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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YINAN CHEN, WEIJIA LU, JIANYI ZHONG,
AJAY ANAND, and JOHN PETRUZZELLO¹

Appeal 2017-002145
Application 14/234,449
Technology Center 3700

Before ERIC B. GRIMES, JOHN G. NEW, and
DEVON ZASTROW NEWMAN, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a method, device, and system for automatic blood pressure measurement, which have been rejected as anticipated; one claim has also been rejected as indefinite. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm the indefiniteness rejection but reverse the anticipation rejection.

¹ Appellants identify the Real Party in Interest as Koninklijke Philips Electronics N.V. (Appeal Br. 2.)

STATEMENT OF THE CASE

“[T]he auscultatory method . . . is the predominant method of clinical measurement” of blood pressure. (Spec. 1: 16–17.) In this method, the inflatable cuff of a sphygmomanometer is inflated until the artery is completely occluded, then the cuff is deflated. (*Id.* at 18–20.) “Clinicians manually detect the moment of occlusion and the moment of reopening of the artery by listening with a stethoscope or a Doppler probe and read the SBP [systolic blood pressure] values from the sphygmomanometer.” (*Id.* at 1:23–25.)

The Specification discloses an automatic “method of detecting occlusion and/or reopening of an artery of the body caused by a changing pressure applied on the artery.” (*Id.* at 2:10–11.)

The basic idea is to detect the occlusion/reopening of an artery on the basis of at least one of a first variable indicative of the magnitude of the blood flow in the artery and a second variable indicative of the periodicity of the blood flow in the artery. In other words, the occlusion/reopening of the artery is automatically detected on the basis of the change of the amplitude and/or the periodicity of the blood flow in the artery. (*Id.* at 2:21–25.) “[P]eriodicity of the blood flow corresponding to the heart rate.” (*Id.* at 4:3.)

Claims 1–19 are on appeal. Claim 1 is illustrative and reads as follows (emphasis added):

1. A method of detecting occlusion or reopening of an artery of a body caused by a changing pressure applied to the artery, the method comprising the steps of:
 - obtaining a blood flow signal indicative of a change of a blood flow in the artery caused by the changing pressure using a Doppler Ultrasound transducer attached to the exterior of the body;

deriving, from the blood flow signal, a first variable indicative of a magnitude of the blood flow and a second variable indicative of a periodicity of the blood flow; and

detecting the occlusion or reopening of the artery on the basis of the magnitude of the first variable relative to at least one magnitude threshold and the periodicity of the second variable relative to a periodicity range.

Claims 7 and 13 are the other independent claims. Claim 7 is directed to a device and claim 13 is directed to a system; both the device and the system include, among other things, a processor configured to “derive, from the blood flow signal, a first variable indicative of a magnitude of the blood flow and a second variable indicative of a periodicity of the blood flow.”

The claims stand rejected as follows:

Claim 19 under 35 U.S.C. § 112, second paragraph, as indefinite (Ans. 2) and

Claims 1–19 under 35 U.S.C. § 102(b) as anticipated by Ogawa² (Ans. 4).

I

The Examiner has rejected claim 19 as indefinite. Claim 19 is directed to “[t]he system as claimed in claim 13, further including: a device configured to communicate the determined blood pressure to a user.”

The Examiner finds that

“a device configured to communicate” is a limitation that invokes 35 U.S.C. 112, sixth paragraph. However, the written description fails to disclose the corresponding structure, material, or acts for the claimed function. There is no known structure to

² Ogawa et al., US 5,072,736, Dec. 17, 1991.

correspond to the claim elements and there is insufficient disclosure in the written description of a corresponding structure.

(Ans. 3.)

Appellants do not dispute that the limitation in question invokes 35 U.S.C. § 112, sixth paragraph. (*See* Appeal Br. 8, Reply Br. 3.) However, Appellants argue that

it is implicit and inherent in the written description of the specification that the determined blood pressure is communicated to a user. This is typically performed by a display device, such as an LCD, LED, CRT, or other well-known digital display screen. Sensors themselves do not communicate measurement readings to a user.

(Reply Br. 3.)

We affirm this ground of rejection. Appellants do not point to any disclosure in the Specification that describes a digital display screen as the structure corresponding to the recited “device configured to communicate.” We do not agree that such a disclosure is implicit or inherent in the Specification, since a blood pressure measurement could be conveyed by a variety of other means; e.g., an analog display such as a dial with a movable arrow, an audible signal that recites the measured blood pressure, or a display that is an integral part of the system of claim 13 rather than being a separate device as recited in claim 19. We therefore agree with the Examiner that that claim 19 as written is indefinite.

II

The Examiner has rejected all of the claims on appeal as anticipated by Ogawa. The Examiner finds that Ogawa discloses a method meeting all of the limitations of claim 1, including “deriving, from the blood flow signal, a first variable indicative of a magnitude of the blood flow and a second

variable indicative of a periodicity of the blood flow (fig.4a; col.3, ll.42-44).” (Ans. 4.)

Appellants argue that Ogawa’s “Figure 4A . . . illustrates that blood flow, indeed, does have a periodicity, but [the Examiner] fails to point out any portion of Ogawa which calls for deriving a variable indicative of the periodicity.” (Appeal Br. 8.) Appellants argue that Ogawa’s disclosure at column 3, lines 42–44 “is expressly directed to *amplitude* data and does not disclose a variable indicative of *periodicity*.” (*Id.*) Appellants also argue that the other portions of Ogawa that the Examiner pointed to “are also expressly directed to *amplitude* data, not a variable indicative of *periodicity*. Contrary to the Examiner’s assertion, there is no disclosure in these cited portions of Ogawa related to a variable indicative of *periodicity*.” (*Id.* at 9.)

We agree with Appellants that the Examiner has not persuasively shown that Ogawa discloses all of the limitations of claim 1. “[A]nticipation requires that the four corners of a single, prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.” *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000).

Ogawa states that an automatic blood pressure measuring apparatus using the oscillometric method “detects a pulse wave caused by the pulsation of the artery as a vibration upon the internal pressure of the cuff and measures the blood pressure based on the change of this vibration.” (Ogawa 1:20–23.) Ogawa discloses an “apparatus based on a new system” in which “maximal and minimal blood pressures can be measured with high accuracy since the values of both blood pressures can be directly determined from the

pulse signals whose vibrating amplitude is more correctly correlated with the depression of the internal pressure of the cuff.” (*Id.* at 1: 61–66.)

Ogawa discloses that its apparatus can include a microcomputer, a cuff, and an ultrasonic blood flow meter with a probe. (*Id.* at 3:9–18.)

Ogawa discloses that

[a]t the time of measuring the blood pressure, the cuff 1 is decompressed for measuring the blood pressure after being compressed. . . . In this decompression process . . . , the blood flow signal . . . detected by the blood flow meter gradually increases in its vibration amplitude from the hemostasis and its vibration amplitude reaches its maximum in the average blood pressure region.

(*Id.* at 2:47–55.) Ogawa describes Figure 4(a) as showing the amplitude data obtained during the process of measuring blood pressure. (*Id.* at 3:43.)

The evidence therefore supports Appellants’ position that Ogawa’s method of measuring blood pressure is based on the *amplitude* of vibrations resulting from blood flow rather than the *periodicity* of the blood flow, as required by the claims on appeal. The Examiner reasons that

the term “periodicity” is defined as the tendency to recur at intervals. The cardiac cycle is a repeating cycle having the tendency to recur at intervals. Claim 1 discloses a “second variable indicative of periodicity” but does not explicitly disclose what the second variable is and how it is “indicative of” periodicity. Examiner’s position is the periodicity variable of Ogawa et al is the location in time of the cardiac cycle.

(Ans. 12.)

We disagree with this reasoning, for two reasons. First, claim 1 on appeal expressly requires “deriving . . . a second variable indicative of *a periodicity of the blood flow*,” not any natural process showing periodicity. Second, even if we accepted the Examiner’s claim interpretation, the

Examiner has not pointed to any disclosure in Ogawa of basing its blood pressure measurements on the location in time of the cardiac cycle.

Because the Examiner has not shown that Ogawa discloses a method meeting all of the limitations of claim 1, we reverse the rejection of that claim as anticipated by Ogawa. Claims 7 (device) and 13 (system) include the same limitation, and claims 2–6, 8–12, and 14–19 depend from one of claims 1, 7, or 13. We therefore reverse the rejection as to those claims as well.

SUMMARY

We affirm the rejection of claim 19 under 35 U.S.C. § 112, second paragraph.

We reverse the rejection of claims 1–19 under 35 U.S.C. § 102(b) based on Ogawa.

TIME PERIOD FOR RESPONSE

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

AFFIRMED-IN-PART