

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHRISTOPHER HUK-SHI CHEH,
SHINN-DER CHANG, CHENGWEN WENG, YUANMING TANG,
INGO B. HOLZHUETER and SAMUEL H. HAWTHORNE

Appeal No. 95-5074
Application No. 08/186,900¹

ON BRIEF

Before KIMLIN, WEIFFENBACH and ELLIS, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

¹ Application for patent filed January 27, 1994. According to appellants, this application is a continuation of Application No. 07/990,054, filed December 14, 1992, now abandoned.

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This is an appeal from the final rejection of claims 2-9. Claim 1, the other claim remaining in the present application, has been allowed by the examiner. Claims 2 and 5 are illustrative:

2. A gas chromatographic method, comprising:

loading a mixture onto a first column packed with a stationary phase wherein mixture components of interest have different affinities for the stationary phase, the column is maintained at an elution temperature profile wherein the temperature increases along the column length from the inlet to the outlet;

flowing the mixture through the first column to effect at least a partial separation of the mixture components;

flowing the effluent from the first column through a second column packed with a stationary phase wherein mixture components of interest have different affinities for the stationary phase, the column is maintained at a temperature profile wherein the temperature decreases along the column length from the inlet to the outlet; and

recovering the separated components of the mixture from the outlet of the second column.

5. A gas chromatographic method, comprising:

loading a mixture onto a column packed with a stationary phase wherein mixture components of interest have different affinities for the stationary phase, the column is then provided with a variable elution temperature profile decreasing along the column length from the inlet to the outlet of the column;

flowing the mixture through the column to effect at least a partial separation of the mixture components; and

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recovering the separated or partially separated components from the outlet of the column.

In the rejection of the appealed claims, the examiner relies upon the following references:

Burow	3,225,521	Dec. 28, 1965
Cheh et al. (Cheh)	4,732,581	Mar. 22, 1988
United Kingdom (U.K. '897) (U.K. patent specification)	1 204 897	Sep. 9, 1970

Appellants' claimed invention is directed to gas chromatographic methods that utilize packed columns for separating a mixture of fluid components. The method defined by appealed claim 2 employs a first and second column wherein the first column "is maintained at an elution temperature profile wherein the temperature increases along the column length from the inlet to the outlet." The gas chromatographic method of appealed claim 5 requires a packed column that is "provided with a variable elution temperature profile decreasing along the column length from the inlet to the outlet of the column."

Appealed claim 2 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Burow. Claim 5 stands rejected under 35 U.S.C. § 102(b) as being anticipated by U.K. '897. Claims 3, 4 and 6-9 stand rejected under 35 U.S.C. § 103 as follows:

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(I) claims 3 and 4 over Burow in view of Cheh;
(II) claims 6 and 8 over U.K. '897 in view of Burow;
(III) claims 7 and 9 over U.K. '897 in view of Burow and
Cheh.

Upon careful consideration of the opposing arguments presented by appellants and the examiner, we will not sustain the examiner's rejections.

We consider first the rejection of claim 2 under § 102 over Burow. Claim 2 requires that the first column "is maintained at an elution temperature profile wherein the temperature increases along the column length from the inlet to the outlet." The examiner states "[a]ny column which has its temperature increased from its inlet end to its outlet end has a temperature which increases along the column length from its inlet to the outlet end because such column is initially at ambient temperature along its length and the flow of the gaseous component will cause such a temperature profile to occur" (sentence bridging pages 4 and 5 of Answer).

While the examiner's statement may be true, Burow does not describe such a column within the meaning of § 102. Burow expressly teaches that "[a] downward temperature gradient in

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the direction of flow will exist at least in column 32 by virtue of the transfer of heat from the preheated carrier gas to the column packing during passage therethrough, and possibly in one or more subsequent columns" (column 6, lines 18-22, emphasis added). Burow further discloses that the establishment of the temperature gradient in the first separating zone is important (column 6, lines 22-24). In addition, Burow explains that:

The temperature gradient functions to distribute the sample over a relatively large portion of the column by virtue of the fact that the gradual drop in temperature encountered by the sample components as they advance through the column slows the rate of advance of the heavier components much more greatly than the lighter components. [Column 6, lines 38-44].

Based on these referenced disclosures, we cannot agree with the examiner that Burow anticipates claim 2. While the examiner invites attention to Burow at column 2, lines 3-39, the disclosed reference to gradually increasing the temperature of the separating zone, when read in context of the entirety of Burow, is properly understood as a gradual increase in the absolute temperature of the zone wherein a downward temperature gradient exists in the direction of the flow. In other words, when the variable rheostats 58, 60, 62

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and 64 are switched on, both the inlet and outlet temperatures are raised but the outlet temperature remains greater than the inlet temperature.

Also, like appellants, we cannot understand how the examiner allowed claim 1 but rejects claim 2 which recites features in addition to those recited in claim 1.

We now turn to the examiner's § 102 rejection of claim 5 over U.K. '897. Claim 5 defines a gas chromatographic method comprising a packed column "provided with a variable elution temperature profile decreasing along the column length from the inlet to the outlet of the column" (emphasis added). We agree with the examiner that U.K. '897 discloses a separation column in which the temperature gradient decreases in the direction of the fluid flow through the column. However, as urged by appellants, appealed claim 5 requires more than that, i.e., the decreasing temperature profile must be variable (see page 6 of present specification and Figure 3 for a description of how appellants effect a variable, decreasing temperature profile). The examiner has pointed to no disclosure in U.K. '897 of a variable temperature profile, and our review of the reference fails to reveal any such disclosure. Accordingly,

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we agree with appellants that claim 5 is not properly rejected under 35 U.S.C. § 102.

Regarding the rejections of claims 3, 4 (dependent on claim 2) and 6-9 (dependent on claim 5) under 35 U.S.C. § 103, since Cheh does not remedy the aforementioned deficiency of Burow with respect to claim 2, or alleviate the deficiency of U.K. '897 with respect to claim 5 (the examiner does not assert such), and the examiner does not take the position that Burow would have rendered obvious the provision of a variable, decreasing temperature profile, we cannot sustain these rejections.

In conclusion, based on the foregoing, the examiner's decision rejecting the appealed claims is reversed.

REVERSED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
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CAMERON WEIFFENBACH)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
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JOAN ELLIS)
Administrative Patent Judge)

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