



- [54] SYSTEM FOR CONTROLLING ACCESS AND DISTRIBUTION OF DIGITAL PROPERTY
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Related U.S. Application Data

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- [52] U.S. Cl. 380/4; 380/9; 380/23; 380/25; 380/49; 380/50
- [58] Field of Search 380/4, 9, 21, 23, 380/24, 25, 49, 50, 51, 55

References Cited

U.S. PATENT DOCUMENTS

- 3,504,132 3/1970 Wallace, Jr. .
- 3,764,742 10/1973 Abbott et al. .
- 3,798,359 3/1974 Feistel .
- 3,878,331 4/1975 Morgan et al. .
- 3,906,460 9/1975 Halpern .
- 3,911,216 10/1975 Bartek et al. .
- 3,944,976 3/1976 France .
- 3,958,081 5/1976 Ehrsam et al. .
- 3,996,449 12/1976 Attanasio et al. .
- 4,004,089 1/1977 Richard et al. .
- 4,028,678 6/1977 Moran .
- 4,037,215 7/1977 Birney et al. .

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

- 0332707 9/1989 European Pat. Off. .
- 9500355 8/1996 Sweden .
- 2236604 4/1991 United Kingdom .
- 2236604 10/1991 United Kingdom .
- WO92/20022 11/1992 WIPO .
- WO9220022 11/1992 WIPO .

- 9301550 1/1993 WIPO G06F 11/34
- WO93/01550 1/1993 WIPO .
- 96/27155 9/1996 WIPO .

OTHER PUBLICATIONS

- Abrams, M. D. et al, "Cryptography", Information Security—An Integrated Collection of Essays, Abrams, M.D. et al eds., IEEE Computer Society Press 1995, pp. 350–384.
- Choudhury, A. K. et al, "Copyright Protection for Electronic Publishing Over Computer Networks", IEEE Network, May/June. 1995, pp. 12–20.
- Ciciora, W. S., "Inside the Set–Top Box", IEEE Spectrum, Apr. 1995, vol. 32, No. 4, pp. 70–75.

(List continued on next page.)

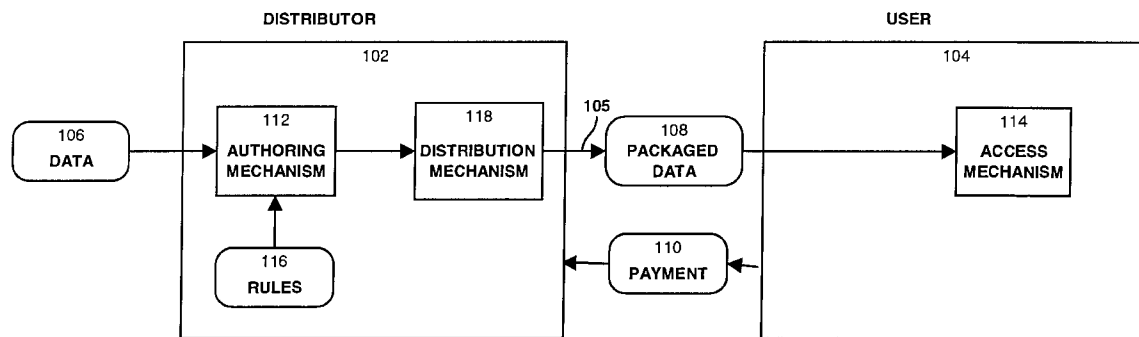
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ABSTRACT

A method and device are provided for controlling access to data. Portions of the data are protected and rules concerning access rights to the data are determined. Access to the protected portions of the data is prevented, other than in a non-useable form; and users are provided access to the data only in accordance with the rules as enforced by a mechanism protected by tamper detection. A method is also provided for distributing data for subsequent controlled use of those data. The method includes protecting portions of the data; preventing access to the protected portions of the data other than in a non-useable form; determining rules concerning access rights to the data; protecting the rules; and providing a package including: the protected portions of the data and the protected rules. A user is provided controlled access to the distributed data only in accordance with the rules as enforced by a mechanism protected by tamper protection. A device is provided for controlling access to data having protected data portions and rules concerning access rights to the data. The device includes means for storing the rules; and means for accessing the protected data portions only in accordance with the rules, whereby user access to the protected data portions is permitted only if the rules indicate that the user is allowed to access the portions of the data.

88 Claims, 26 Drawing Sheets

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U.S. PATENT DOCUMENTS

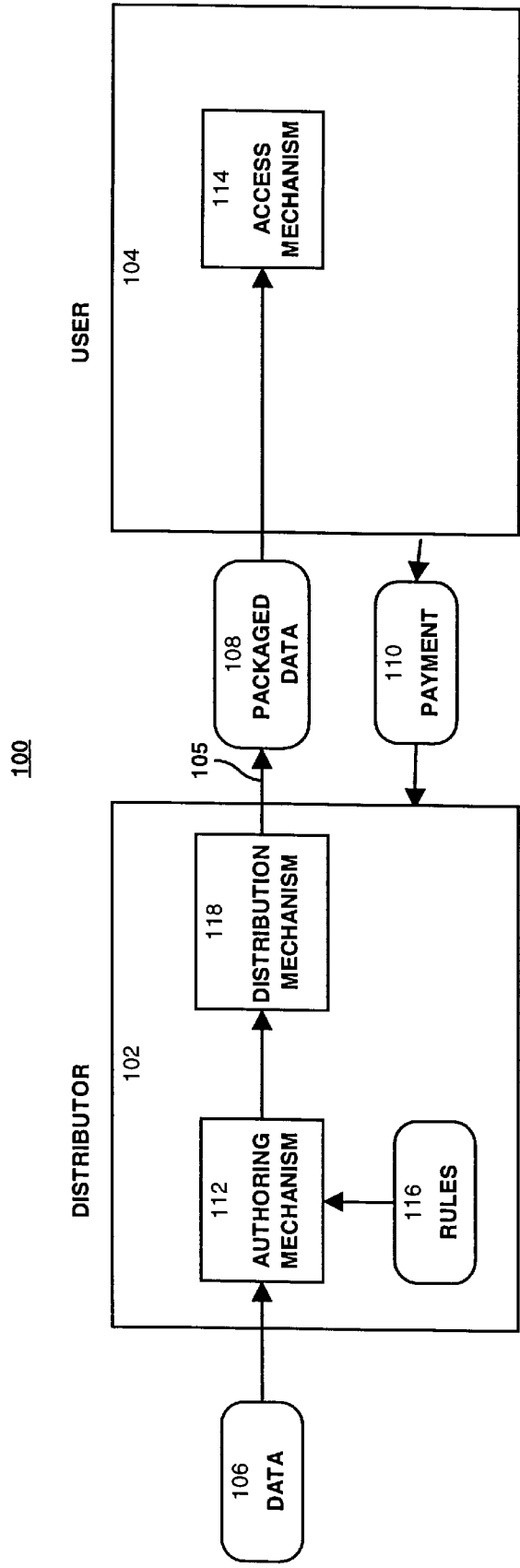
4,074,066	2/1978	Ehrsam et al. .	
4,087,856	5/1978	Attanasio .	
4,120,030	10/1978	Johnstone .	
4,168,396	9/1979	Best .	
4,183,085	1/1980	Roberts et al. .	
4,193,131	3/1980	Lennon et al. .	
4,206,315	6/1980	Matyas et al. .	
4,238,854	12/1980	Ehrsam et al. .	
4,246,638	1/1981	Thomas .	
4,264,782	4/1981	Konheim .	
4,278,837	7/1981	Best .	
4,281,215	7/1981	Atalla .	
4,306,289	12/1981	Lumley .	
4,319,079	3/1982	Best .	
4,323,921	4/1982	Guillou .	
4,433,207	2/1984	Best .	
4,446,519	5/1984	Thomas .	
4,454,594	6/1984	Heffron et al. .	
4,458,315	7/1984	Uchenick .	
4,465,901	8/1984	Best .	
4,471,163	9/1984	Donald et al. .	
4,529,870	7/1985	Chaum	235/380
4,558,176	12/1985	Arnold et al. .	
4,646,234	2/1987	Tolman et al.	380/4
4,658,093	4/1987	Hellman	380/25
4,757,533	7/1988	Allen et al.	380/25
4,796,181	1/1989	Wiedemer	380/4 X
4,827,508	5/1989	Shear .	
4,924,378	5/1990	Hershey et al. .	
4,932,054	6/1990	Chou et al.	380/4
4,937,863	6/1990	Robert et al.	380/4
4,953,209	8/1990	Ryder, Sr. et al.	380/23
4,961,142	10/1990	Elliott et al. .	
4,977,594	12/1990	Shear	380/4
5,010,571	4/1991	Katznelson	380/4
5,014,234	5/1991	Edwards, Jr. .	
5,023,907	6/1991	Johnson et al.	380/4
5,027,396	6/1991	Platteter et al. .	
5,047,928	9/1991	Wiedemer .	
5,050,213	9/1991	Shear .	
5,058,162	10/1991	Santon et al. .	
5,058,164	10/1991	Elmer et al.	380/50
5,103,476	4/1992	Waite et al.	380/4
5,113,519	5/1992	Johnson et al. .	
5,146,499	9/1992	Geffroin	380/23
5,159,182	10/1992	Eisele	235/492
5,191,193	3/1993	LeRoux	235/379
5,204,897	4/1993	Wyman	380/4
5,222,134	6/1993	Waite et al.	380/4
5,235,642	8/1993	Wobber et al. .	
5,247,575	9/1993	Sprague et al. .	
5,260,999	11/1993	Wyman .	
5,263,157	11/1993	Janis .	
5,263,158	11/1993	Janis .	
5,291,596	3/1994	Mita .	
5,301,231	4/1994	Abraham et al. .	
5,319,705	6/1994	Halter et al. .	
5,337,357	8/1994	Chou et al. .	
5,339,091	8/1994	Yamazaki et al. .	
5,345,588	9/1994	Greenwood et al. .	
5,347,578	9/1994	Duxbury .	
5,369,702	11/1994	Shanton .	
5,386,469	1/1995	Yearsley et al. .	
5,386,471	1/1995	Bianco .	
5,388,156	2/1995	Blackledge, Jr. et al. .	
5,392,351	2/1995	Hasebe et al. .	
5,394,469	2/1995	Nagel et al. .	
5,400,403	3/1995	Fahn et al. .	
5,410,598	4/1995	Shear .	
5,432,849	7/1995	Johnson et al. .	
5,438,508	8/1995	Wyman .	
5,442,541	8/1995	Hube et al. .	
5,450,489	9/1995	Ostrover et al. .	
5,473,687	12/1995	Lipscomb et al. .	
5,504,814	4/1996	Miyahara .	
5,530,235	6/1996	Stefik et al. .	
5,592,549	1/1997	Nagel et al.	380/4
5,594,491	1/1997	Hodge et al. .	
5,594,936	1/1997	Rebec et al. .	
5,615,264	3/1997	Kazmierczak et al. .	
5,629,980	5/1997	Stefik et al. .	
5,638,443	6/1997	Stefik et al. .	
5,646,992	7/1997	Subler et al. .	
5,673,316	9/1997	Auerbach et al.	380/4

OTHER PUBLICATIONS

- Department of Defense Standard, Department of Defense Trusted Computer System Evaluation Criteria, DOD 2500.28-STD, GPO 1986-623-93, 643 0, Dec. 26, 1985.
- Graubart, R., "On the Need for a Third Form of Access Control", Proceedings of the 12th National Computer Security Conference, 1989, pp. 296-303.
- K. Brunnstein and P. P. Sint, eds., KnowRight'95, Intellectual Property Rights and New Technologies: Proceedings of the KnowRight'95 Conference, Austrian Computer.
- Low, S. H. et al, "Document Marking and Identification using both Line and Word Shifting", 1995 InfoCom Proceedings, IEEE, 1995, pp. 853-860.
- McCollum, C. J. et al, "Beyond the Pale of MAC and DAC: Defining New Forms of Access Control", Proceedings of the Symposium on Research in Security and Privacy, IEEE Computer Society Press, 1990, pp. 190-200.
- National Institute of Standards and Technology (NIST) and National Security Agency (NSA), Federal Criteria for Information Technology Security: vol. I, Protection Profile Development; vol. II, Registry of Protection Profiles, Version 1.0, Dec. 1992.
- Samuelson, P., "Copyright and Digital Libraries", Communications of the AMC, Apr. 1995, vol. 38, No. 3, pp. 15-20 & 110.
- Samuelson, P. et al, "A Manifesto Concerning the Legal Protection of Computer Programs", Columbia Law Review, vol. 94, No. 8, pp. 2308-2431.
- Sandhu, R. S. "The Typed Access Matrix Model", Proceedings of the Symposium on Research in Security and Privacy, IEEE Computer Society, 1992, pp. 122-136.
- Sandhu, R. S. et al, "Implementation Considerations for the Typed Access Matrix Model in a Distributed Environment", Proceedings of the 15th National Computer Security Conference, 1992b, pp. 221-235.
- Yee, B., "Using Secure Coprocessors", Carnegie Mellon University, School of Computer Science, CMU-CS-94-149, May 1994, (also available Defense Technical Information Center as AD-A281 255).
- Maxem Chuk, N.F., Sep. 1994, "Electronic Document Distribution," AT&T Technical Journal, pp. 73-80.
- Weber, R., "Metering Technologies For Digital Intellectual Property," A Report to the International Federation of Reproduction Rights Organization, Oct. 1994, pp. 1-29.
- Clark, P.C. and Hoffman, L.J., "Bits: A Smartcard Protected Operating System," Communications of the ACM, Nov. 1994, vol. 37, No. 11, pp. 66-70, and 94.
- Saigh, W.K., Knowledge is Sacred, Video Pocket/Page Reader Systems, Ltd., 1992.

- Kahn, R.E., "Deposit, Registration And Recordation In an Electronic Copyright Management System," Corporation for National Research Initiatives, Virginia, Aug. 1992, pp. 1-29.
- Hilts, P. Mutter, J., and Taylor, S., "Books While U Wait," Publishers Weekly, Jan. 3, 1994, pp. 48-50.
- Strattner, A., "'Cash register on a chip' may revolutionize software pricing and distribution," Wave Systems Corp., Computer Shopper, Copyright, Apr. 1994, vol. 14;No. 4; p. 62.
- O'Conner, M.A., "New distribution option for electronic publishers; iOpener data encryption and metering system for CD-ROM use; Column," CD-ROM Professional, Copyright, Mar. 1994, vol. 7;No. 2; p. 134; ISSN:1049-0833.
- Willett, S., "'Metered PCs:Is your system watching you?"; Wave Systems beta tests new technology,' InfoWorld, Copyright, May 2, 1994, p. 84.
- Linn, R.J., "Copyright and Information Services in the Contest of the National Research and Education Network," IMA Intellectual Property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 9-20.
- Perritt, Jr., H.H., "Permissions Headers ad Contract Law," IMA Intellectual Property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 27-48.
- Uptegrove, L., and Roberts, R., "Intellectual Property Header Descriptors: A Dynamic Approach," IMA Intellectual Property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 63-66.
- Sirbu, M.A., "Internet Billing Service Design and Prototype Implementation, IMA" Intellectual Property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 67-80.
- Simmel, S.S., and Godard, I., "Metering and Licensing of Resources: Kala's General Purpose Approach," IMA Intellectual Property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 81-110.
- Kahn, R.E., "Deposit, Registration and Recordation in an Electronic Copyright Management System," IMA Intellectual property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 111-120.
- Tygar, J.D., and Bennet, Y., "Dyad: A System for Using Physically Secure Coprocessors," IMA Intellectual Property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 121-152.
- Griswold, G.N., "A Method for Protecting Copyright on Networks," IMA Intellectual Property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 169-178.
- Nelson, T.H., "A Publishing and Royalty Model for Networked Documents," IMA Intellectual Property Project Proceedings, Jan. 1994, vol. 1, Issue 1, pp. 257-259.
- European Search Report for Corresponding European Application 95308420.9.
- U. Flasche et al., Decentralized Processing of Documents, Comput. & Graphics, vol. 10, No. 2, 1986, pp. 119-131.
- R. Mori et al., Superdistribution: The Concept and the Architecture, The Transactions of the IEICE, vol. E 73, No. 7, 1990, Tokyo, JP, pp. 1133-1146.
- Rosse, P.E., "Data guard", Forbes, Jun. 6, 1994, p. 101.
- Xiao-Wen Yang et al., Key distribution system for digital video signal, ICSP '96. 1996 3rd International Conference on Signal Processing Proceedings (Cat. No. 96TH8116), vol. 2 1996, pp. 847-850.
- E.A.I. Claus, Digital network for video surveillance and video distribution, Proc. SPIE—Int. Soc., Opt. Eng. vol. 2952 1996, pp. 194-204.
- R. J. Bankapur et al., Switched digital video access networks, Bell Labs Tech. J. vol. 1 No. 1 Summer 1996, pp. 66-77.
- C.A. Mandel et al., Intellectual access to digital documents: joining proven principles with new technologies, Cat. Classif. Q., vol. 22, No. 3-4 1996, pp. 25-42.
- B.J. Goldsmith et al., Digital video distribution and transmission, International Broadcasting Convention (Conf. Publ. No. 428) 1996, pp. 26-31.
- D. Van Schooneveld, Standardization of conditional access systems for digital pay television, Philips J. Res. (UK), vol. 50, No. 1-2, 1996, pp. 217-225.
- H.D. Wactlar, Intelligent access to digital video: Informedia project Computer, vol. 29, No. 5, May 1996, pp. 46-52.
- J.E. Dail et al., Adaptive digital access protocol: A MAC protocol for multiservice broadband access networks INS, IEEE Commun. Mag. vol. 34, No. 3, Mar. 1996, pp. 104-112.
- S. Stevens et al., Informedia: improving access to digital video—Ins, Interactions, vol. 1, No. 4, Oct. 1994, pp. 67-71.
- B. Hein et al., RACE 1051: a multigigabit transport and distribution technology for provision of digital video services—INS, Proc. SPIE—Int. Soc. Opt. Eng., vol. 1974, 1993, pp. 26-33.
- Chen Ching-Chin et al., Analog, digital and multimedia: implications for information access INS, Online Information 91. 15th International Online Information Meeting Proceedings, 1991, pp. 283-292.
- Marshall Abrams, et al, Generalized Framework For Access Control, Towards Prototyping the ORGCON Policy, Oct. 1991, pp. 1-20, Proc 1991 Nat'l Computer Security Conf.
- Marshall D. Abrams, et al, Mediation and Separation in Contemporary Information Technology Systems, 1992, pp. 1-15, Proc. 1992 Nat'l Compute Security Conf.
- Marshall D. Abrams, et al, Generalized Framework for Access Control: A Formal Rule Set for The ORGCON Policy, MITRE, Apr. 1992, pp. 1-58.
- Marshall D. Abrams, Renewed Understanding of Access Control Policies, 1993, pp. 1-10, Proc. 16th National Computer Security Conference.
- Leonard J. LaPadula, A Rule-Set Approach to Formal Modeling of a Trusted Computer System, Computing Systems Journal, Winter 1994, vol. 7, No. 1, pp. 113-167, pp. 1-38.

FIG. 1



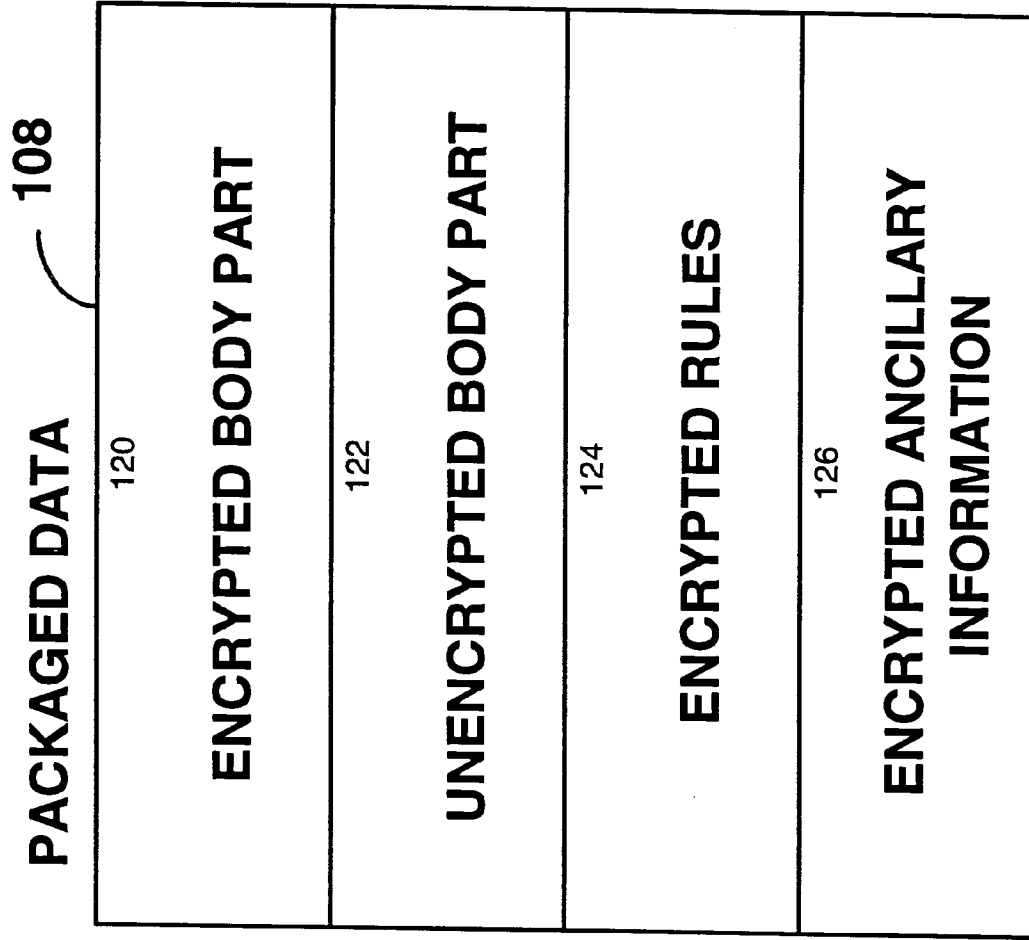


FIG. 2

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