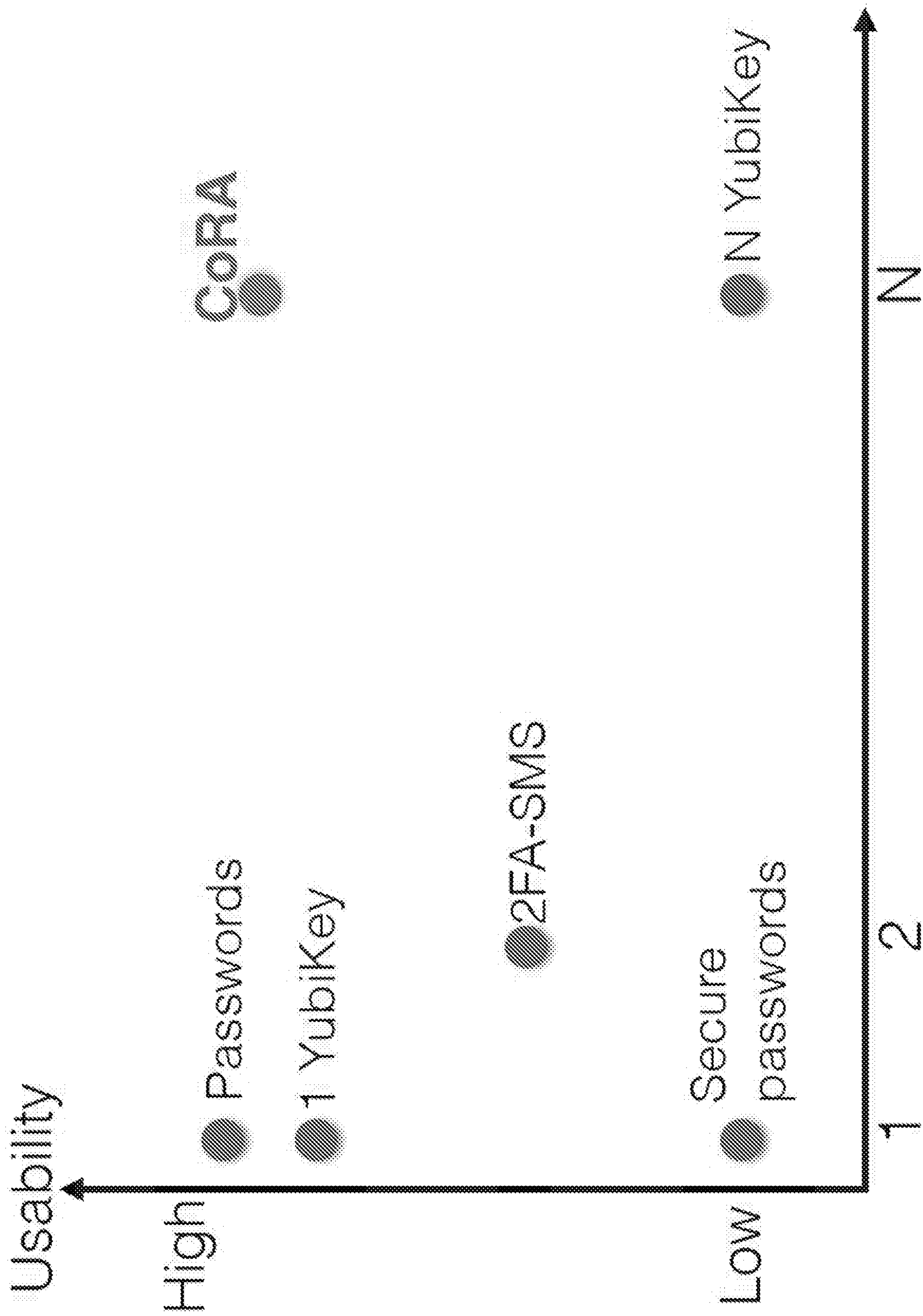




Number of factors

FIG. 1

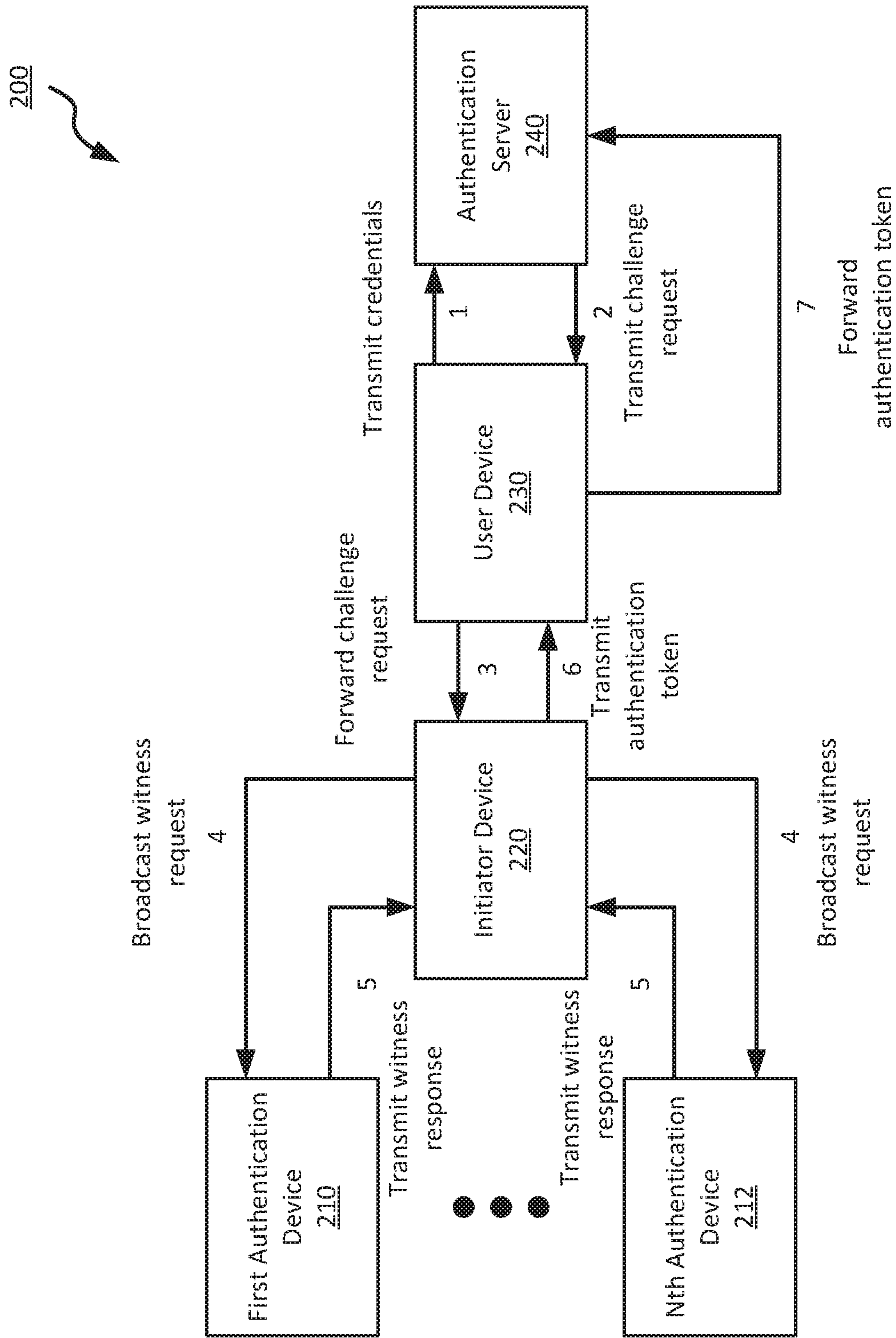


FIG. 2

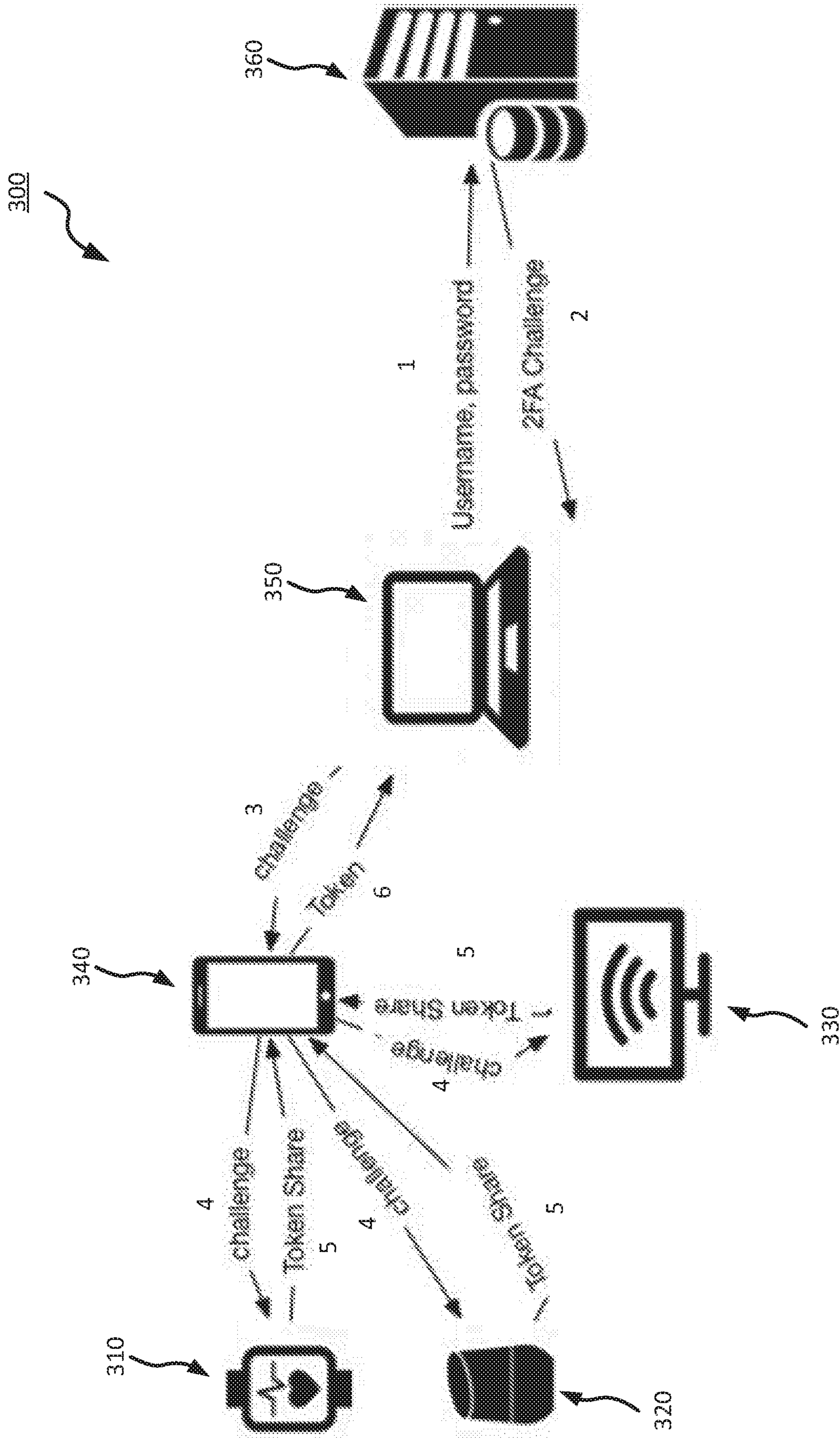


FIG. 3

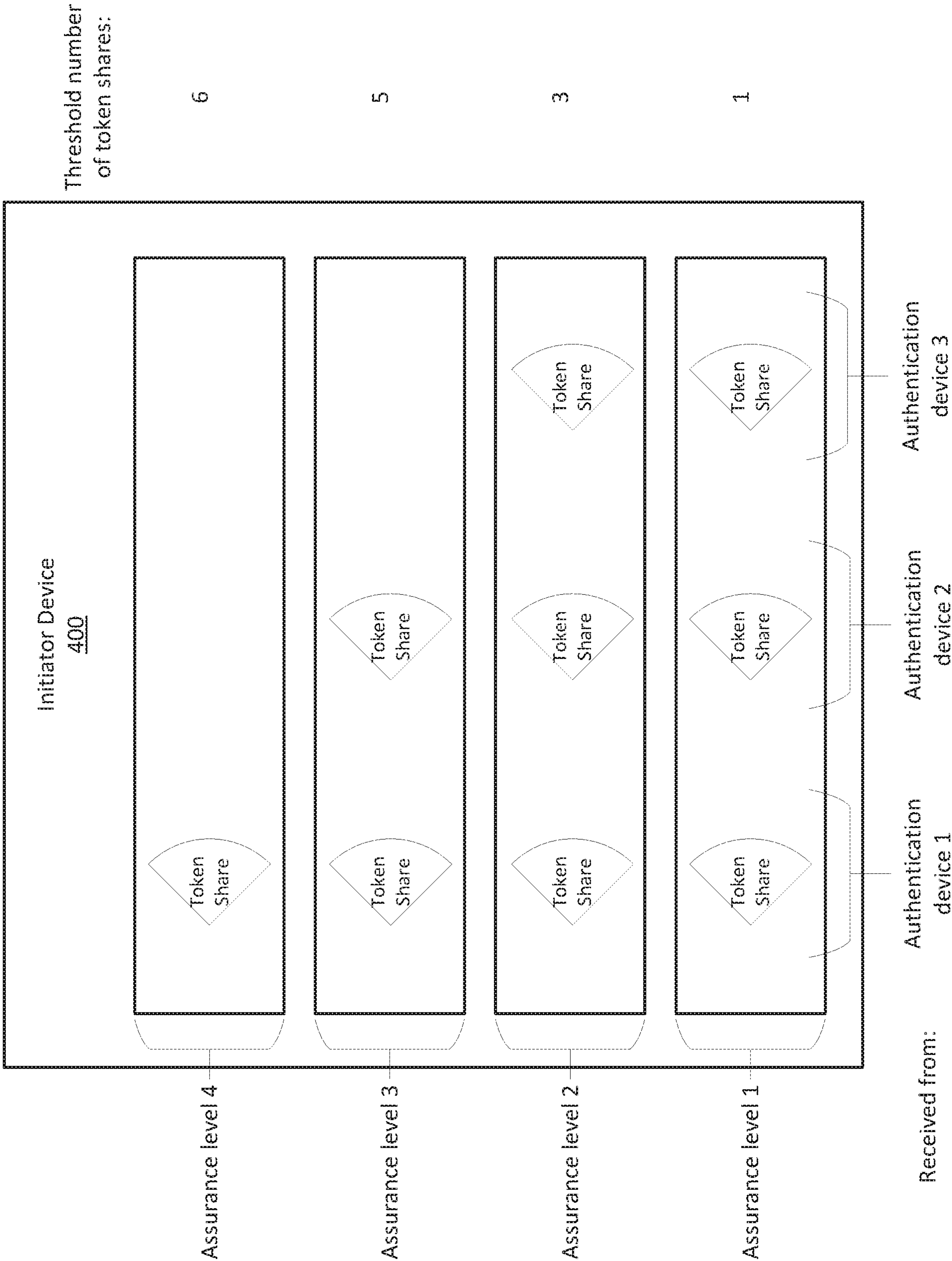
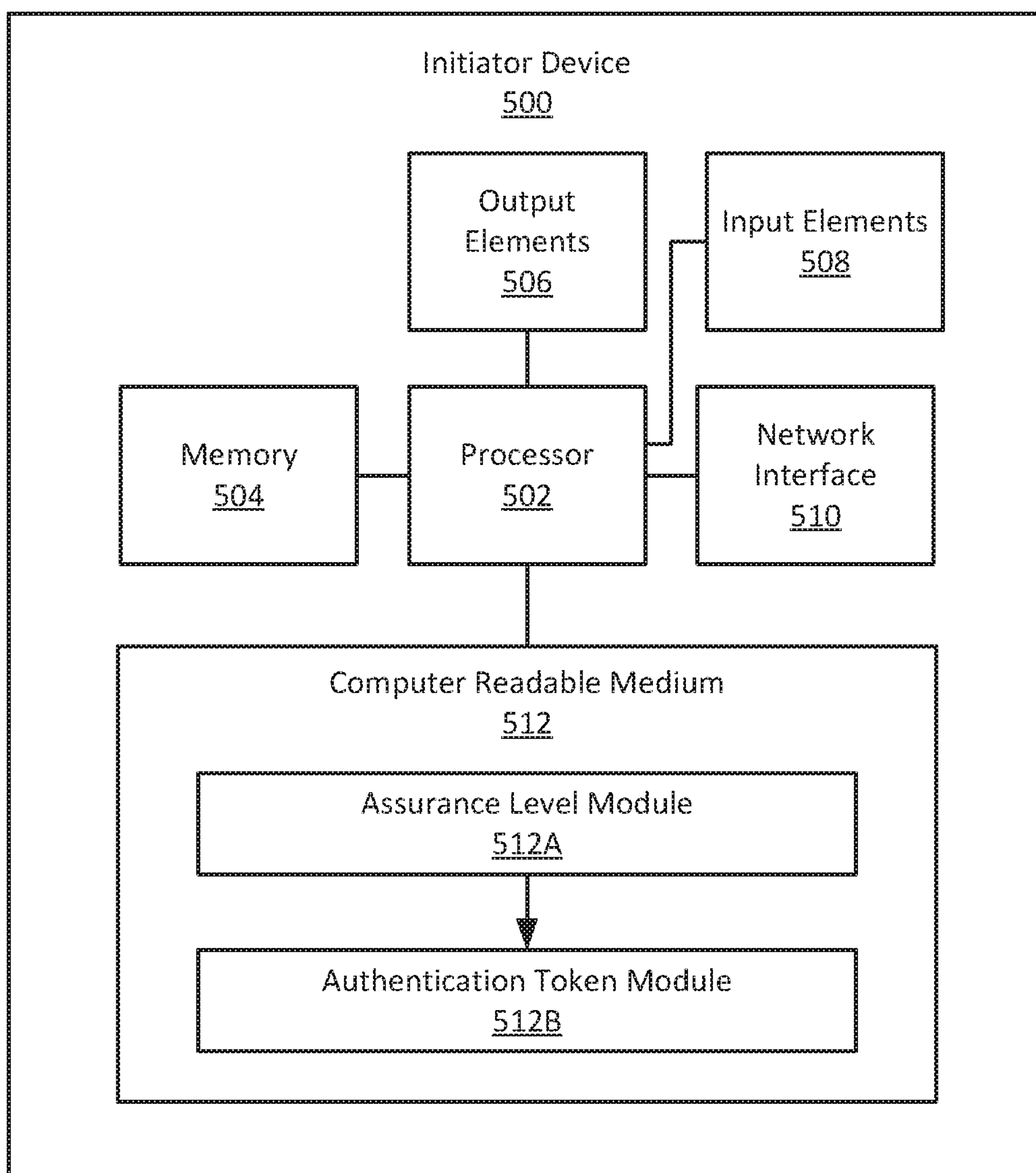


FIG. 4

**FIG. 5**

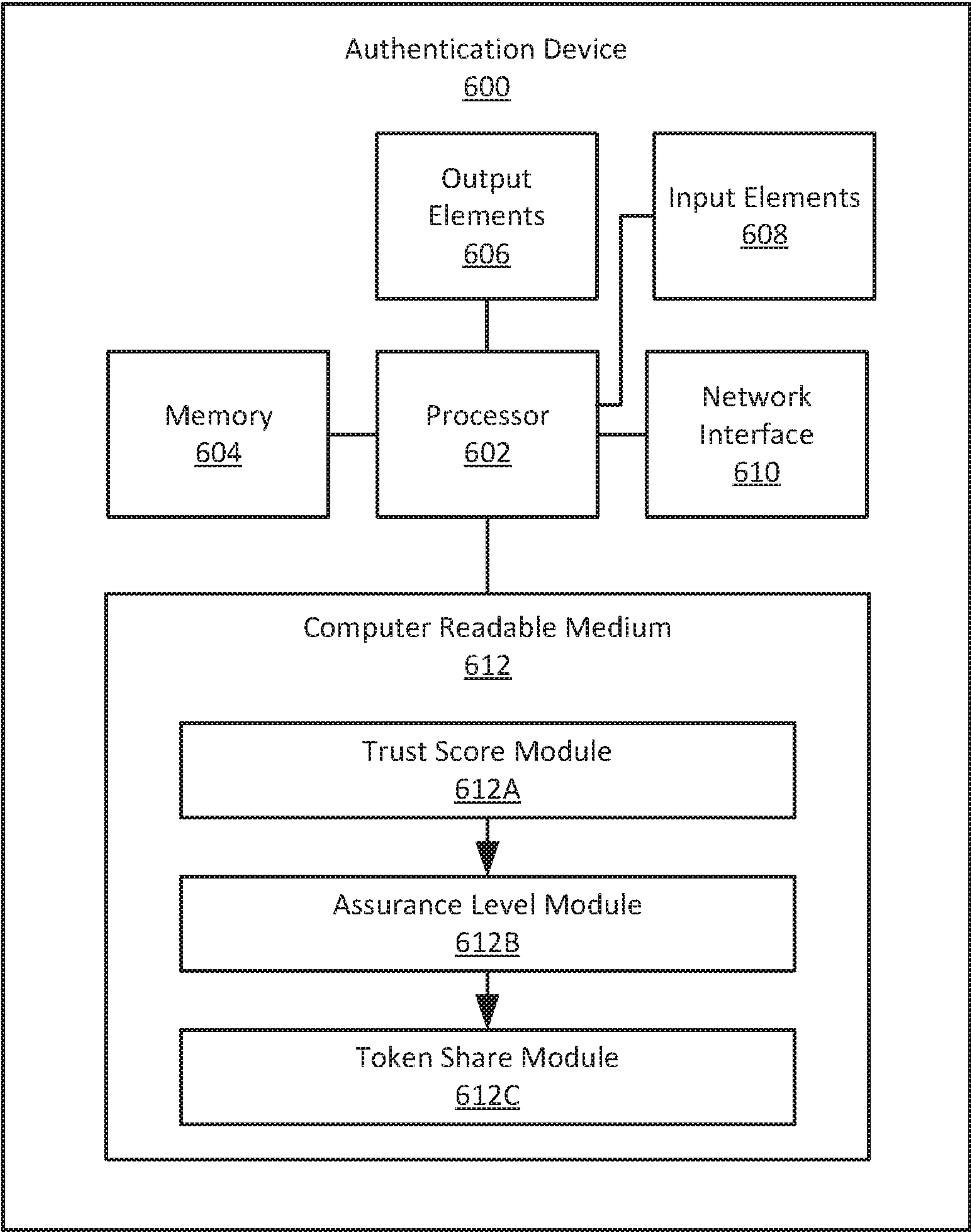


FIG. 6

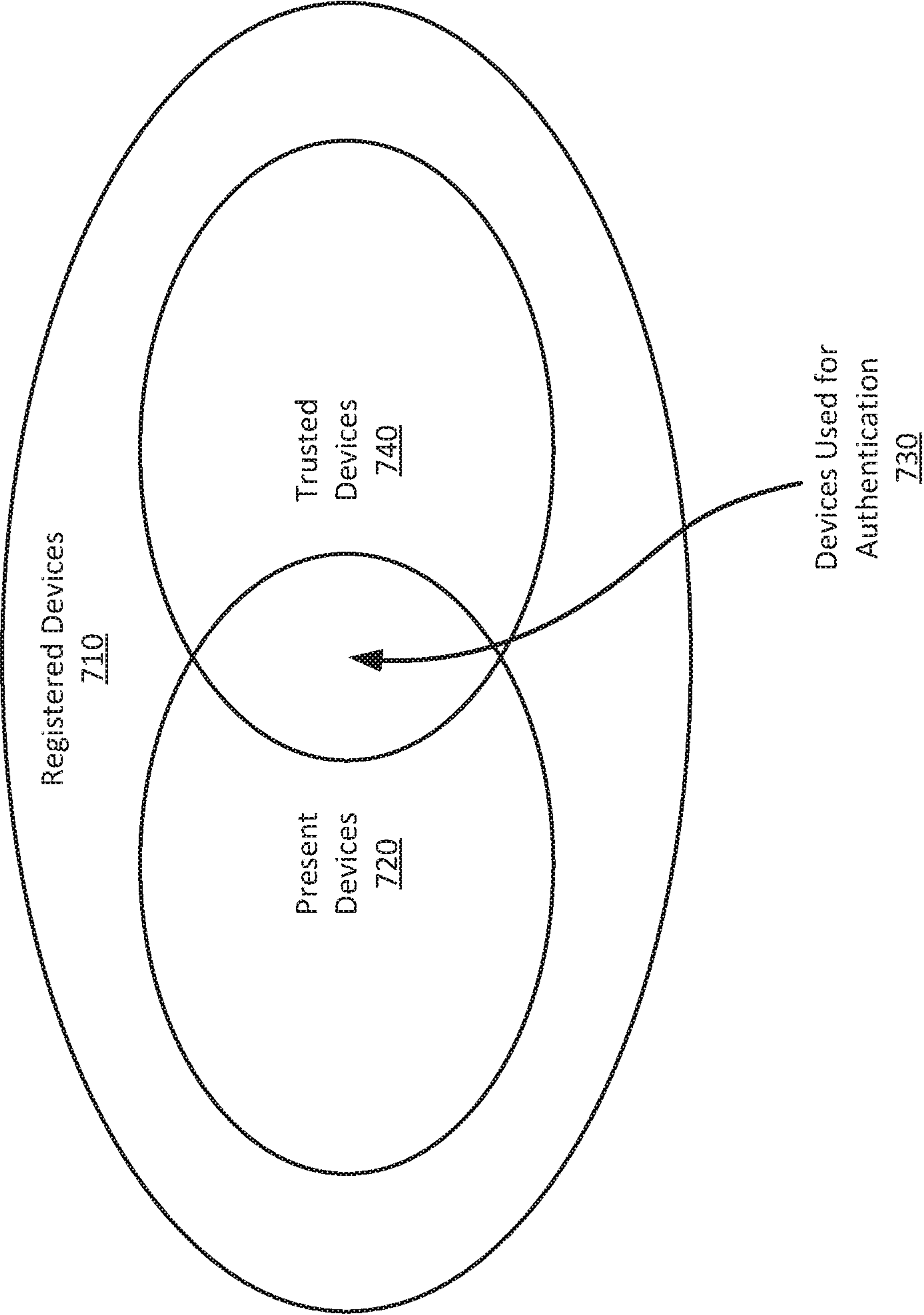


FIG. 7

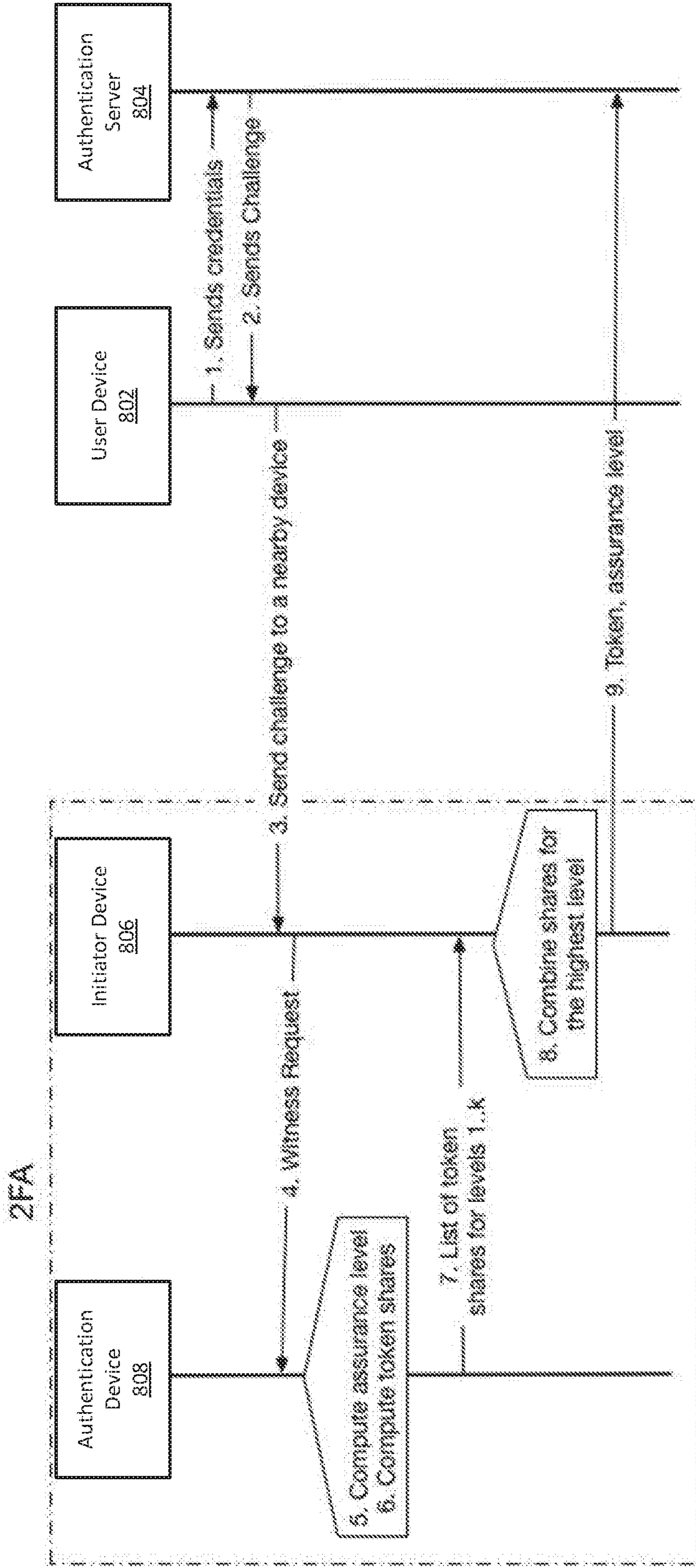


FIG. 8

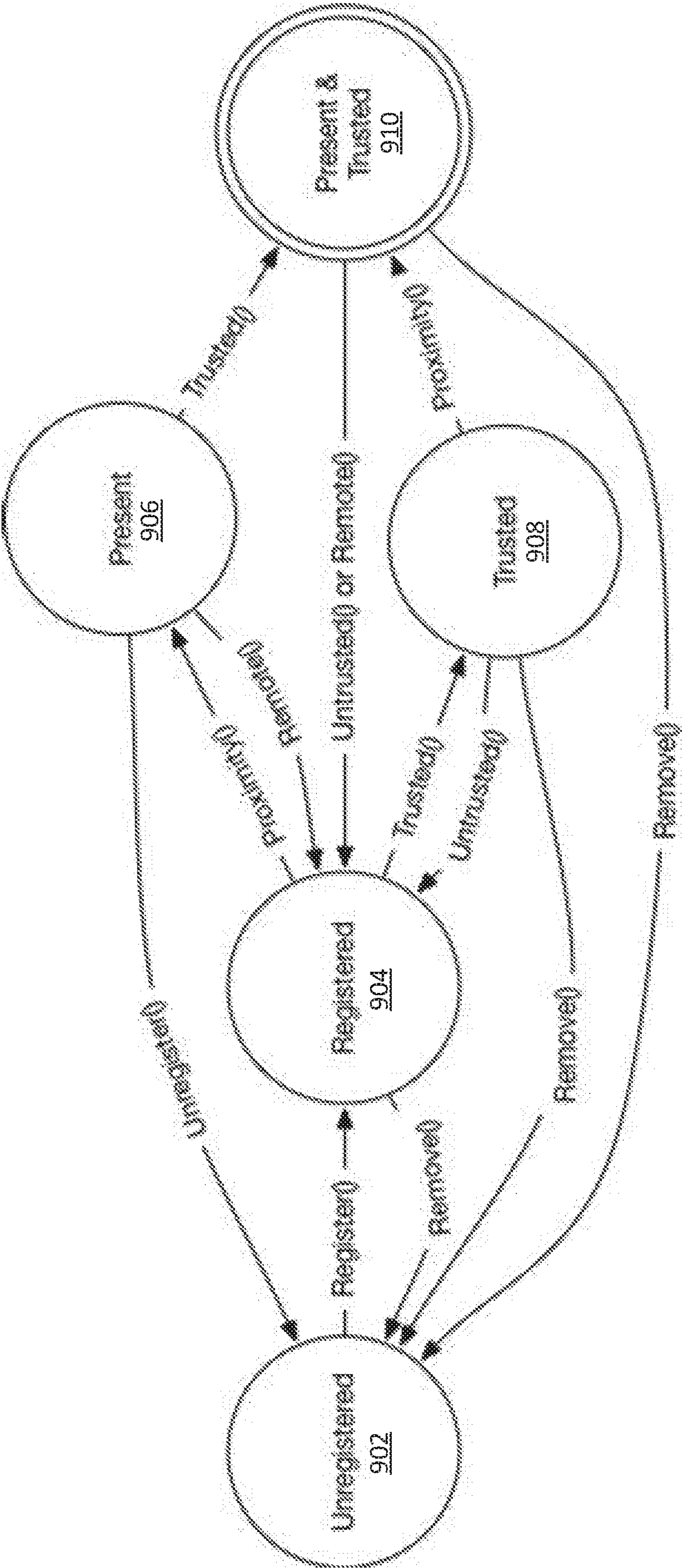
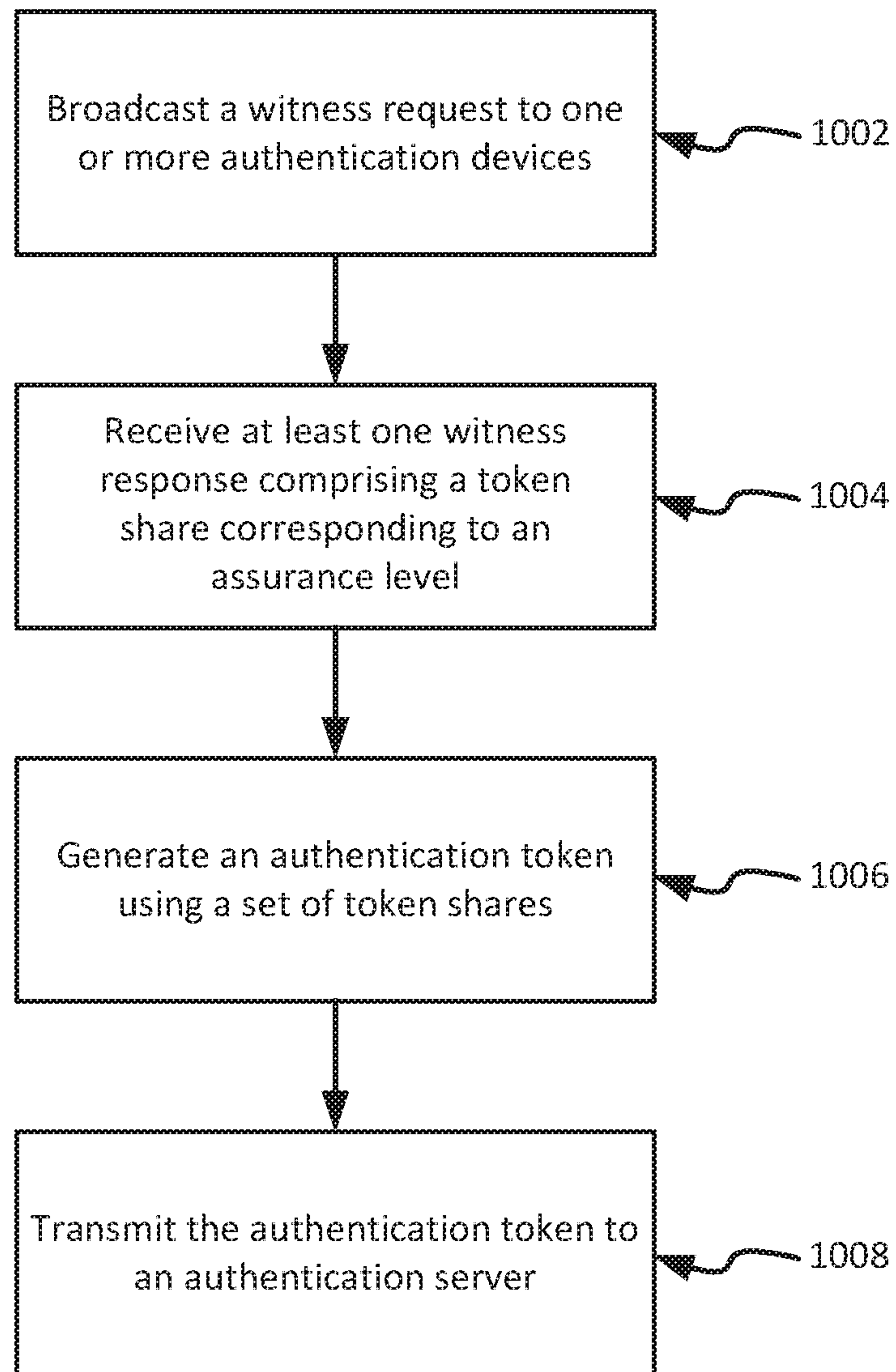
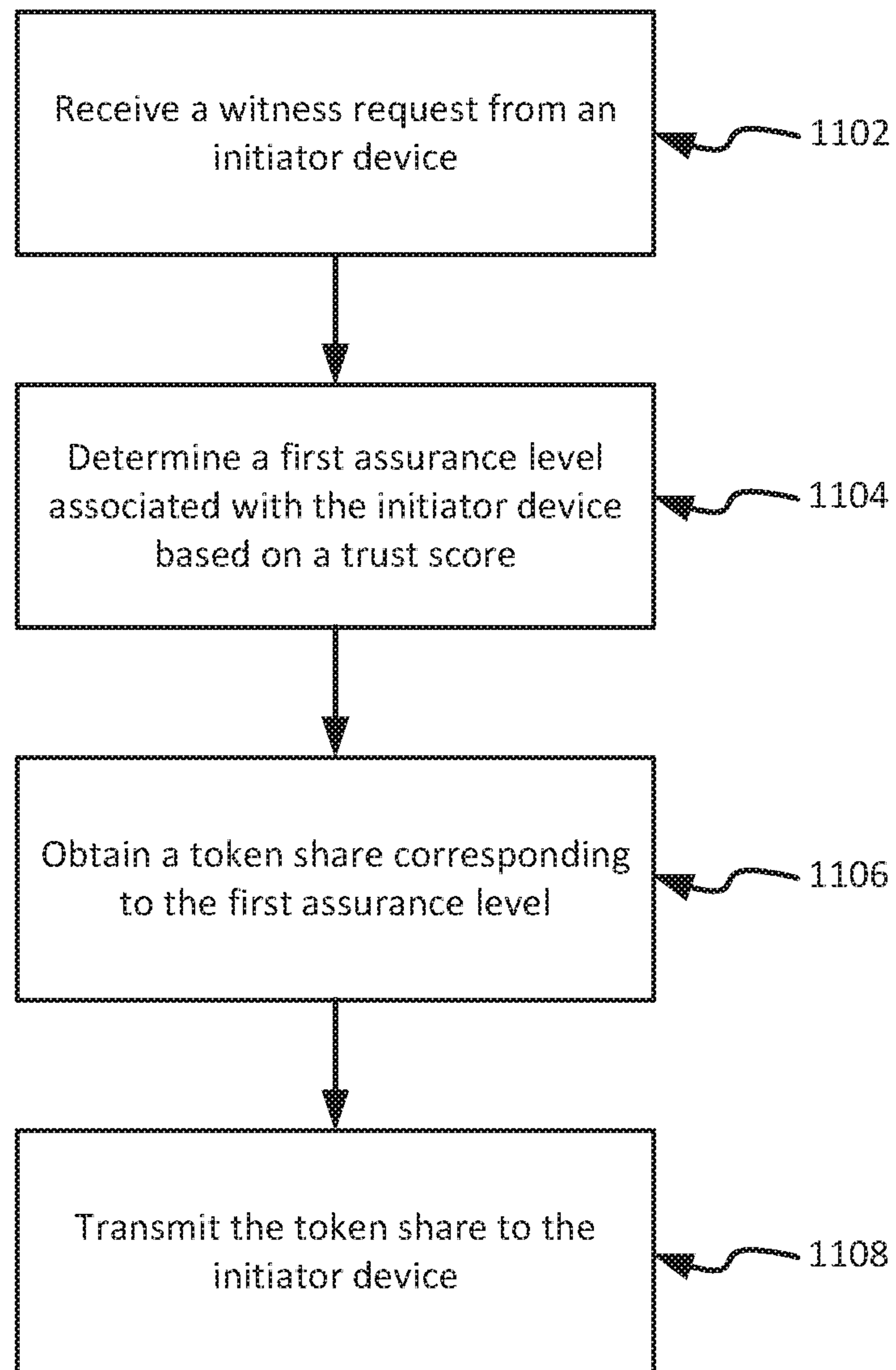


FIG. 9

**FIG. 10**

**FIG. 11**

Scheme	Usability							Deployability						
	Memorywise-Effortless	Scalable-for-Users	Nothing-to-Carry	Physically-Effortless	Easy-to-Learn	Efficient-to-Use	Infrequent-Errors	Easy-Recovery-from-Loss	Accessible	Negligible-Cost-per-User	Server-Compatible	Browser-Compatible	Mature	Non-Proprietary
Embodiments			S		Y	Y	S	S	Y	Y		Y		
Listening Watch		S	S		Y	Y	S	S	Y	Y		Y		
Sound-Proof		S	S		Y	Y	S	S	Y	Y		Y		Y
PhoneAuth		S	S		Y	Y	S	S	Y	Y				Y
Google 2SV		S	S		Y	S	S	S	S	S		Y	Y	Y
Passwords		Y	Y		Y	Y	S	Y	Y	Y	Y	Y	Y	Y

FIG. 12

Scheme	Security											
	Resilient-to-Physical-Observation	Resilient-to-Targeted-Impersonation	Resilient-to-Throttled-Guessing	Resilient-to-Unthrottled-Guessing	Resilient-to-Internal-Observation	Resilient-to-Leaks-from-Other-Verifiers	Resilient-to-Phishing	Resilient-to-Theft	No-Trusted-Third-Party	Requiring-Explicit-Consent	Unlinkable	Resilient-to-context-manipulation
Embodiments	Y	S	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Listening Watch	Y	S	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sound-Proof	S	S	Y	Y	Y	Y	Y	Y	Y	Y		
PhoneAuth	S	S	Y	Y	Y	Y	Y	Y	Y	Y	S	S
Google 2SV	S	S	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Passwords		S						Y	Y	Y	Y	Y

FIG. 13

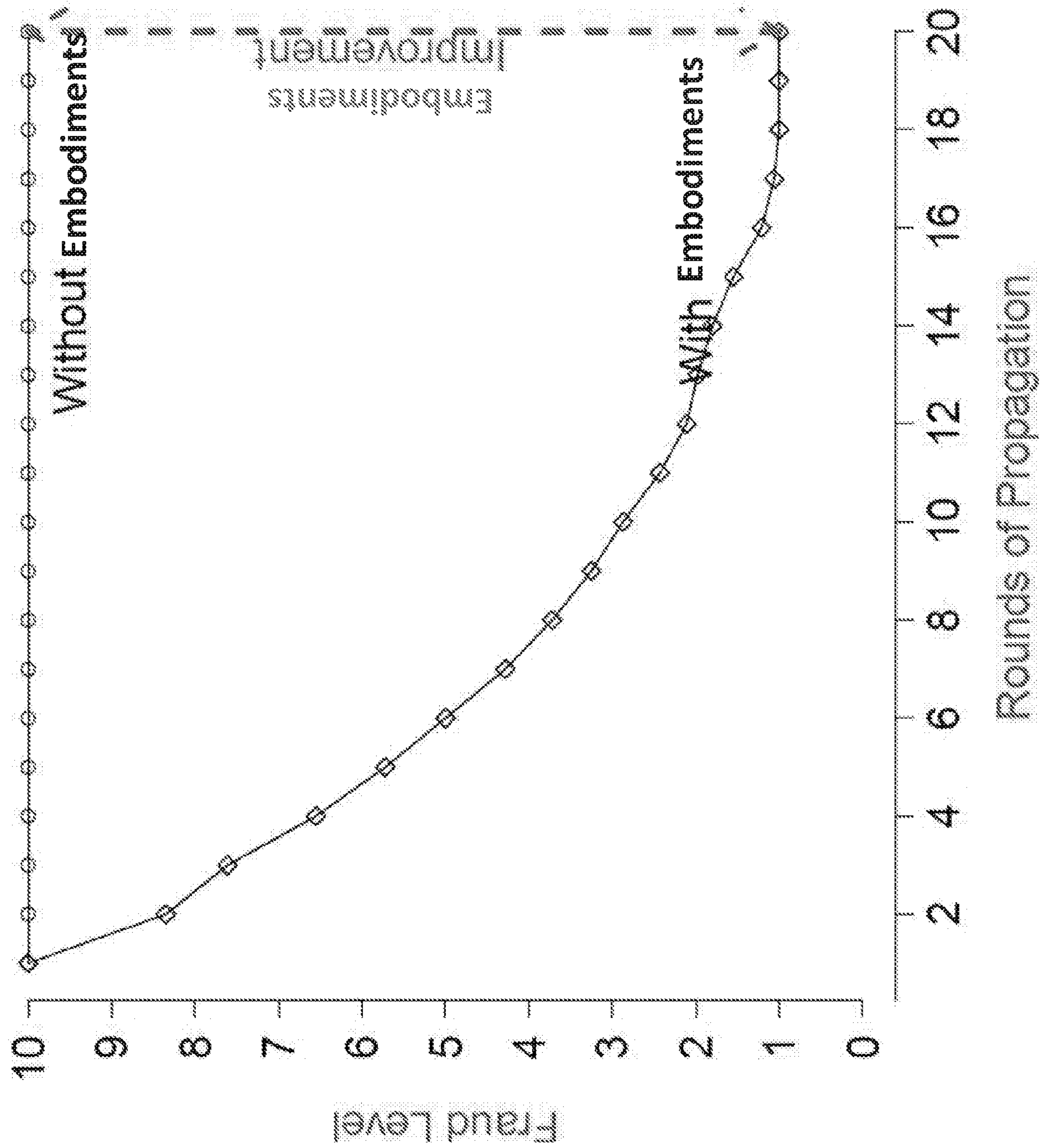
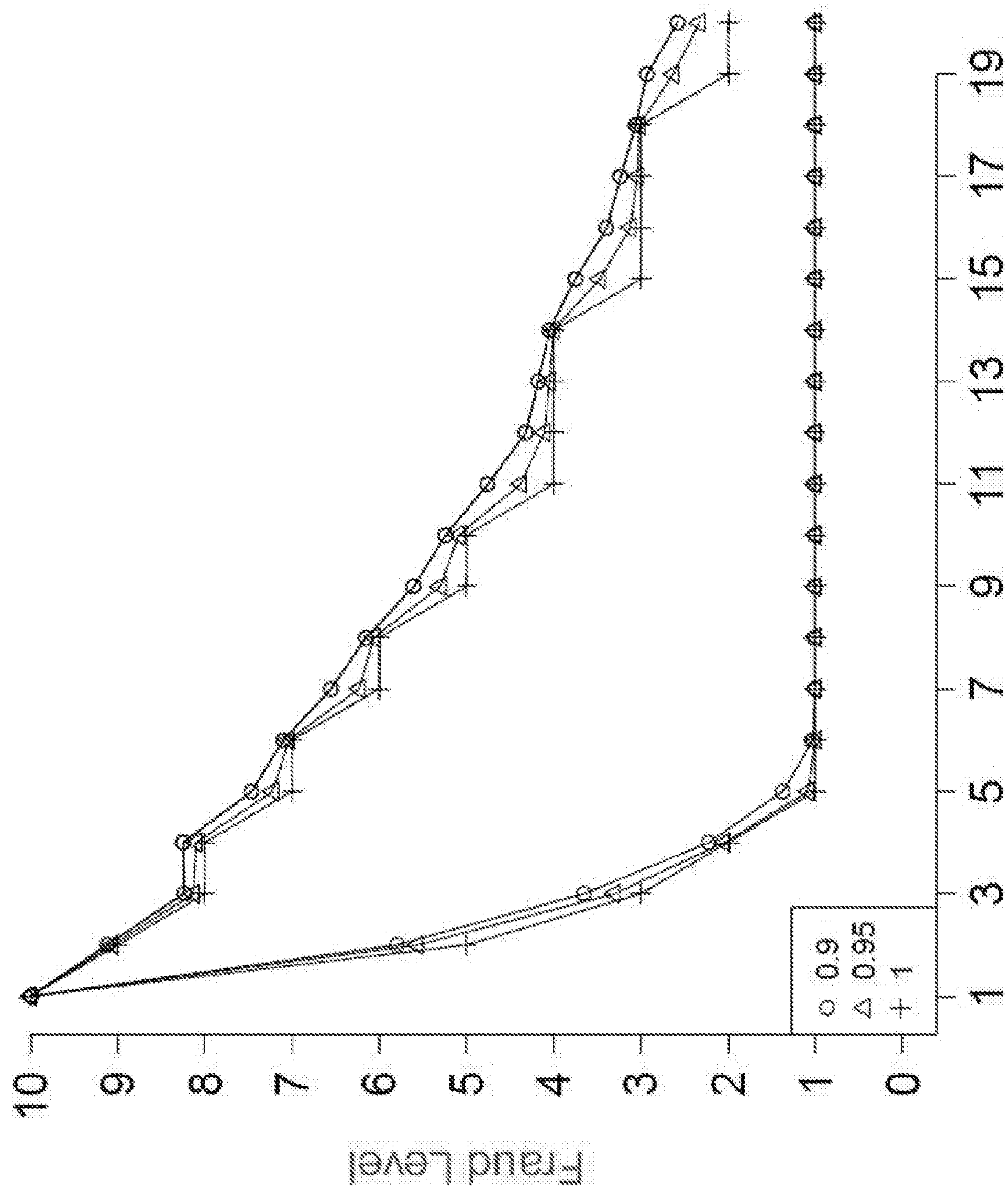


FIG. 14



Rounds of Propagation

FIG. 15

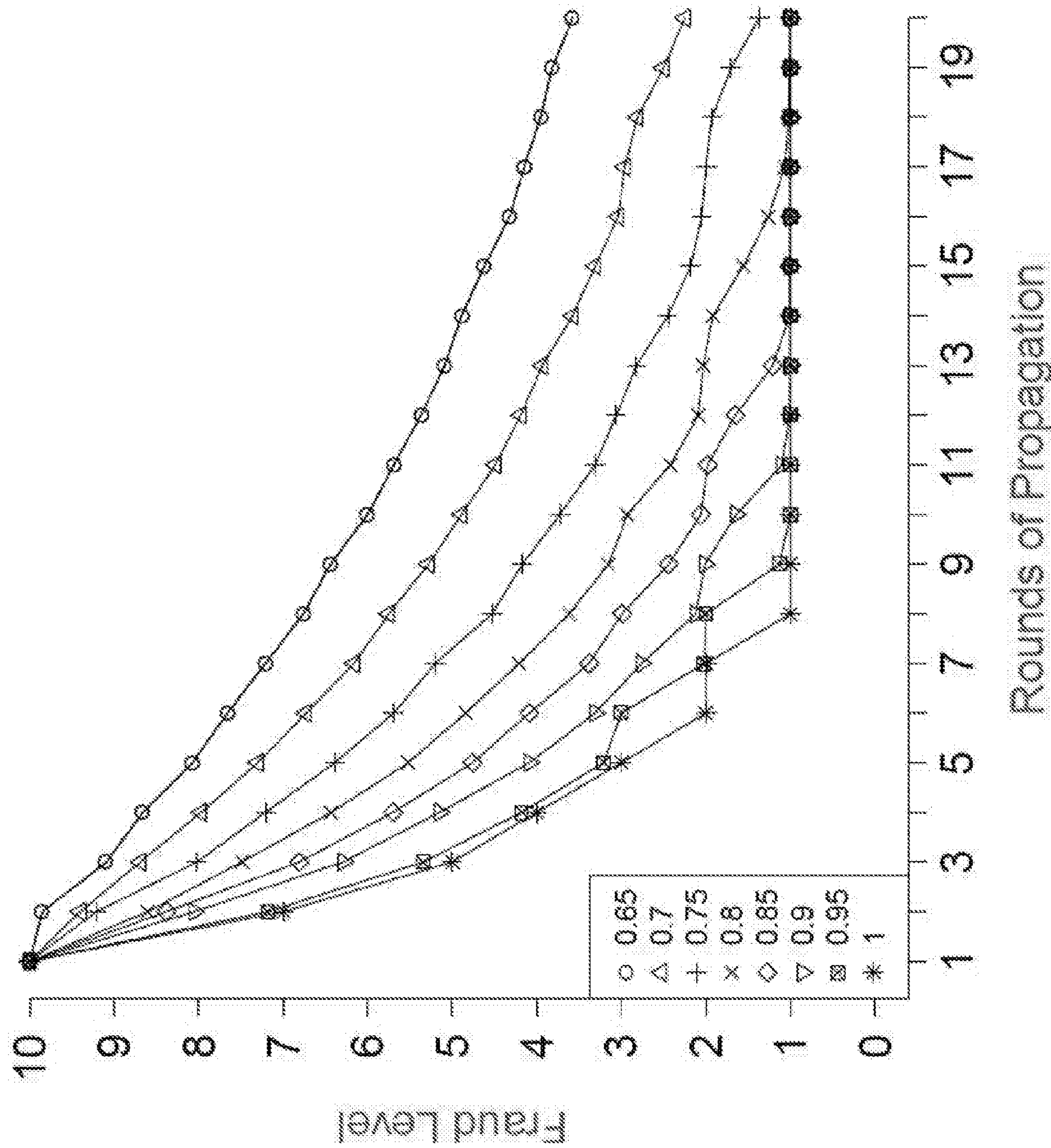


FIG. 16

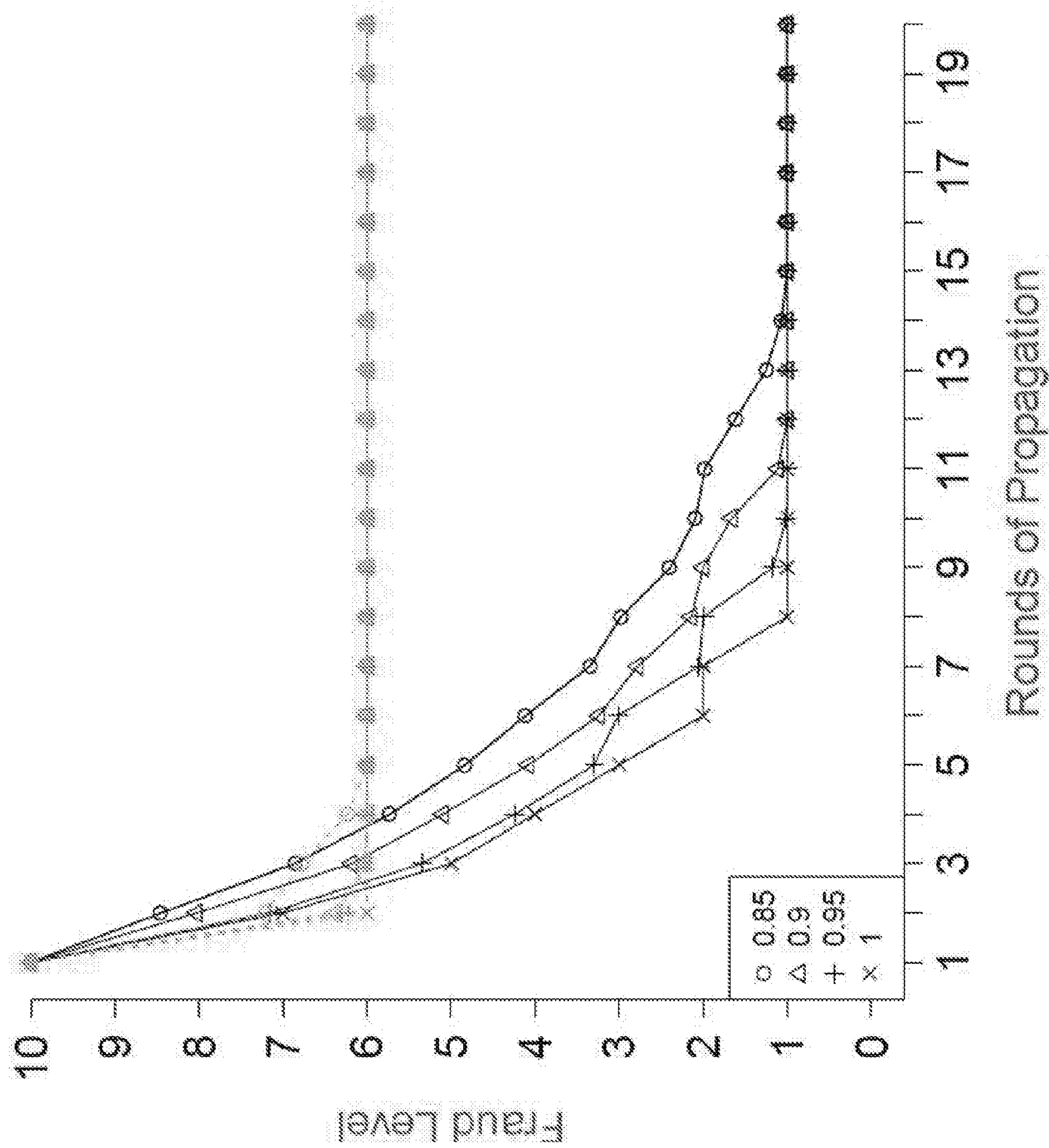


FIG. 17

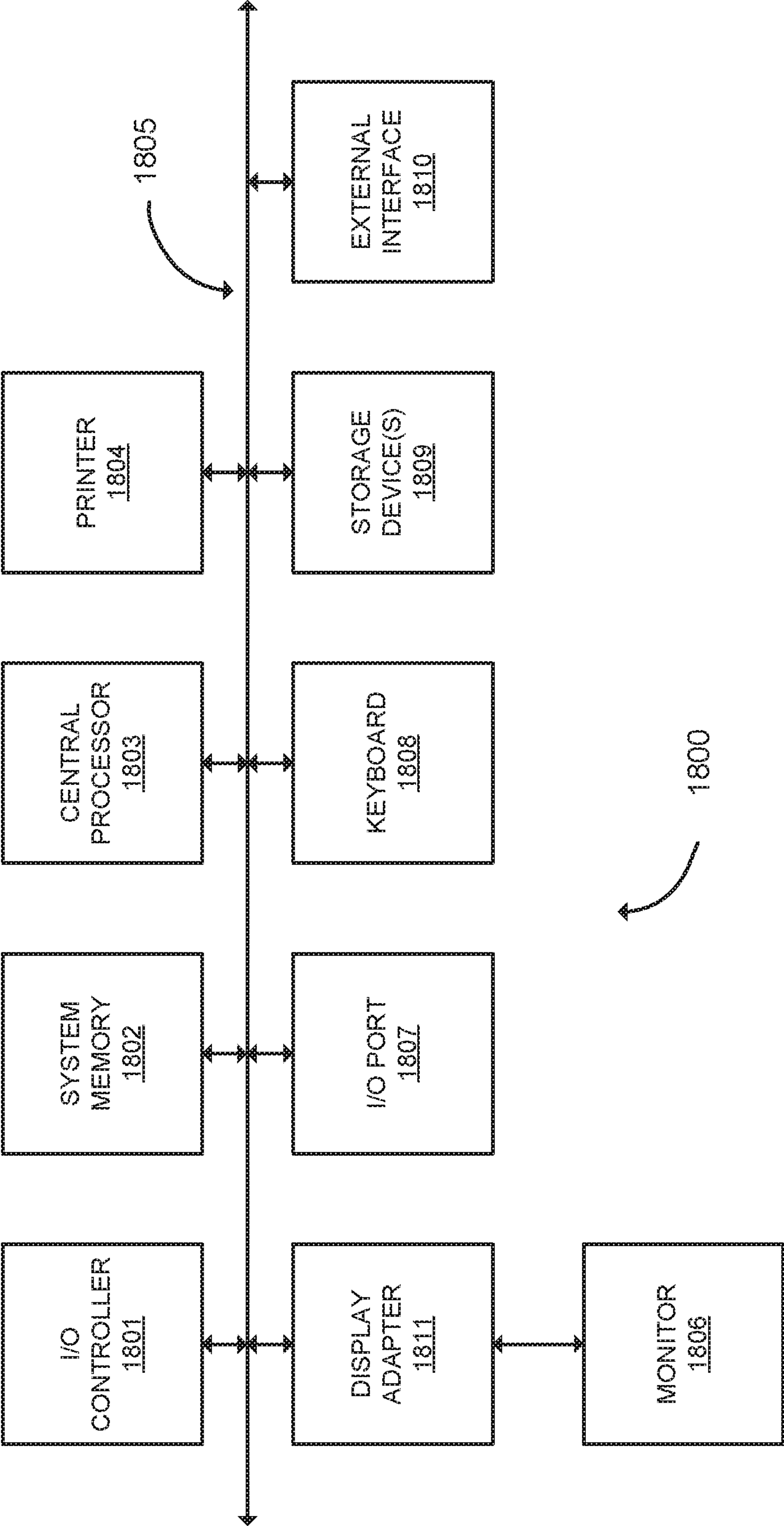


FIG. 18