



Glance-Only Outdoor Privacy Interface

Outdoor display architecture for home vaults that communicates delivery status, urgency, and sender category while firmware-enforcing prohib...

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Abstract

Outdoor display architecture for home vaults that communicates delivery status, urgency, and sender category while firmware-enforcing prohibition against document bodies, titles, amounts, or account numbers on exterior surfaces.

Field of Invention

Privacy-preserving human-machine interfaces for secure delivery devices.

Background of the Invention

Smart mailbox patents describe outdoor cameras and OCR of mail pieces — exposing medical, financial, and legal information to passersby. Window envelopes perform the same failure in paper form.

Residents need to know that mail arrived and whether it is urgent without advertising account details to the street.

Summary of the Invention

A content-free status layer receives ENUM fields only: SENDER_CLASS, COUNT, URGENCY_LEVEL, GLYPH_ID. A separate encrypted vault compartment holds ciphertext inaccessible to the display controller bus. Urgency uses border patterns and icons — not descriptive text.

Brief Description of Drawings

- 1. Glance-only display allowed vs blocked fields
- 2. System with separated display bus

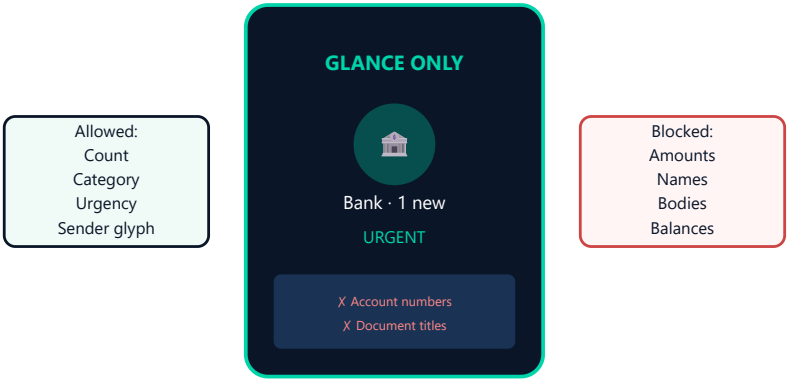


Fig. 1 — Glance-only outdoor UI — metadata without document content

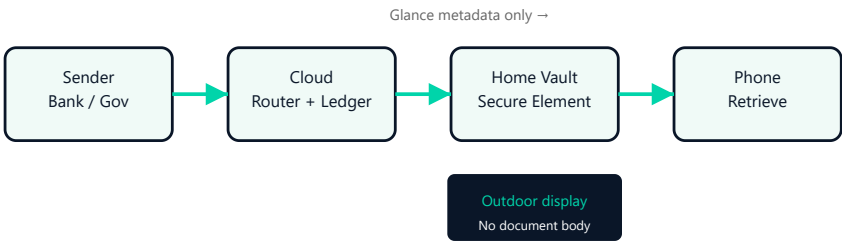


Fig. 2 — eMbox system architecture — sender to household retrieve

Detailed Description of Embodiments

Firmware-enforced separation

Display MCU has no DMA path to vault decryption keys. IPC channel carries max 32-byte status structs. Violation attempts log tamper events.

Urgency without content

URGENCY_LEVEL 0–3 maps to border color pulse patterns and icon set (clock, alert triangle) — never "IRS audit" or "summons" strings outdoors.

Phone-first retrieve

Outdoor UI includes retrieve affordance (LED/NFC icon) directing user to phone; full render occurs only on paired device after handshake.

Advantages

- Neighborhood privacy for sensitive recipients
- HIPAA-aligned outdoor layer for healthcare mail
- Differentiation from camera-based smart mailboxes

Independent Claims (Representative)

1. An outdoor display controller for a secure delivery vault configured to render only sender category, item count, urgency encoding, and a certificate-derived glyph, and firmware-prohibited from rendering document bodies, financial amounts, account identifiers, or document titles.
2. A method comprising: decrypting document content only on a user device after retrieve; and supplying to an outdoor display a metadata structure of fewer than a fixed byte size excluding human-readable document fields.

Dependent Claims (Representative)

3. The controller of claim 1, wherein urgency is encoded as non-textual border patterns.
4. The method of claim 2, wherein the outdoor display microcontroller lacks access to vault decryption keys.

Related Innovations

This family relates to eMbox platform components documented in the Solution Architecture and Engineering briefs. Cross-reference patent families in the Portfolio Overview document.