US006282206B1

(12) **United States Patent**
Hindus et al.

(10) **Patent No.: US 6,282,206 B1**
(45) **Date of Patent: Aug. 28, 2001**

(54) **VARIABLE BANDWIDTH COMMUNICATION SYSTEMS AND METHODS**

(75) Inventors: **Debby Hindus**; **Scott Mainwaring**, both of San Francisco; **Elin Pedersen**, Redwood City; **Sean Michael White**, San Francisco, all of CA (US); **William Gaver**, London (GB)

(73) Assignee: **Interval Research Corporation**, Palo Alto, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/169,713**

(22) Filed: **Oct. 9, 1998**

Related U.S. Application Data

(60) Provisional application No. 60/103,814, filed on Oct. 8, 1998, and provisional application No. 60/062,144, filed on Oct. 9, 1997.

(51) **Int. Cl.**[7] **H04J 3/16**; H04J 3/22

(52) **U.S. Cl.** **370/468**

(58) **Field of Search** 370/468, 465, 370/276, 278, 280, 281, 294, 295; 375/222

(56) **References Cited**

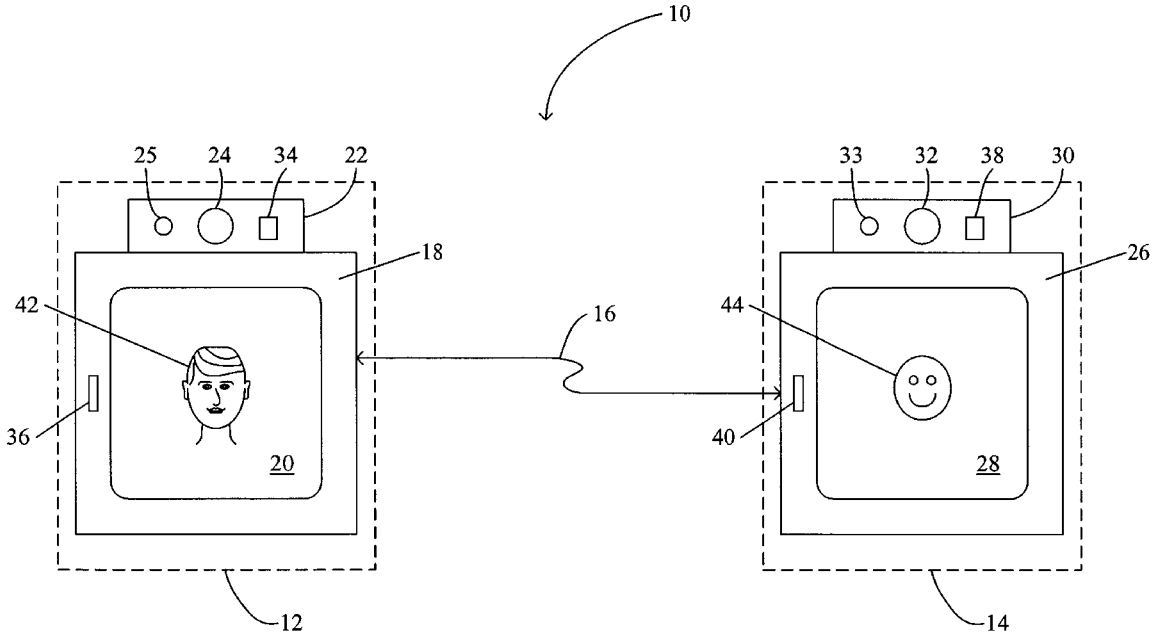
U.S. PATENT DOCUMENTS

4,780,883 * 10/1988 O'Connor 375/222
4,882,726 * 11/1989 Lang et al. 375/222
4,893,305 * 1/1990 Fernandez et al. 370/222
5,231,649 * 7/1993 Duncanson 375/222
5,790,138 * 8/1998 Hsu 345/512
5,812,430 * 9/1998 Altschuler et al. 364/572

* cited by examiner

Primary Examiner—Ajit Patel
(74) *Attorney, Agent, or Firm*—Oppenheimer Wolff & Donnelly, LLP

(57) **ABSTRACT**

A variable bandwidth communication system includes a first communication station and a second communication station coupled to the first communication station for continuous, by directional communication. The first communication station is capable of transmitting at a first bandwidth and a second bandwidth greater than the first bandwidth, and is capable of receiving at a third bandwidth and a fourth bandwidth greater than the third bandwidth. The transmitting bandwidth of the first communication station is selectable by first user. The second communication station is capable of receiving at the first bandwidth and at the second bandwidth and is capable at transmitting at the third bandwidth and the fourth bandwidth. Again, the transmitting bandwidth of the second communication station is selectable by the second user. Preferably, but not necessarily, the first bandwidth and the third bandwidth are about the same, and the second bandwidth and the fourth bandwidth are about the same. The first communication system is capable of displaying communication received at the fourth bandwidth at a first lower bandwidth display level, and the second communication system is capable of displaying communications received at the second bandwidth at a second lower bandwidth display level. In this fashion, two or more users can interact at a variety of threshold levels dependent upon the user's desires for privacy and/or high bandwidth communications.

22 Claims, 9 Drawing Sheets