

# United States Court of Appeals for the Federal Circuit

04-1048, -1064

ASYST TECHNOLOGIES, INC.,

Plaintiff-Appellant,

v.

EMTRAK, INC., JENOPTIK AG,  
JENOPTIK INFAB, INC., and MEISSNER + WURST GmbH,

Defendants-Cross Appellants.

Darryl M. Woo, Fenwick & West LLP, of Mountain View, California, argued for plaintiff-appellant. With him on the brief were Daniel Johnson, Jr., Sean P. DeBruine, and Jonathan H. Takei.

Richard L. Stanley, Howrey Simon Arnold & White, LLP, of Houston, Texas, argued for defendants-cross appellants. With him on the brief were Daniel T. Shvodian and James F. Valentine, of Menlo Park, California.

Appealed from: United States District Court for the Northern District of California

Judge Jeremy Fogel

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DECIDED: March 22, 2005

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Before MICHEL, \* Chief Judge, NEWMAN, and BRYSON, Circuit Judges.

BRYSON, Circuit Judge.

Asyst Technologies, Inc., filed this action against Jenoptik AG and other parties (collectively, “Jenoptik”) in the United States District Court for the Northern District of California. Asyst charged Jenoptik with infringing Asyst’s U.S. Patent Nos. 4,974,166 (“the ’166 patent”) and 5,097,421 (“the ’421 patent”). Asyst asserted independent claims 1 and 2 of the ’421 patent, as well as dependent claims 11-14.

After construing pertinent terms in the asserted claims, the district court granted summary judgment of noninfringement as to both patents. Asyst appealed, and we concluded that the district court had erred in certain respects. Accordingly, we reversed

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\* Paul R. Michel assumed the position of Chief Judge on December 25, 2004.

the summary judgment of noninfringement and remanded for further proceedings. Asyst Techs., Inc. v. Empak, Inc., 268 F.3d 1364 (Fed. Cir. 2001). On remand, the district court again granted summary judgment of noninfringement as to the asserted claims of the '421 patent, and it dismissed the claims of infringement of the '166 patent pursuant to the parties' agreement. Asyst Techs., Inc. v. Empak, Inc., No. C-98-20451 (N.D. Cal. Oct. 9, 2003). We conclude that the court correctly entered summary judgment with respect to one of the two independent claims at issue, but not with respect to the other. Accordingly, while we affirm the district court's summary judgment as to the first claim at issue, we vacate the summary judgment of noninfringement and remand for further proceedings on the second. Because the court's summary judgment decision was based on limitations in independent claims 1 and 2, our judgment affects the dependent claims as well. In light of our disposition of the claims on appeal, we deny Asyst's request that we direct the district court to enter summary judgment in its favor.

I

Integrated circuits are used in a wide variety of electronic devices, and the production of such circuits is an important industry. The production process begins with the fabrication of large silicon wafers. Various tools are then used to process the wafers in multiple stages by generating one processed layer at a time. After all of the layers are processed, the manufacturer cuts each silicon wafer into many individual integrated circuits. The layers of the wafer must be processed in a particular sequence by particular tools. Any deviation will ruin the wafer as well as the many integrated circuits made from the wafer.

Fabricators typically process wafers in large lots, keeping all the wafers ultra-clean throughout the manufacturing process. To maintain an ultra-clean processing environment, fabricators place the wafer lots in sealed transportable containers known as “pods.” Human operators typically transport the pods from tool to tool as each wafer layer is processed.

The sequence of tools used to process the wafers is dictated by the integrated circuit design. The sequence differs with each design. For that reason, the pods do not invariably travel in the same path from tool to tool. Rather, an operator must carry a pod of wafers back and forth among the various tools in different orders. It is critical that the operator have the correct routing information to ensure that the wafers are not irreparably damaged by processing them at the wrong tool or at the wrong point in the process.

Asyst’s ’421 patent describes an information processing system and an inventory management system that can be used in the production of integrated circuits to increase efficiency and reduce the risk of human error. A central feature of the system is an automated process of pod-tool recognition that ensures that each pod is processed by the right tool at the right time and that enables the system operators to monitor the status of the wafers during the fabrication process.

The claims of the ’421 patent recite a system in which microcomputers mounted on each pod communicate with microcomputers mounted on each wafer processing tool. The two sets of microcomputers communicate by means of communication devices mounted on the pods and tools. Each tool processes the wafers in a particular

pod only after the microcomputer on the tool verifies that the particular pod is at the correct tool at the correct time in the fabrication sequence.

The two independent claims at issue in this appeal, claims 1 and 2 of the '421 patent, read as follows:

1. A processing system comprising:

(1) at least one transportable container for transporting articles to be processed;

(2) first two-way communication means mounted on said at least one transportable container;

(3) first microcomputer means mounted on said at least one transportable container for receiving and processing digital information communicated with said first two-way communication means;

(4) storage means mounted on said at least one transportable container for storing digital information processed by said microcomputer means; and

(5) a plurality of work stations each respectively adapted to having said at least one transportable container removably mounted thereon and each respectively including mounted thereon,

(a) respective second two-way communication means adapted for two-way communication with said at least one transportable container when said container is mounted on the respective work station therewith, and

(b) respective second microcomputer means for receiving and processing digital information communicated with said respective second two-way communication means mounted on the respective work station therewith.

2. An inventory management system comprising:

(1) At least one transportable container for transporting articles, said at least one container including mounted thereon,

(a) first two-way communications means,

(b) first microcomputer means for receiving and processing digital information communicated with said first two-way communication means, and

(c) storage means for storing digital information processed by said microcomputer means;

(2) a plurality of respective sensing means for sensing the presence of said at least one transportable container, each respective sensing means including respective second two-way communication means adapted for two-way communication with said first two-way communication means;

(3) selection means for selecting between respective sensor means of said plurality;

(4) central processor means coupled to said selection means for receiving digital information from and for providing digital information to respective two-way communication means of respective sensor means of said plurality.

Two representative figures from the '421 patent, depicting aspects of the inventions of claims 1 and 2, respectively, are reproduced below:

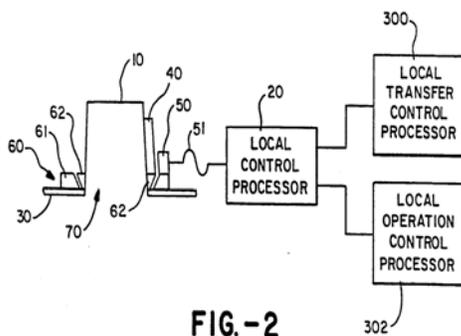


FIG. -2

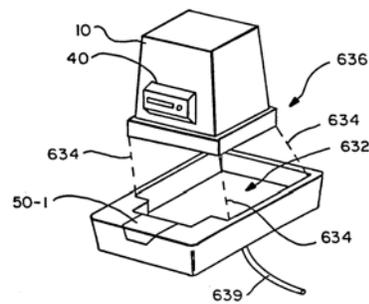


FIG. -12

II

A

On the first appeal in this case, we held that the structure corresponding to the “second microcomputer means” element of claim 1 was “the local control processor 20.” Asyst, 268 F.3d at 1370. On remand, the district court ruled on summary judgment that

Jenoptik's accused system, known as the IridNet system, does not contain any structure that is the same as or equivalent to the local processor 20 recited in claim 1 of the '421 patent, and that the system therefore did not satisfy the "second microprocessor means" limitation of that claim. The district court based its conclusion on two grounds.

First, the court held that the IridNet system does not have a "local microprocessor means" that is mounted on the workstation and performs the functions of the second microprocessor means identified in claim 1. Instead, the court ruled that those functions are performed in the IridNet system by a central processing computer, known as the Ridian Server, which acts as a translation hub for the devices in the system. The court explained that, rather than using a local control processor, the IridNet system "uses a central computer, which then communicates with the workstation via a cell controller." The court concluded that Asyst's system "of independent workstations with locally mounted microcomputers" is "not the same or substantially equivalent structure as the accused system."

Second, the district court ruled that the second microprocessor means in the IridNet system is not "mounted on the respective workstation," as required by claim 1. Even assuming that the cell controller constitutes the second microprocessor means, the court ruled that the cell controllers of the IridNet system are not "mounted on" the workstations. With respect to that issue, the court noted that the evidence showed that the cell controllers in the IridNet system are merely electrically connected to the workstations and that multiple workstations may be controlled by the same cell controller. The existence of an electrical connection between a cell controller and the

workstation, the court held, does not render the cell controller “mounted on” the workstation. Accordingly, the court entered summary judgment for Jenoptik on claim 1.

## B

On appeal, Asyst argues that the district court erred in finding that the IridNet system lacks the “second microcomputer means” of claim 1 of the '421 patent, i.e., the microcomputer means that performs the functions of “receiving and processing digital information communicated with [the] second two-way communication means.” Asyst contends that the district court incorrectly ruled that in the IridNet system the Ridian Server performs those functions. According to Asyst, those functions are performed by cell controllers that are associated with the workstations in the IridNet system. Asyst’s expert stated, for example, that “when a pod is mounted and engaged on a tool’s load port, the cell controller for that tool receives and processes digital information communicated with the tool-mounted IRT.” In response to that information, according to Asyst’s expert, “the cell controller determines whether the lot is at the proper processing tool. Thus, the cell controller processes that information to determine whether the workstation’s load port should extract the wafer cassette from the . . . pod for processing of the wafers.” In addition to expert testimony, Asyst offered portions of Jenoptik’s documentation for the IridNet system, which showed that the cell controller verifies lot identifications, directs the process of loading the contents of the pod into the tool, directs the tool process, and directs the unloading process.

According to Asyst’s evidence, the cell controller in the IridNet system provides or implements commands to the processing tool through the use of software run on a microcomputer. The evidence before the court on summary judgment showed that the

IridNet cell controller containing the microcomputer that performs that function need not be affixed to a processing tool, but can simply be placed near a tool or a cluster of tools. IridNet's cell controller is connected by a serial cable to the processing tool that it controls, and it is possible for a single cell controller to serve multiple processing tools.

The district court ruled in its summary judgment order that the IridNet system lacks the "second microcomputer means" of claim 1 because in the IridNet system it is the Ridian Server, not the cell controller, that performs the functions of the second microcomputer means. The court thus appears to have concluded that the local cell controllers in the IridNet system merely serve to convey information between the Ridian Server and the local workstations. However, because Asyst introduced evidence that the cell controllers in the IridNet system perform the functions identified with the second microcomputer means, it was incorrect for the court to conclude, for summary judgment purposes, that the Ridian Server, not the cell controllers, performs the functions of the second microcomputer means.

Although we disagree with the court's conclusion that, as a matter of law, the Ridian Server constituted the second microcomputer means in the IridNet system, that was not the only ground on which the district court based its summary judgment on claim 1. The court also held that claim 1 could not be infringed because, "[e]ven if there was a corresponding local second microcomputer means, it is not mounted." In particular, the court construed the '421 patent to require that the structures corresponding to the second microcomputer means be "mounted on the workstation, with the result that each workstation is independent." In the accused system, the court

concluded that the alleged second microcomputer means is not mounted on each workstation, and each workstation does not contain a unique mounted microcomputer.

In support of the district court's claim construction, Jenoptik argues that the phrase "mounted thereon" should be given its ordinary meaning of "fastened into position" or "fixed securely to a support." Jenoptik contends that the cell controllers in the IridNet system, which are electrically connected to one or more workstations by a serial cable but are not otherwise attached to the workstations, cannot be regarded as "mounted on the respective work station" within the ordinary meaning of that phrase. In contrast, Asyst argues that the phrase "mounted on the respective workstation" includes direct electrical connection with the workstation, such as by a serial cable. Asyst further contends that the fact that a single cell controller in the IridNet system may be connected to and serve more than a single workstation does not avoid infringement, because claim 1 does not require that there be a one-to-one relationship between each second microcomputer means and each workstation.

We agree with Jenoptik that the ordinary meaning of "mounted on," i.e., securely attached, affixed, or fastened to, applies here and that Asyst's much broader definition must be rejected. Asyst failed to point to any intrinsic evidence to show that in the pertinent art or in the context of the '421 patent the phrase "mounted on" means connected via a serial cable.

Asyst's expert, Phillip Faillace, submitted a declaration in which he stated that, in his opinion, a cable connection between the cell controller and the workstation satisfies the "mounted thereon" limitation. That single conclusory statement by Mr. Faillace, however, is insufficient to demonstrate that the term "mounted on" had that meaning to

a person of ordinary skill in the art at the time of the patent application, particularly in light of the fact that Mr. Faillace's definition departs significantly from the ordinary meaning of the phrase.

As Jenoptik points out, both the specification and the prosecution history support the district court's determination that the phrase "mounted on" should be accorded its ordinary meaning. The specification uses the phrase "mounted on" to refer to a number of other components, and the context makes clear that the phrase is used in those instances to mean securely affixed to objects such as the transportable container, a workstation, or some component of those structures. See, e.g., '421 patent, col. 2, ll. 19-41 (describing storage means "mounted on" the transportable container; communicating means "mounted" on the processing station "[a]djacent the engaging means"; data processing means "mounted on" the transportable container; and means for receiving data "on the transportable container"). The phrase "mounted on" is repeatedly used interchangeably with the term "on," which in context clearly denotes a form of attachment, not simply an electrical connection. See id., col. 3, line 41 to col. 4, line 20. Moreover, on occasion the patent distinguishes between features that are "mounted on" an object and those that are "connected to" or "in electrical communication with" an object, which strongly supports the court's conclusion that the phrases "mounted on" and "in electrical communication with" do not mean the same thing in the '421 patent. See id., col. 3, ll. 48-53 ("means 50 for communication with an electronic card 40" is "mounted on the processing station" but is "connected to a data processor 20 on the processing station"); id., col. 8, ll. 14-16 (local processor 20 "is

mounted on the work station 100” but is “in electronic communication with the [communication] means 50”).

The prosecution history also suggests that the inventors intended the phrase “mounted on” to have its ordinary meaning and not the broader meaning proposed by Asyst. In claim 10 of the parent to the application that matured into the '421 patent, the inventors referred to a “data processing means mounted on the transportable container,” but did not specify any location for the associated “communication means.” When the examiner rejected that claim based on a prior art patent to Hainsworth (U.S. Patent No. 4,492,504), the inventors added a limitation that required the communication means to be “disposed adjacent the at least one processing station.” The examiner continued to reject the claim on the ground that “adjacent” simply meant “not distant” and thus did not sufficiently distinguish the prior art reference. At that point, the inventors filed the continuation-in-part application that matured into the '421 patent. Claim 21 of that application, which corresponded to claim 10 of the parent application, claimed both a second two-way communication means “mounted on” a workstation and a microcomputer means “mounted on” a transportable container. The inventors commented at that time that the new claim language distinguished the Hainsworth patent because Hainsworth did not teach or suggest “the ‘second two-way communication means’ mounted on a work station.” Although those changes related principally to the communication means rather than to the second microcomputer means, they provide evidence that the inventors meant for the term “mounted on” to be narrowly limited to a structure that is “affixed to” an object and not to include structure that is “adjacent to” that object.

There are two further problems with Asyst's proposed definition of "mounted on." First, as the district court pointed out, in the IridNet system a single cell controller may be connected to multiple workstations, and it is awkward, at the very least, to refer to a single device as being "mounted on" two separate workstations. Second, Asyst's proposed definition is in tension with one of the objectives of the "distributed processing system," as expressed in the specification and the prosecution history, i.e., to enable a system that "does not require centralized control." '421 patent, col. 11, ll. 5-6. As the inventors explained to the examiner, the claimed apparatus "permits the control of the processing of articles . . . to be maintained locally (at the 'work station') without the need for a central computer." Since Asyst's definition of "mounted on" would be consistent with a system in which a single cell controller controlled all the workstations in the system (and thus, according to Asyst's definition, would be deemed "mounted on" all of them), that system would no longer feature localized control, but would be centralized in nature, contrary to the inventors' characterization of their invention in the specification and the prosecution history. These considerations lead us to conclude that the district court was correct in holding that the IridNet system does not literally infringe claim 1 of the '421 patent.

With respect to whether the IridNet system might infringe under the doctrine of equivalents, the district court concluded that the "mounted on" limitation is binary in nature. That is, the second microcomputer means must be either mounted or unmounted. For purposes of equivalents, the court concluded, "an unmounted microcomputer means cannot be equivalent to a mounted one."

We agree with the district court's conclusion with respect to the claim of infringement under the doctrine of equivalents. To hold that "unmounted" is equivalent to "mounted" would effectively read the "mounted on" limitation out of the patent. As the district court noted, the "all elements rule" provides that the doctrine of equivalents does not apply if applying the doctrine would vitiate an entire claim limitation. See Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 29 (1997). This case falls within both that doctrine and its corollary, the "specific exclusion" principle, since the term "mounted" can fairly be said to specifically exclude objects that are "unmounted." See SciMed Life Sys. v. Advanced Cardiovascular Sys., 242 F.3d 1337, 1346 (Fed. Cir. 2001) (noting the close kinship of the "all elements rule" and the "specific exclusion" principle); Moore U.S.A., Inc. v. Standard Register Co., 229 F.3d 1091, 1106 (Fed. Cir. 2000) ("it would defy logic to conclude that a minority—the very antithesis of a majority—could be insubstantially different from a claim limitation requiring a majority, and no reasonable juror could find otherwise"); Athletic Alternatives, Inc. v. Prince Mfg., Inc., 73 F.3d 1573, 1582 (Fed. Cir. 1996) ("specific exclusion" principle is "a corollary to the 'all limitations' rule"). In this case we hold that the district court was correct in ruling that the doctrine of equivalents cannot be extended to reach an "unmounted" system such as the IridNet system without vitiating the "mounted on" limitation altogether. We therefore uphold the district court's summary judgment of noninfringement with respect to claim 1, both literally and under the doctrine of equivalents.

### III

With regard to claim 2, the district court entered summary judgment of noninfringement on the ground that the IridNet system fails to satisfy the limitation

requiring “a plurality of respective sensing means for sensing the presence of said at least one transportable container.” That limitation further requires that each respective sensing means include “respective second two-way communication means adapted for two-way communication with said first two-way communication means.”

A

In our previous decision in this case, we determined that claim 2 was not indefinite for failing to recite structure corresponding to the sensing means limitation. We reached that conclusion based on the reference in the patent to the “ready, set” protocol that is performed when a transportable container is transported to a workstation. The portion of the patent that describes the inventory management system refers to the “two-way communication” between the card on the transportable pod and the communication means 50-1, which is part of the workstation. Although we regarded the question as close, we held that claim 2 is not indefinite because the reference to the communication between the card 40 and communication means 50-1, together with the reference to the “ready, set” protocol that can be run when the pod is attached to the workstation, provide sufficient support for the claim language to avoid invalidation of the patent on grounds of indefiniteness. Asyst, 268 F.3d at 1375-76.

On remand, the district court ruled that our reference to the two-way communication effected by communication means 50-1, and in particular the “ready, set” protocol, contemplated the participation not only of the communication means 50-1, but also of a local control processor 20. The court explained that it treated local control processor 20 as part of the structure constituting the sensing means in the ’421 patent, because “the communication means cannot perform the protocol independent of the

microcomputer means, and because the specification describes the protocol only in terms of performance by computers, and not in terms of performance by a communication means.” Because the court had already concluded that the IridNet system does not have a local microcomputer equivalent to local control processor 20 described in the specification, the court held that the IridNet system could not infringe the “sensing means” limitation on the ground that it lacks “the same or equivalent sensing means structure.” Accordingly, the court granted Jenoptik’s motion for summary judgment of noninfringement of claim 2.

## B

In their appeal briefs, the parties debate the meaning of our opinion in the prior appeal regarding the structure that performs the sensing function of the “sensing means” limitation. In support of the district court’s analysis, Jenoptik argues that our prior opinion required that communication means 50-1 be capable of performing the “ready, set” protocol in order to qualify as the corresponding structure to the sensing means of claim 2. Asyst, on the other hand, argues that our reference to the “ready, set” protocol performed by communication means 50-1 was not meant to suggest that the protocol was a necessary feature of that structure, but was merely a description of the manner in which communication means 50-1 performs the function of sensing the presence of a transportable container.

Apparently, our prior opinion was not as clear on this point as it should have been. To clarify any possible confusion on the point, we did not intend to suggest that a particular structure had to perform the “ready, set” protocol in order to fall within the scope of the “sensing means” limitation of claim 2. Instead, we merely noted that

communication means 50-1, which was shown to effectuate that protocol, is structure that corresponds to the “sensing means” and performs the sensing function. Thus, any structure that is the same as, or equivalent to, communication means 50-1 and performs the function of “sensing the presence of at least one transportable container” infringes the “sensing means” limitation of claim 2, regardless of whether it performs that function by way of something like the “ready, set” protocol or otherwise.

Moreover, we do not agree with the district court that the structure corresponding to the “sensing means” of claim 2 necessarily includes local processor 20. It is true that communication means 50-1 is not sufficient, standing alone, to direct the process of detecting the presence of a transportable container or to convert the signal sent by communication means 50-1 into a form that is useable by a system operator. Those functions would appear to be performed in the claimed system by software running on local processor 20. Nonetheless, because communication means 50-1 exchanges signals with the transportable container and generates a signal in response to the presence of a pod, it performs the sensing function, even if later processing of the signal is necessary to make the signal meaningful to a system user.

Jenoptik makes two further, and related, arguments regarding the “sensing means” limitation. First, Jenoptik argues that because the “ready, set” protocol in the claimed invention is not triggered until the system detects the presence of the transportable container at the workstation, the “ready, set” protocol “does not perform the function of sensing the presence of the container in the first place.” Second, Jenoptik argues that in its system the presence of the container at the workstation is detected when the tray depresses a mechanical switch. Because a mechanical switch

is not the same as or equivalent to the communication means 50-1 disclosed in the specification, Jenoptik contends that it does not infringe the sensing means limitation.

These arguments were answered in substance in our prior opinion in this case. We noted that the recited function is “sensing,” not “initiating a sensing protocol.” We therefore held that it was not necessary to set forth structure that initiates the sensing protocol in order to satisfy the requirement of reciting structure corresponding to the claimed function. Asyst, 268 F.3d at 1376. The same analysis answers Jenoptik’s arguments regarding the triggering device for the “ready, set” protocol and the mechanical switch in the IridNet system. Because the “ready, set” protocol is capable of performing the function of sensing the presence of the container, the structure that first detects the presence of the container is not an essential feature of the “sensing means” limitation. Moreover, the fact that the IridNet system employs a mechanical switch to detect the presence of the transportable container does not avoid infringement if the IridNet system also contains a sensing means that is the same as or equivalent to the sensing means claimed in the ’421 patent, i.e., communication means 50-1. See N. Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 945 (Fed. Cir. 1990) (“The addition of features does not avoid infringement, if all the elements of the patent claims have been adopted.”); Radio Steel & Mfg. Co. v. MTD Prods., Inc., 731 F.2d 840, 848 (Fed. Cir. 1984) (same).

On remand, Asyst introduced evidence designed to show that the IridNet system has structure equivalent to the “sensing means” of claim 2 that is capable of “sensing the presence of at least one transportable container.” In particular, Asyst sought to show that the means for sensing the presence of a container at the workstation in the

IridNet system included the IRTs on the workstations, which satisfied the claim requirement of “second two-way communication means adapted for two-way communication with said first two-way communication means.”

Because the district court entered summary judgment on claim 2 based on other grounds, the court did not determine whether the evidence offered by Asyst as to the “sensing means” limitation established at least a genuine issue of material fact as to whether the IridNet system has structure equivalent to communication means 50-1 that performs the function of sensing the presence of a transportable container. Inasmuch as the district court has not addressed that question, we think that rather than address that issue ourselves, it is preferable to leave that question to the district court, which is conversant with the evidence proffered by the parties at the summary judgment stage. For present purposes, it is enough to hold that we disagree with the grounds employed by the district court in reaching summary judgment of noninfringement, and that we reject Jenoptik’s alternative grounds for supporting the summary judgment (including a request that we revisit our prior decision in this case). Accordingly, while we affirm the decision of the district court with respect to claim 1 of the ’421 patent, we vacate the court’s order of summary judgment with respect to claim 2. On remand, the court should reconsider the issue of infringement with respect to claim 2 and with respect to claims 11-14 to the extent that they are dependent from claim 2.

Each party shall bear its own costs for this appeal.

AFFIRMED IN PART, VACATED IN PART, and REMANDED.