalent to ‘a sleeve made of a magnetizable material’ the accused structure must perform the specified function of shielding magnetic fields regardless of their strength. For the equivalent to be

foreseeable, one skilled in the art would have to foresee that the accused equivalent structure would shield. Even if the inventor may have thought he did not need a sleeve of magnetizable material because of low magnetic leakage fields, it does not follow that he, or one skilled in the art, could foresee that an aluminum sleeve was **equivalent** to a sleeve made of magnetizable material.

(Pl.'s Mem. in Supp. Motion to Alter or Amend ("Festo Mem.") 5.)

While no one disputes that the use of an aluminum alloy sleeve for purposes of shielding magnetic fields was not known at the time of amendment, or that aluminum is a non-magnetizable material, the strength of the magnetic field in the design of the Festo device at the time of amendment is relevant because the foreseeability analysis cannot be divorced from "the context of the invention." *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 344 F.3d 1359, 1371 (Fed. Cir. 2003) (en banc). The undisputed evidence indicates that the leakage field was very small due to the design of the Festo device itself. Thus, in the context of the very small leakage fields, the use of an aluminum alloy sleeve (an old technology) instead of a magnetizable one was foreseeable to a person of ordinary skill in the art at the time of the 1981 amendments.

2. Seals

Festo's second argument concerns the amendment adding the limitation of a pair of sealing rings at each end of the piston. Festo

argues that SMC's asymmetrical three-ring structure was not the foreseeable equivalent of the four-ring combination in the Festo device. To recap, claim 1 defines a four-ring combination including a pair of guide rings and a pair of sealing rings on the piston to accomplish the functions of guiding, wiping impurities on the inside of the tube away from the piston magnets, and sealing. SMC's device employed only one two-way sealing ring at one end of the piston (instead of a sealing ring at each end). It also had a guide ring on each end.

Festo argues that the Court erroneously held that Stoll's earlier German patent is prior art in the field demonstrating that SMC's use of a single two-way sealing ring would have been foreseeable. Festo correctly points out that the German patent was a large-gap device which had a sealing ring at each end of the piston, but no guide rings at either end of the piston.²⁶ Guide rings were not important in the German prior art patent, Festo explains, because there was no need to maintain a small gap between the inner and outer magnets. Festo then argues that the German patent teaches a symmetrical arrangement of sealing rings and does not render foreseeable to a skilled artisan the ability to guide, wipe, and seal a small-gap magnetically coupled rodless cylinder using the

²⁶ My earlier opinion, while citing the appropriate sections of the record, fails to explain explicitly and clearly that the German patent had two-way sealing rings at each end of the piston but no guide rings at all. (*See* Trial Tr. 50-58, Dec. 16, 2004; Def. Ex. 7.) This opinion provides clarification on the precise configuration of the German prior art.

asymmetric three-ring combination in the SMC device.

While the German prior art did not have guide rings, significantly, it did disclose the use of a two-way sealing ring that sealed equally well from both sides. (Trial Tr. 21-22, Dec. 17, 2004.) Thus, the two-way sealing ring does not constitute later technology.

Festo criticizes the Court's conclusion of foreseeable equivalence by noting that the Supreme Court and the Federal Circuit incorrectly described the Festo sealing rings as having a "lip" on one side when the "125 patent clearly establishes that there is no mention or teaching of 'one way' or 'two way' seals and no mention of the seals having a 'lip' on one side." (Festo Mem. 9 n.5.) Regardless of the merits of this critique, the Federal Circuit has remanded the case for this Court to resolve the specific factual issue of "whether a person of ordinary skill in the art would have considered the accused two-way sealing ring to be an unforeseeable equivalent of the recited pair of sealing rings." *Festo*, 344 F.3d at 1371-72.

The question, then, is whether a person of ordinary skill in the art would have foreseen that one two-way sealing ring as used by SMC located at one end of the piston is the equivalent of two sealing rings, one located at each end of the piston, when taken in combination with the guide rings. Since the purpose of the sealing ring was largely to prevent impurities from penetrating the space between the piston and the cylinder by wiping and sealing (Trial Tr. 14, Dec. 17, 2004), the existence in the prior art of a two-way sealing ring, which "seals equally well from both sides" (*Id.* 21-22), is

quite relevant to the foreseeability analysis because the guide rings also perform the wiping function (*Id.* 14). Dr. Wolf conceded at the jury trial and the remand trial that one sealing ring was “good enough” even though the device may become more vulnerable to dirt. (*Id.* 15-16.)

Festo’s stronger argument involves the issue of torsional deformation. The ‘125 Patent provides:

Preferably the wiping means of the driven assembly and the sealing means of the piston lie in the same plane transversal to the axis of the tubular part. The contact pressure of the wiping means and sealing means does not exert a torsional deforming moment on the tubular part, which should preferably have thin walls in order to ensure a small total air gap between the two magnet arrangements.

‘125 Patent col. 1, 1.63 - col. 2, 1.2; *see also id.* col. 4, 11. 30-53. Festo argues that the tube will deform if a sealing ring is not used next to a guide ring. At the remand trial, Festo argued that developments in magnet technology enabled the use of a single sealing ring in the later-invented SMC device because stronger magnets permitted a thicker cylinder which did not require a second sealing ring to prevent torsional deforming moments. (Trial Tr. 34, Dec. 17, 2004.)

Festo criticizes this Court for finding that it failed to provide empirical evidence about the thinness of the tube and strength of the magnets in the Festo devices to prove that one two-way sealing ring at one end of the piston would not work, pointing out that these devices do not physically

exist but are only embodiments disclosed in the patent. The short answer is that Festo could easily have measured the walls of the tubes in Festo's commercial product and the strength of the magnets. More importantly, this criticism misses the mark. Festo's primary failing was the lack of data comparing the strength of the magnets in the art in 1981 (the time of amendment) vis-à-vis the magnets in the SMC device. There were also no measurements of the thickness of the SMC cylinder and how that thickness correlated with the improved magnet strength.

Without supporting data, the Court has no way of gauging Dr. Wolf's expert opinion concerning the objective foreseeability of using one two-way sealing ring with two guide rings as an equivalent of the Festo combination to prevent torsional deformation in 1981. Festo produces only Dr. Wolf's *ipse dixit*, and he concedes he is not a magnetics expert. (*Id.* 40.) This conclusory testimony without more is not credible because Dr. Wolf said the opposite at the jury trial, and there is no empirical support for his about-face.

Thus, in the context of the invention, I find it was objectively foreseeable to one of ordinary skill in the art in 1981 to use one two-way sealing ring, which existed in the prior art, in combination with the guide rings as an equivalent of a sealing ring/guide ring combination at each end of the piston.

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Accordingly, the Court's conclusion that Festo failed to rebut the presumption of surrender remains unchanged. Festo's motion (Docket No. 419) is **DENIED**.

PATTI B. SARIS
United States District Judge

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**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

05-1492

FESTO CORPORATION,

Plaintiff-Appellant,

v.

SHOKETSU KINZOKU KOGYO KABUSHIKI CO.,
LTD., (also known as SMC Corporation)
and SMC PNEUMATICS, INC.

Defendants-Appellees.

ORDER

A combined petition for panel rehearing and for rehearing en banc having been filed by the Appellant, and the petition for rehearing, having been referred to the panel that heard the appeal, and thereafter the petition for rehearing en banc having been referred to the circuit judges who are in regular active service,

UPON CONSIDERATION THEREOF, it is

ORDERED that the petition for panel rehearing be, and the same hereby is, DENIED and it is further

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ORDERED that the petition for rehearing en banc be, and the same hereby is, DENIED.

The mandate of the court will issue on September 21, 2007.

FOR THE COURT,

Jan Horbaly
Clerk

Dated: 09/14/2007

cc: Charles R. Hoffmann
Arthur I. Neustadt

FESTO CORP V SMC CORP, 2005-1492
(DCT-88-CV-1814)

1 is foreseeable. If you're just saying --

2 THE COURT: Well, you know, truthfully,
unless it's

3 a new invention, that may be true.

4 THE WITNESS: No, but --

5 THE COURT: You know, that's the concern I
have. I

6 put a very limited question here, unbelievably
limited. And

7 I agree with you fully that this was equivalent.
I can't

8 remember which I found or which the jury
found. It doesn't

9 matter. I agree with it. It's a knock-off. But
the problem

10 is, the way the Federal Circuit has worded it is,
was it

11 foreseeable enough so it should have been
included within the

12 claim?

13 THE WITNESS: No. Can I -- may I comment
on that?

14 THE COURT: This is where I'm losing you on
it

15 because I could have thought of it, and I'm a
nobody. I just

16 went to law school.

17 THE WITNESS: Can I comment on this,
please?

18 THE COURT: Yes.

19 THE WITNESS: I think this is serious, and I
would

20 like to clarify this.

21 THE COURT: It is.

22 THE WITNESS: I've done research and
development

23 for about 40 years on mechanical devices. Let's
put

24 ourselves now in the place of a guy who's trying
to develop

25 something. At any given time in your
development process,