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(12) **United States Patent**  
**Ghassabian**

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- (54) **INTEGRATED KEYPAD SYSTEM**
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- (\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 232 days.
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§ 371 (c)(1),  
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PCT Pub. Date: **May 3, 2001**

(58) **Field of Classification Search** ..... 341/22, 341/23; 345/168, 169, 173, 175; 704/270-278  
See application file for complete search history.

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(74) *Attorney, Agent, or Firm*—Sofer & Haroun, LLP

**Related U.S. Application Data**

- (60) Provisional application No. 60/220,578, filed on Jul. 25, 2000, provisional application No. 60/208,619, filed on Jun. 1, 2000, provisional application No. 60/194,767, filed on Apr. 3, 2000, provisional application No. 60/169,149, filed on Dec. 6, 1999, provisional application No. 60/164,597, filed on Nov. 10, 1999, provisional application No. 60/164,656, filed on Nov. 4, 1999, provisional application No. 60/163,996, filed on Oct. 27, 1999.

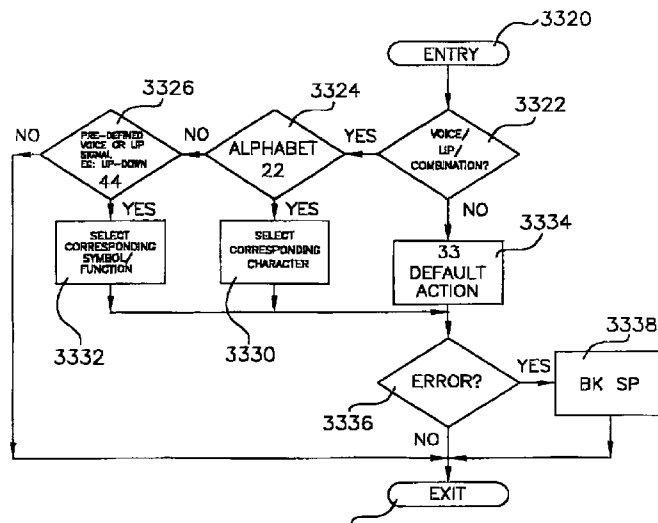
- (51) **Int. Cl.**  
**H03M 11/04** (2006.01)
- (52) **U.S. Cl.** ..... **379/368; 341/22; 341/23; 345/168; 345/169; 345/173; 345/175**

(57) **ABSTRACT**

A data entry system comprising a group of data symbols comprising at least one of alphabetical symbols, numeric symbols, and commands (128-136), divided into subgroups. Each subgroup is associated with at least a portion of the user's finger (102-120). The system also comprises a keypad (126) defining a plurality of keys, wherein each key contains at least one of the symbols. At least one finger recognition system (100) is configured to recognize the portion of the finger when it touches a key, and to select the subgroup symbols associated with that portion of the finger interacting with that key.

**80 Claims, 34 Drawing Sheets**

**ALPHA PROCEDURE**



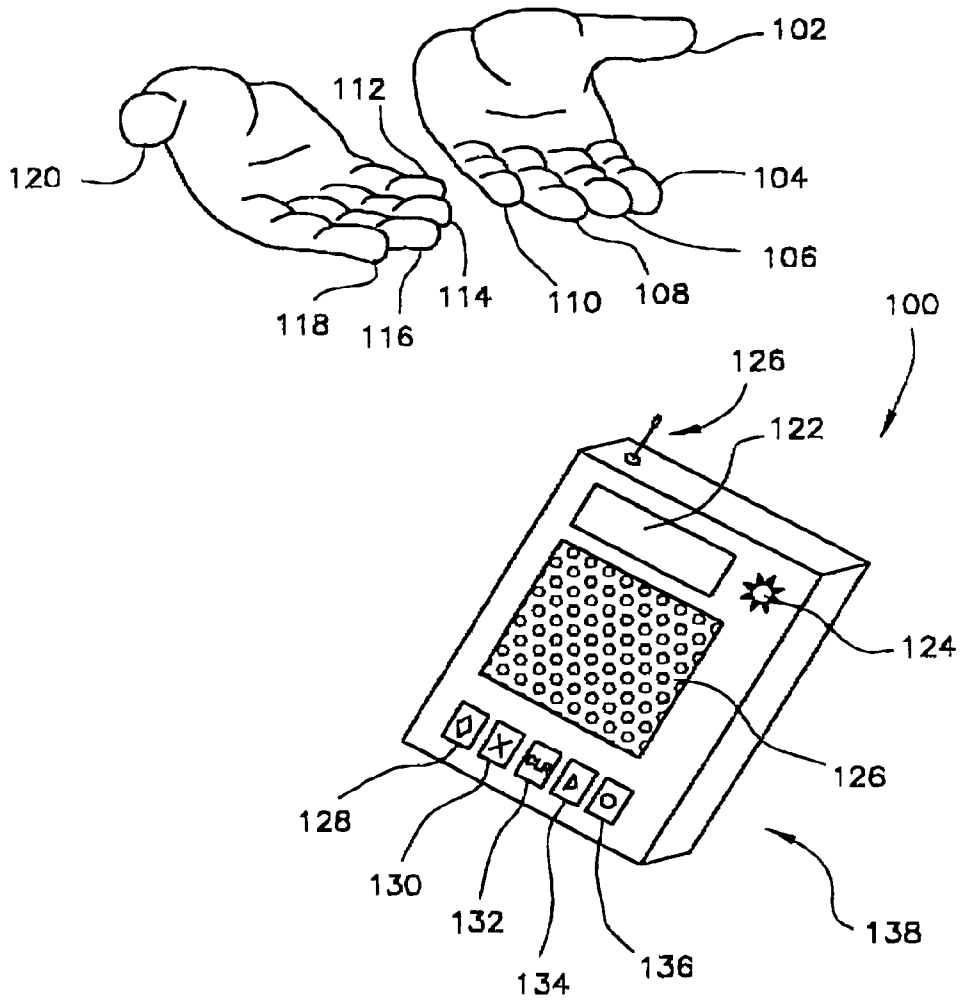


FIG. 1

200

212

204

206

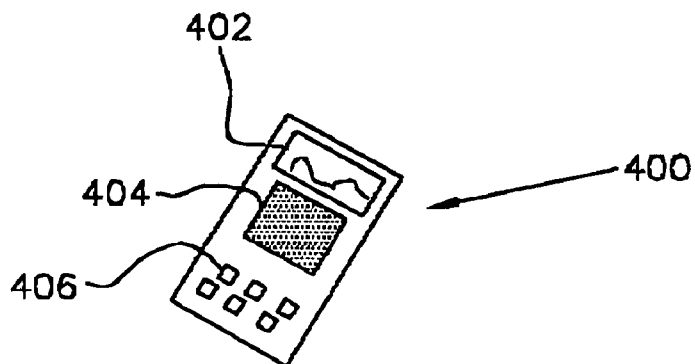
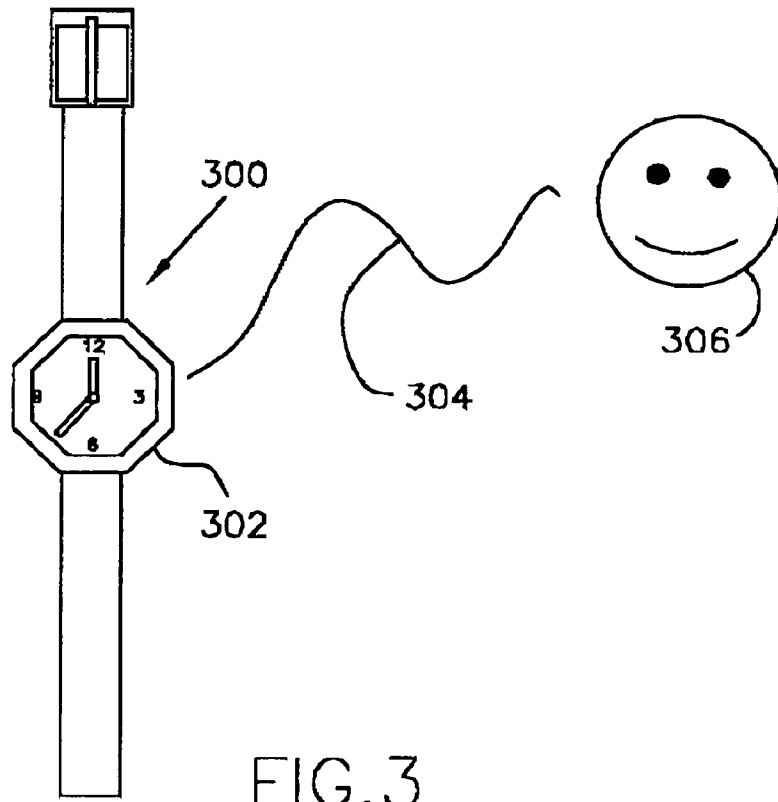
208

210

202

FINGERPRINT INDEX	SINGLE TAP	DOUBLE TAP	HOLD IN PLACE	GLIDE	ETC...
47913220-01	NUMBER → 0	NUMBER → 6	FUNCTION 1	FUNCTION 11	
47913220-03	NUMBER → 2	NUMBER → 7	FUNCTION 3	FUNCTION 13	
47913220-09	LETTER → I	LETTER → S	SYMBOL → #	FUNCTION CAPS	
527212208	ACTIVITY X	...			
	...				

FIG.2



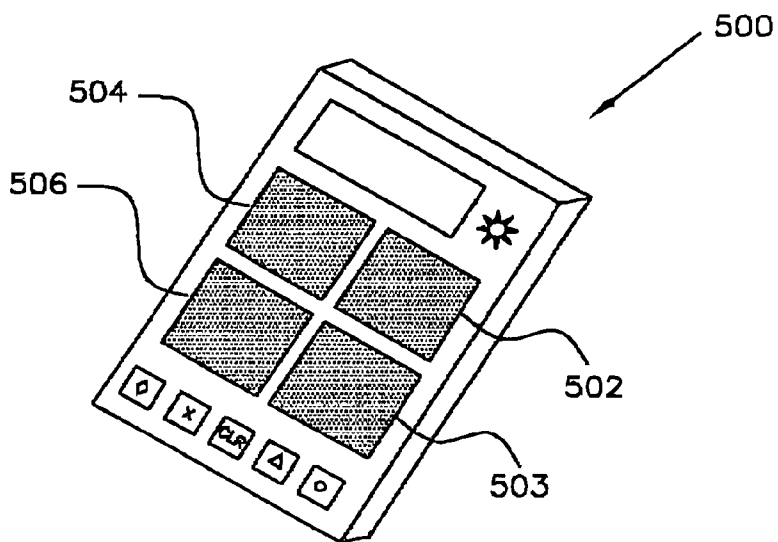


FIG. 5

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