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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TAIRO OGURA

Appeal 2018–007567
Application 14/780,077¹
Technology Center 2800

Before JEFFREY T. SMITH, BEVERLY A. FRANKLIN, and
MARK NAGUMO, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

¹ SHIMADZU CORPORATION is the applicant and real party in interest.
(*See App. Br. 2*).

STATEMENT OF THE CASE

This decides an appeal under 35 U.S.C. § 134(a) from the May 19, 2017 final rejection of claims 1–13. We have jurisdiction under 35 U.S.C. § 6(b).

Appellant’s invention is directed generally to a mass spectrometer capable of an MS^n analysis, where n is any integer equal to or more than 3, involving a dissociation operation conducted in at least $n-1$ stages. (Spec. ¶ 30). The mass spectrometer has an automatic MS^n analysis function of executing, given an MS^m , where m is an integer, spectrum obtained through an MS^m analysis, an operation of: selecting an ion that satisfies a predetermined condition as a precursor ion for an MS^{m+1} analysis from the MS^m spectrum (Spec. ¶ 32); and dissociating the precursor ion and performing a mass analysis, until a value of m becomes $n-1$ in order from 1 (Spec. ¶ 33). Claim 1 is illustrative of the subject matter on appeal and is reproduced from the Claims Appendix of the Appeal Brief below:²

1. A mass spectrometer capable of an MS^n analysis (whose n is any integer equal to or more than 3) involving a dissociation operation conducted in at least $n-1$ stages, the mass spectrometer having an automatic MS^n analysis function of executing, given an MS^m (whose m is an integer) spectrum obtained through an MS^m analysis, an operation of: selecting an ion that satisfy a predetermined condition as a precursor ion for an MS^{m+1} analysis from the MS^m spectrum; and dissociating the precursor ion and performing a mass analysis, until a value of m becomes $n-1$ in order from 1, the mass spectrometer comprising:

² Independent claim 13 is a method claim that recites similar features to claim 1.

a) a precursor ion information memory unit for holding information on mass-to-charge ratios of precursor ions to be dissociated in first to m^{th} stages for the MS^{m+1} analysis, in association with one another; and

b) an analysis controller configured to acquire an MS^n spectrum by executing, up to the MS^n analysis, including

b1) a first stage precursor ion determiner for determining whether or not an ion that is held as a precursor ion to be dissociated in the first stage in the precursor ion information memory unit exists on an MS^1 spectrum obtained at a time of executing an analysis;

b2) a MS^2 analysis performer for performing an MS^2 analysis in which the ion is set as a precursor ion, if the ion exists;

b3) a second stage precursor ion determiner for determining whether or not an ion that is held as a precursor ion to be dissociated in the second stage in association with the precursor ion to be dissociated in the first stage in the precursor ion information memory unit exists on an MS^2 spectrum obtained through the MS^2 analysis; and

b4) a MS^3 analysis performer for performing an MS^3 analysis in which the ion are set as a precursor ion, if the ion exists;

wherein the ion information memory unit includes information regarding whether the precursor ion to be dissociated in the second stage can be acquired by the first stage dissociation.

The following rejection is presented for our review.

Claims 1–13 are rejected under 35 U.S.C. § 102(a)(1) as unpatentable over Ishimaru (US 2006/0255263 A1).

OPINION

We REVERSE.

We limit our discussion to independent claim 1.³

The Examiner finds Ishimaru discloses a mass spectrometer capable of MSⁿ analysis (whose n is any integer equal to or more than 3) involving a dissociation operation conducted in at least n-1 stages that anticipates the claimed invention. (Final Act. 2–3; Ishimaru Fig. 4; ¶ 53).

Appellant argues Ishimaru does not anticipate the claimed invention because Ishimaru does not disclose that the mass-to-charge ratio of a product ion that is the precursor ion for the next stage is known and held in a precursor ion information memory unit. (App. Br. 6). Appellant further argues:

Ishimaru does not disclose that the mass-to-charge ratio of a product ion that is the precursor ion for the next stage is known and held in a precursor ion information memory unit. There is no need in Ishimaru to know the mass-to-charge ratio of the product ion because Ishimaru performs calculations to determine the combination of product ions and does not need to include information on mass-to-charge ratios of precursor ions to be dissociated in first to mth stages for the MS_{m+1} analysis, in association with one another and information regarding whether the precursor ion to be dissociated in the second stage can be acquired by the first stage dissociation.

(App. Br. 6).

In response to Appellant’s arguments, the Examiner contends that the first phase of Ishimaru anticipates the claimed subject matter. Specifically the Examiner states:

[T]he application of Ishimaru to the present claims is better shown by the embodiment depicted in Fig. 11 and described in paragraphs 0095-

³ Our analysis also applies to independent claim 13.

0096. The process described in this embodiment involves two phases: in the first phase, (steps S21-S24), a “suitable fragment ion” for identifying an oligosaccharide is found by searching MS^2 data for a fragment ion that is only formed by desorbing monosaccharide and, if such a fragment ion is found, selecting that ion for MS^3 analysis. The MS^3 data is then searched for a fragment ion that is only formed by desorbing monosaccharide, and if such a fragment ion is found, that ion is selected for MS^4 analysis, and so on, until the spectrum contains only fragments that result from breaking of intramolecular bindings instead of by desorption of monosaccharide. *Ishimaru*, paragraphs 0095-0096 and 0100.
(Ans. 6).

We cannot sustain the Examiner’s rejection. The Examiner has not identified where *Ishimaru* describes the mass-to-charge ratio of the product ion is known and kept in memory. In the embodiment depicted in Figs. 11 and 12, *Ishimaru* performs calculations to determine the combination of product ions and does not include information on mass-to-charge ratios of precursor ions to be dissociated in first to m^{th} stages for the MS^{n+1} analysis, in association with one another and information regarding whether the precursor ion to be dissociated in the second stage can be acquired by the first stage dissociation.

For the foregoing reasons and those provided by the Appellant we reverse the appealed rejection.

ORDER

The rejection of claims 1–13 under 35 U.S.C. § 102(a)(1) is reversed.

REVERSED