The opinion in support of the decision being entered today was _not_ written for publication and is _not_ binding precedent of the Board.

Paper No. 35

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte VICTOR M. WEGLARZ,
CARL F. WEISSER,
and JACOB S. COHEN

Appeal No. 1999-1894
Application 08/847,804[1]

ON BRIEF

Before KRASS, JERRY SMITH, and BARRETT, _Administrative Patent Judges_.

BARRETT, _Administrative Patent Judge_.

DECISION ON APPEAL

[1] Application for patent filed April 28, 1997, entitled "Triple Frequency, Split Monopole, Emergency Locator Transmitter Antenna," which is a continuation of Application 08/704,294, filed August 28, 1996, now abandoned, which is a continuation of Application 08/292,535, filed August 18, 1994, now abandoned.

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 9, 11-20, 23, and 25-30. Claims 1-8, 10, 21, 22, 24, and 31-33 have been canceled.

We reverse.

BACKGROUND

The disclosed invention relates to a split monopole antenna which provides for simultaneous transmission of three emergency frequencies of an emergency locator transmitter (ELT).

Claim 9 is reproduced below.

> 9. A triple frequency antenna for use as an emergency locator transmitter (ELT) comprising:
>
> (a) a first radiating element electrically coupled to said transmitter and to a first band rejection filter;
>
> (b) a second radiating element electrically coupled to said first rejection filter and to a second band rejection filter;
>
> (c) a third radiating element electrically coupled to said second band rejection filter,
>
> wherein said first band rejection filter resonates at a selected resonant frequency and said first radiating element having a length of less than a quarter wavelength at said selected resonant frequency to radiate in a radiation pattern at said selected resonant frequency having an absolute gain in the vertical plane between about -3 dBi to about +4dBi over the elevation angle from about 10E to about 60E.

The Examiner relies on the following prior art:

Fenwick	4,145,693	March 20, 1979
Dell-Imagine et al. (Dell-Imagine)	4,962,488	October 9, 1990
Dörrie et al. (Dörrie)	5,258,765	November 2, 1993

Claims 9, 11-20, and 25-30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fenwick and Dörrie.

Claim 23 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fenwick and Dörrie, as applied to the rejection of claim 9, further in view of Dell-Imagine.

We refer to the final rejection (Paper No. 26) (pages referred to as "FR__") and the examiner's answer (Paper No. 32) (pages referred to as "EA__") for a statement of the Examiner's position, and to the appeal brief (Paper No. 30) (pages referred to as "Br__") and the reply brief (Paper No. 33) (pages referred to as "RBr__") for Appellants' arguments thereagainst.

OPINION

Fenwick discloses a prior art three-frequency trap monopole antenna 22 in Fig. 2, which is described at column 2, lines 31-48. The parallel inductor coil 24 and capacitor 25 make up a subcircuit which is resonant at $2f_L$, along with an inductor coil 27 and capacitor 28 making up subcircuit 29 which is resonant at $4f_L$. Thus, the antenna portion between the bottom feed 23 and subcircuit 29 forms a first radiating element, the antenna portion between subcircuit 29 and subcircuit 26 forms a second radiating element, and the antenna portion from the subcircuit 26 to the top of the antenna forms a third radiating element. The first radiating element radiates at the highest frequency $4f_L$, the combination of first and second radiating elements radiates at a second radiating frequency $2f_L$, and the combination of first, second, and third radiating elements radiates at a third radiating frequency f_L. Fig. 2 shows the length of the first radiating element to be 8/4 at $4f_L$. Thus, Fenwick shows the general structure of a three-frequency trap monopole antenna.

The differences between the subject matter of claim 9 and Fenwick are argued to be: (1) "said first radiating element having a length of less than a quarter wavelength at said selected resonant frequency"; and (2) "to radiate in a radiation pattern at said selected resonant frequency having an absolute gain in the vertical plane between about -3 dBi to about +4dBi over the elevation angle from about 10E to about 60E." We note that the radiation pattern of (2) must result from the "length of less than a quarter wavelength at said selected resonant frequency" limitation of (1). That is, the only structure recited to produce the radiation pattern is the length of the first radiating element. The radiation pattern cannot be due to unclaimed structure because the radiation pattern is a functional limitation and 35 U.S.C. § 112, sixth paragraph, requires that the only way to recite a function without specific structure in support thereof is with a mean-plus-function limitation.

As to (1), a quarter-wavelength antenna at a frequency f=406.025 MHz would have a length 8/4 = c/4f = $(3 \cdot 10^{10}$ cm/s)/4·$(406.025 \cdot 10^{6}$ cycles/s) = 18.47 cm. The length of the disclosed 406 MHz element 22 is 13.7 cm (specification, p. 5, lines 18-20) plus 0.5 cm for the insert (specification, p. 5, lines 28-30) plus 1.2 cm for the threaded retainer (specification, p. 6, lines 25-27), for a total length of 15.4 cm. Thus, the disclosed antenna is about 3 cm shorter than 8/4 at the highest frequency of 406 MHz.

The Examiner admits that "Fenwick makes no suggestion that the highest band radiator has to be less than a quarter wavelength of the design frequency of the first trap 20" (FR2). The Examiner relies on Dörrie.

Dörrie discloses an improvement to the known multi-band antenna of Fenwick such that it becomes broadband and can be used for four different frequency bands (col. 1, lines 21-40). The antenna has a first, straight wire section 14, a first coil 15 connected therewith, a second, straight wire section connected therewith, a second coil 17 connected therewith, and an adjoining third straight wire section 18 (col. 1, line 64 to col. 2, line 4). The length L1 of the first, straight wire section 14 is 81/4, where 81 is the mean operating frequency of the highest frequency band of, for example, 825 to 960 MHz (col. 2, lines 16-20). The first coil 15 is a trap circuit tuned to the mean operating wavelength 81 of the highest frequency band (col. 2, lines 21-24) and the second coil 17 is used for phase shifting and generates a phase shift of 135E at the mean operating wavelength 82 of the next-highest frequency band (col. 2, lines 30-32).

The Examiner relies on the teaching that the length L1 of the first, straight wire section 14 is 81/4, where 81 is the mean operating frequency of the highest frequency band of, for example, 825 to 960 MHz. The Examiner calculates the mean frequency to be 892.5 MHz. The Examiner reasons that if 895 MHz is the "selected resonant frequency," the antenna is less than a quarter of that wavelength, but the antenna can still radiate (FR3). Presumably, the Examiner intends to pick a frequency having a longer wavelength than 892.5 MHz, whose quarter wavelength is longer than the length of the radiating element; this requires a lower (not higher) frequency, such as 890 MHz. Appellants respond that the Examiner departs from the claim language and the "selected resonant frequency" of claim 9 is fixed by the parameters of the band rejection filter (the trap) (Br10). The Examiner persists in his interpretation that antenna element 22 in Fenwick or 14 in Dörrie "does exhibit a length less than the design frequency <u>when operating at a frequency higher [sic, lower] than the mean (design) frequency of the antenna which is used in the frequency band of operation</u>" (EA5).

We agree with Appellants that the Examiner's reasoning is inconsistent with the language of claim 9. Claim 9 defines that "said first band rejection filter resonates at a selected resonant frequency," so the selected resonant frequency is fixed by the trap. When the trap circuit of coil 15 in Dörrie is tuned to the mean operating wavelength 81 of the highest frequency band it resonates at "a selected resonant frequency" of 892.5 MHz. Claim 9 further recites "said first radiating element having a length of less than a quarter wavelength at said selected resonant frequency"; thus, the length of the first radiating element is 81/4. There is a physical relationship between the resonant frequency of the trap and the length of the first radiating element. The Examiner errs in interpreting a "selected resonant frequency" to refer to something different than the resonant frequency of coil 15, i.e., to an arbitrary frequency in the band not equal to the resonant frequency of coil 15.

The Examiner further reasons that a length of less than a quarter wavelength could happen naturally in a sample of radiators as a result of tolerances (FR3-4). Appellants respond that this does not address the claimed radiation pattern of limitation (2) (Br11). Appellants further argue that "less than a quarter wavelength" implies a sufficient departure from a quarter wavelength to be outside a typical tolerance range of a quarter wavelength design (RBr4).

"In order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method." Motorola, Inc. v. Interdigital Tech. Corp., 121 F.3d 1461, 1471, 43 USPQ2d 1481, 1489 (Fed. Cir. 1997). The fact that some antennas may happen to have a length less than an exact quarter wavelength due to manufacturing tolerances does not teach one of ordinary skill in the art to make the claimed invention of less than a quarter wavelength and does not render such limitation obvious. There must be something that would teach one of ordinary skill to make the length less than a quarter wavelength. We agree with Appellants that "less than a quarter wavelength" requires the length to be outside a typical tolerance range for a quarter wavelength design.

As to limitation (2), Appellants argue that the radiation pattern is a direct result of the length of the first radiating element being less than a quarter wavelength at the selected resonant frequency and is not disclosed by the combination of Fenwick and Dörrie (Br11). The Examiner states (EA4): "The specific (power) gain range in the vertical plane and elevation angle range are not features but merely the results of a particular radiating antenna structure when operated at a specific frequency." The Examiner further states (EA6):

> These specific "limitations" are deemed to result, given the exact same structure set forth in the references of record. No unexpected results are obtained by Appellant because the electrical design is substantially the same as the prior art of record. . . . [T]hese "characteristics" are merely ranges obtained in the antennas of Fenwick and Dorrie et al when the antenna operates . . . on a higher [sic, lower] frequency of operation in the specified frequency band of operation." [Emphasis added.]

Thus, it appears to be the Examiner's position that the structures in Fenwick and Dörrie are the same as the claimed structure and that the claimed radiation pattern will inherently result when the antenna is operated at a certain frequency.

Appellants respond that the antenna of Fenwick and Dörrie does not have the same structure because the physical length of first radiating element is less than a quarter of the wavelength of the selected resonant frequency of the first band rejection filter and radiates in a defined radiation pattern at the selected resonant frequency (RBr2-3). Appellants note that if the Examiner's hypothetical antenna were to radiate at a lower frequency, where the effective antenna length is less than a quarter wavelength at that lower frequency, "then it would not be radiating at the selected resonant frequency where the band rejection filter is designed to resonate, as recited in the claims" (emphasis omitted) (RBr3).

We agree with Appellants. A particular physical structure is defined by the first band rejection filter resonating at a selected resonant frequency and by the physical length of first radiating element being less than a quarter of the wavelength of the selected resonant frequency. This is not taught or suggested by Fenwick or Dörrie. Claim 9 also recites that the radiation pattern is at the selected resonant frequency, not some other frequency in the band as hypothesized by the Examiner. The Examiner's hypothetical example of a way the antenna could be operated so as to meet the claim limitations is inconsistent with the express claim limitations. The claimed radiation pattern is evidently set by legislation, but the Examiner has presented no evidence that one skilled in the art would have been motivated to utilize a radiating monopole element of less than a quarter wavelength to achieve the claimed radiation pattern.

Appellants have submitted a declaration by co-inventor Carl F. Weissner under 37 CFR § 1.132 (Paper No. 24). The Examiner finds the declaration insufficient for several reasons (EA6-7). We disagree with the Examiner and briefly point out what we find persuasive about the declaration. First, the ELT specification requires a radiation pattern having an absolute gain in the vertical plane between -3 dBi and +4 dBi over an elevation angle from about 10E to 60E (para. 4), but Mr. Weissner states that "[n]othing in this legislative requirement dictates the specific length of the antenna elements in relation to its radiation frequency" (para. 5).[2] Thus, Appellants are not trying to claim a length

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[2] The specification, as filed, stated (p. 4, lines 29-31): "The radiation efficiency and radiation pattern at 406 MHz required by legislation dictates an antenna slightly shorter than one quarter wave length at 406 MHz" (emphasis added). This implies that persons of ordinary skill in the antenna art would have known that it was necessary to provide an antenna slightly shorter than a quarter wavelength in order to achieve the radiation efficiency and radiation pattern in the legislation, which is specified in the claims; i.e., the radiation efficiency and radiation pattern required by the legislation necessarily imposes a certain length of less than a quarter wavelength even though no specific dimension is expressly stated in the legislation standard. If so, this would provide the motivation to modify Fenwick. However, the word "dictates" has been changed by amendment to be "is obtained by," which does not carry the same meaning. We do not question the amendment.

required in a technical standard. Second, a 8/4 monopole as taught by Fenwick does not inherently have the claimed radiation pattern (paras. 6 & 7), while a monopole in accordance with the invention does have the claimed pattern (para. 8). Third, not every "short monopole" (length less than 8/4) necessarily meets the claimed radiation pattern (para. 9). Thus, the length of the radiating element must be selected to provide the claimed radiation pattern.

For the reasons above, we conclude that the Examiner has failed to establish a prima facie case of obviousness as to independent claim 9. The rejection of claims 9, 11-14, 17-20, and 25-29 is reversed. Dell-Imagine does not cure the deficiencies of Fenwick and Dörrie with respect to claim 9 and, consequently, the rejection of claim 23 is reversed. Independent claims 15 and 30 contain length and radiation pattern limitations similar to those in claim 9, which are also missing from the combination of Fenwick and Dörrie. Therefore, the rejection of claims 15, 16, and 30 is reversed.

CONCLUSION

The rejections of claims 9, 11-20, 23, and 25-30 are reversed.

REVERSED

ERROL A. KRASS Administrative Patent Judge	)	
JERRY SMITH Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
LEE E. BARRETT Administrative Patent Judge	)	

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