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SHAY GLENN LLP 2755 CAMPUS DRIVE SUITE 210 SAN MATEO, CA 94403			AKAR, SERKAN	
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* CHARLES A. CAIN, TIMOTHY L. HALL,  
WILLIAM W. ROBERTS, ZHEN XU, J. BRIAN FOWLKES, and  
THOMAS W. DAVISON

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Appeal 2015-004979  
Application 12/868,775  
Technology Center 3700

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Before LYNNE H. BROWNE, JEREMY M. PLENZLER, and  
JEFFREY A. STEPHENS, *Administrative Patent Judges*.

STEPHENS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants<sup>1</sup> seek our review under 35 U.S.C. § 134(a) from the Examiner's Final Office Action ("Final Act.") rejecting claims 17–28. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

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<sup>1</sup> The real parties in interest are identified as (1) The Regents of the University of Michigan and (2) Histosonics Inc. App. Br. 2.

*Claimed Subject Matter*

Claims 17 and 24 are independent. Claim 17, reproduced below, illustrates the claimed subject matter.

17. A method of treating urinary stones, comprising:

applying Histotripsy therapy by transmitting Histotripsy ultrasound pulses having a pulse repetition frequency between 100 Hz and 1,000 Hz to generate a bubble cloud;

positioning the bubble cloud on a urinary stone;

applying Lithotripsy therapy by transmitting a Lithotripsy ultrasound pulse having a pulse repetition frequency less than or equal to 2 Hz to generate a shock wave to fractionate the urinary stone into macroscopic urinary stone particles; and

applying the Histotripsy therapy to the macroscopic urinary stone particles to erode the macroscopic urinary stone particles.

*Rejections*

I. Claims 17, 18, 21, 22, and 24–28 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Zhong et al. (US 2005/0038361 A1, pub. Feb. 17, 2005) (“Zhong”) and Cain et al. (WO 2007/038160 A2, pub. Apr. 5, 2007) (“Cain ’160”). Final Act. 3–6.

II. Claims 19 and 23 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Zhong, Cain ’160, and Cain et al. (US 2007/0083120 A1, pub. Apr. 12, 2007) (“Cain ’120”). Final Act. 6–8.

III. Claim 20 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Zhong, Cain ’160, and Eizenhofer (US 2003/0199857 A1, pub. Oct. 23, 2003). Final Act. 8–9.

## DISCUSSION

### *Rejection I*

The Examiner finds Zhong teaches two sets of shock waves to generate a bubble cloud, maintain the cloud, then suppress the cloud in order to fragment urinary stones. Ans. 4. The Examiner acknowledges Zhong does not teach the specific pulse repetition frequencies recited in claim 17, but finds Cain '160 teaches these limitations. Ans. 5–6; Final Act. 4–5.

Appellants argue Zhong teaches transmitting a pair of pulses with a specific set of peak pressure parameters separated by a specific time delay, but makes no mention of adjusting the pulse repetition frequency (“PRF”). App. Br. 5. Appellants further state that Cain '160 “does not disclose transmitting Histotripsy ultrasound pulses having a pulse repetition frequency between 100 Hz and 1,000 Hz and transmitting a Lithotripsy ultrasound pulse having a pulse repetition frequency less than or equal to 2 Hz.” *Id.* at 5–6. Appellants also contend the Examiner fails to provide a rational basis for combining Zhong and Cain '160, and that “a skilled artisan would not be motivated by Zhong to adjust a PRF value between subsequent pulses, because the entire Zhong disclosure is directed towards transmitting a pair of Lithotripsy pulses with a specific set of peak pressure parameters separated by a specific time delay between the pulses.” *Id.* at 6.

In response to the Examiner’s position that the claim does not recite “adjusting” the PRF, Ans. 7, Appellants state the argument “was intended to highlight that the method steps of transmitting ultrasound pulses having a PRF between 100 Hz and 1,000 Hz, followed by transmitting ultrasound pulses having a PRF less than or equal to 2 Hz, are not found in the Zhong disclosure,” Reply Br. 3. Appellants further argue “Cain provides no

disclosure for the specific combination of pulses, PRF values, and application of therapies to urinary stones as required by claims 17 and 24.”  
*Id.* at 4.

Claim 17 requires a specific order of pulses within a specific range of pulse repetition frequencies. The claim recites positioning “the bubble cloud” generated with Histotripsy pulses (having a PRF between 100 Hz and 1,000 Hz) on “a urinary stone,” and applying Lithotripsy therapy (pulses having a PRF less than or equal to 2 Hz) “to fractionate the urinary stone into macroscopic urinary stone particles.” Thus, the bubble cloud must be generated by the Histotripsy pulses prior to the stone being fractionated by the Lithotripsy pulses. The claim then recites that the “macroscopic urinary stone particles” are eroded using the Histotripsy therapy, which must necessarily follow the Lithotripsy therapy that creates the macroscopic urinary stone particles. Thus, claim 17 requires the claimed PRF for Histotripsy therapy to be used first, followed by the claimed PRF for Lithotripsy therapy, followed by additional Histotripsy pulses with the claimed PRF.

Claim 24 recites delivering: (1) a first Lithotripsy pulse, (2) a sequence of Histotripsy pulses having a pulse repetition frequency between 100 Hz and 1,000 Hz “after the first Lithotripsy pulse,” and (3) a second Lithotripsy pulse “after the sequence of Histotripsy pulses.” The claim specifies that “the first and second Lithotripsy pulses are separated in time by a pulse repetition frequency less than or equal to 2 Hz.”

We agree with Appellants’ argument (*see* App. Br. 6; Reply Br. 4) that the Examiner has not provided sufficient findings and reasoning for modifying Zhong to use the specific frequencies in the order required by

claims 17 and 24. The Examiner states that “having the PRF of 500Hz and 1Hz would provide more effective methods and techniques for pulsed cavitation ultrasound therapies and would also enable beneficial noninvasive alternatives to many present methods in the surgical field,” citing Cain ’160, paragraph 12. Final Act. 6. One of ordinary skill in the art may have reason to apply multiple therapies to obtain the benefits of both. The Examiner’s reasoning, however, does not explain why one of ordinary skill in the art would have: (1) applied pulses with the Histotripsy PRF, followed by pulses with the Lithotripsy PRF, followed again by pulses with the Histotripsy PRF, as claimed in claim 17, or (2) delivered a sequence of pulses at the Histotripsy PRF between two pulses separated in time by the Lithotripsy PRF as claimed in claim 24. Because the Examiner’s reasoning for combining Zhong and Cain ’160 does not account for this particular order of steps, we do not sustain the Examiner’s rejection of independent claims 17 and 24 as obvious over Zhong and Cain ’160. We also do not sustain the rejections of dependent claims 18, 21, 22, and 25–28, rejected on the same basis.

### *Rejections II–III*

Rejections II–III rely on the same unsupported findings as the rejection of claims 17 and 24 discussed *supra*. Accordingly, we do not sustain the Examiner’s decision rejecting claims 19, 20, and 23, as set forth in Rejections II–III, for the same reasons we do not sustain the Examiner’s decision rejecting claims 17 and 24.

Appeal 2015-004979  
Application 12/868,775

DECISION

We reverse the Examiner's rejection of claims 17–28.

REVERSED