

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
3 January 2002 (03.01.2002)

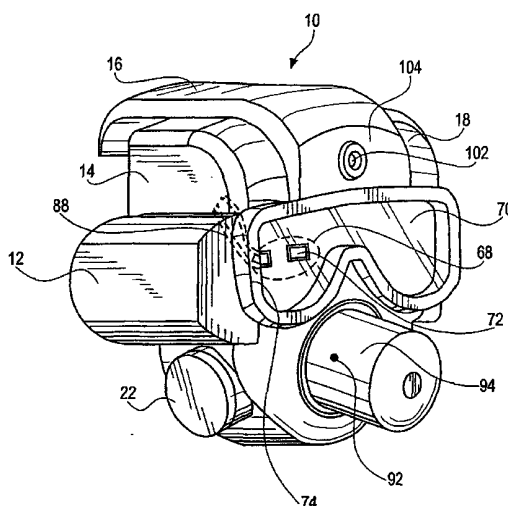
PCT

(10) International Publication Number
WO 02/00299 A3

- (51) International Patent Classification⁷: **G09G 5/00**, G03H 1/00, G02B 27/14
- (21) International Application Number: PCT/US01/20064
- (22) International Filing Date: 22 June 2001 (22.06.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/213,824 23 June 2000 (23.06.2000) US
- (71) Applicant (for all designated States except US): **COM-SONICS, INC.** [US/US]; 1350 Port Republic Road, Harrisonburg, VA 22801 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **ESTEP, Randall, S.** [US/US]; 1170 Portland Drive, Harrisonburg, VA 22801 (US).
- (74) Agents: **COHEN, Eric, D.** et al.; Welsh & Katz, Ltd., 22nd Floor, 120 South Riverside Plaza, Chicago, IL 60606 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Declaration under Rule 4.17:**
— as to the identity of the inventor (Rule 4.17(i)) for the following designation US
- Published:**
— with international search report

[Continued on next page]

(54) Title: DIVING MASK WITH EMBEDDED COMPUTER SYSTEM



(57) **Abstract:** An underwater diving mask (10) for use by a diver in an underwater diving environment has a viewing portion defined by the diver's face and a lens, a visual display device (68) proximate the viewing portion to provide visual images to the diver, a speaking chamber (94) configured to sealingly engage a portion of the diver's mouth to permit the diver to speak, and a sound transducer (92) located proximal the speaking chamber (94). A computer system (16) is disposed in a portion of the mask and is operatively coupled to the sound transducer (92) and to the visual display device (68), where the computer system (16), the viewing portion and the speaking chamber (94) are sealingly isolated from the underwater diving environment. The computer system (16) receives electrical signals produced by the sound transducer (92) and is configured to recognize and identify the electrical signals as spoken words of the diver, such that the identified spoken words provide input to the computer (16) to direct the computer system (16) to provide visual images to the visual display (68) in response thereto, to facilitate hands-free operation of the diver.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

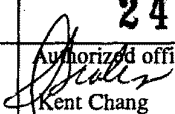
(88) Date of publication of the international search report:

4 April 2002

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/20064

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : G09G 5/00; G03H 1/00; G02B 27/14 US CL : 345/8; 359/13, 630 According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 345/8; 359/13, 630 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	US 5,598,297 (YAMANAKA et al) 28 January 1997, see entire document.	1-18		
A,P	US 6,084,556 A (ZWERN) 04 July 2000, see entire document.	1-18		
A	US 5,844,824 A (NEWMAN et al) 01 December 1998, see entire document.	1-18		
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.				
<table border="0"> <tr> <td> * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family			
Date of the actual completion of the international search 25 September 2001 (25.09.2001)		Date of mailing of the international search report 24 JAN 2002		
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230		Authorized officer  Kent Chang Telephone No. 703-305-9700		