Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte JOSEPH A. CLARK and JANE A. YOUNG

Appeal No. 2001-2271
Application No. 08/971,839[1]

ON BRIEF

Before SCHEINER, ADAMS and MILLS, Administrative Patent Judges.

SCHEINER, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-5, 7, 8, 10-13 and 15, the only claims remaining in the application.

Claims 1, 2 and 3 are representative, and read as follows:

1. A method of treating aquatic animals by infusion of tissue cells thereof with a biological agent dissolved within a body of water in a treatment zone within which said infusion is performed, the improvement residing in the steps of: establishing an acoustic field of limited duration within said treatment zone during which said biological agent is transferred to the tissue cells; and regulating conditions of the body of water within the treatment zone to establish a constant temperature therein during said limited duration of the acoustic field under which said infusion occurs for absorption of the biological agent into the tissue cells.

2. The improvement as defined in claim 1 wherein said step of establishing an acoustic field comprises the steps of: generating steady state electrical signal energy

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[1] Application for patent filed November 17, 1997.

having a frequency within a cavitation range; amplifying the steady state electrical signal energy to an operative voltage level and converting said amplified electrical signal energy into acoustic energy for producing said acoustic field within the treatment zone.

3. The improvement as defined in claim 2 wherein said biological agent is selected from a group of tagging compounds consisting of calcein and oxytetracycline hydrochloride.

The references relied on by the examiner are:

Zohar et al. (Zohar) 5,076,208 Dec. 31, 1991

Heat Systems Ultrasonics, Inc., "Breaking the Heat Barrier," Sonicator Series Application Notes, AN-1, pp. 1-2 (1977)

Monaghan, "Comparison of Calcein and Tetracycline as Chemical Markers in Summer Flounder," Transactions of the American Fisheries Society, Vol. 122, pp. 298-301 (1993)

Mohler, "Immersion of Larval Atlantic Salmon in Calcein Solutions to Induce a Non-Lethally Detectable Mark," North American Journal of Fisheries Management, Vol. 17, pp. 751-756 (1997)

Claims 1, 2, 7, 10 and 11 stand rejected under 35 U.S.C. § 103 as unpatentable over Zohar and Heat Systems Ultrasonics, while claims 3-5, 8, 12, 13 and 15 stand rejected under 35 U.S.C. § 103 as unpatentable over Zohar, Heat Systems Ultrasonics, Monaghan and Mohler.

BACKGROUND

The present invention is directed to a method of infusing aquatic animal tissues (e.g., fish eggs or larvae) with biological agents (e.g. chemical markers or DNA). Infusion of the biological agent is "performed within [a] treatment zone under an acoustic energy field of limited duration produced by amplification of a steady state electrical power signal converted into ultrasound waves within a cavitation frequency range establishing the acoustic field within the treatment zone" (Brief, page 2). As explained in the specification, with reference to Figure 2, the "treatment zone" comprises water "enclosed by a cylindrical shaped transducer . . . [which] converts

electrical energy . . . into ultrasound energy in the form of acoustic waves . . . establishing the acoustic field within the water treatment zone" (specification, page 3). "Fish eggs and/or larvae . . . [are] exposed during experimental treatment to the . . . acoustical field within [the treatment] zone [ ] by placement into [an acoustically transparent] test tube . . . mixed with a body of seawater [ ] having [the biological] agent [ ] dissolved therein" (id., page 4). According to appellants, "treatment [is] maximized by passage of a continuous flow of water from a coolant supply [ ] to maintain the body of seawater . . . [at] a predetermined constant temperature" (id.).

DISCUSSION

The examiner has rejected claims 1, 2, 7, 10 and 11 as unpatentable over Zohar and Heat Systems Ultrasonics, and claims 3-5, 8, 12, 13 and 15 as unpatentable over Zohar, Heat Systems Ultrasonics, Monaghan and Mohler. Initially we note appellants' statement on page 3 of the Brief that claims 1, 2, 7, 10 and 11 "form one group of claims" and claims 3-5, 8, 13 and 15 "form yet another group." Therefore, we shall limit our consideration of the issues raised by this appeal as they pertain to claim 1 as representative of the first group - thus claims 2, 7, 10 and 11 will stand or fall with claim 1; and claim 3 as representative of the second group - thus claims 4, 5, 8, 12, 13 and 15 will stand or fall with claim 3. 37 CFR § 1.192(c)(7) (1999).

The Rejection of Claims 1, 2, 7, 10 and 11

Claim 1 is directed to a method of treating aquatic animals by infusing an agent dissolved in a body of water in a treatment zone into the tissues of the animals, wherein an acoustic field is established within the treatment zone for a limited time, during which

the body of water within the treatment zone is maintained at a constant temperature, and during which the biological agent is transferred to the aquatic animals.

Zohar describes "[a] method for administering compounds, including proteins . . . non-protein drugs, and nucleic acids, to aquatic animals, especially fish, in an aquatic medium containing the compound to be administered to enhance or effect the uptake of the compound by the animal from the water" (column 1, lines 56-63). While Zohar states that goldfish were held in a 180 liter aquarium maintained at 20°C prior to ultrasonic treatment to enhance uptake of a peptide hormone (column 3, Example 1), the examiner concedes that "there is no explicit teaching that the water temperature [was] maintained during the ultrasound treatment" (Answer, page 7).

According to Heat Systems Ultrasonics, "[o]ne of the most important aspects of sonifying with high power . . . is keeping the processed material cool. Over 150 watts of energy is delivered to the solution . . . [it] is emitted as sound, becoming in turn cavitation, and finally heat, which must be absorbed by a cooling bath as quickly as possible" (page 1). The reference describes several cooling cell configurations and procedures capable of "hold[ing]" or "maintain[ing]" samples at various temperatures during ultrasonification, and which "greatly simplify the critical cooling procedure, so that enzyme and biological activity are preserved" (id.).

According to appellants, "[i]n the present case, patentability is predicated on the maintenance of a constant temperature within an underwater treatment zone during its exposure to an acoustic field" (Brief, page 3). In their sole argument, appellants emphasize that this limitation distinguishes Zohar from each of the claims on appeal, and take exception to the examiner's assertion that Zohar, either alone or in

combination with Heat Systems Ultrasonics, "establishes an implication that the water temperature of 20°C referred to in [Zohar] is maintained constant during ultrasonification" (id., page 4).

On this particular point, we agree with appellants. We see no basis for the assertion that a constant temperature was maintained during Zohar's ten to fifteen minute ultrasound treatment. Nevertheless, the claims were rejected as unpatentable over the combination of Zohar and Heat Systems Ultrasonics, and "[t]he test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art." In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991). As the examiner points out, Heat Systems Ultrasonics teaches that "temperature control during ultrasonication is necessary because of the inescapable heating that accompanies ultrasonication" (Answer, page 11), and also describes exactly how to maintain a desired temperature. In our view, these references, taken together, provide evidence that those of skill in the art would have been led to combine their disclosures, and would have had a reasonable expectation of success in doing so. See In re Dow Chemical Co., 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Therefore, we find no error in the examiner's determination that the combined teachings of Zohar and Heat Systems Ultrasonics are sufficient to establish that "it would have been prima facie obvious to one of ordinary skill in the art . . . to maintain the temperature constant at a temperature . . . which is suitable for the organism being treated during [ ] ultrasonic . . . infus[ion of] compounds into aquatic organisms" (id.), as required by claim 1 on appeal.

On this record, we find no error in the examiner's determination that claim 1 is unpatentable under 35 U.S.C. § 103. As previously indicated, claims 2, 7, 10 and 11

stand or fall with claim 1. Accordingly, the rejection of claims 1, 2, 7, 10 and 11 is affirmed.

The Rejection of Claims 1, 2, 7, 10 and 11

Claim 3 specifies that the biological agent is calcein or oxytetracycline hydrochloride, neither of which is disclosed by Zohar or Heat Systems Ultrasonics. Thus, the examiner relies on Monaghan and Mohler as evidence that both were well known in the art as chemical markers "especially when mass-marketing larval fish for long-term hatchery product evaluation" (Answer, page 8). Appellants argue that the Monaghan and Mohler references "are not relevant to the claimed distinction involved herein," i.e., maintaining a constant temperature during ultrasonification, "even though they are relevant to other limitations of the second group of claims" (Brief, page 5).

Inasmuch as we have found no error in the examiner's determination that Zohar and Heat Systems Ultrasonics are sufficient to establish that "it would have been prima facie obvious . . . to maintain the temperature constant at a temperature . . . during [ ] ultrasonic . . . infus[ion of] compounds into aquatic organisms," and appellants agree that Monaghan and Mohler "are relevant to other limitations of the second group of claims," we affirm the examiner's rejection of claims 3-5, 8 and 13 as well.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

Toni R. Scheiner Administrative Patent Judge	)
	) BOARD OF PATENT
Donald E. Adams Administrative Patent Judge	) APPEALS AND
	) INTERFERENCES
Demetra J. Mills Administrative Patent Judge	)

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