UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY

Petitioner

v.

ETHANOL BOOSTING SYSTEMS, LLC, and MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

Patent Owner

Case: IPR2019-01400

U.S. Patent No. 8,069,839

DECLARATION OF DR. JAMES L. MULLINS

I, Dr. James L. Mullins, declare as follows:

1. My name is Dr. James L. Mullins.

2. I have been retained by Alston & Bird, LLP on behalf of Ford Motor Company ("Ford" or "Petitioner") in the above-captioned *inter partes* review relating to U.S. Patent No. 8,069,839 to provide opinions relating to books authored by (1) John A. Heywood, titled *Internal Combustion Engine Fundamentals* and published by McGraw-Hill in 1988 that includes 930 pages ("Heywood"), and (2) *Automotive Handbook*, 3rd Edition, edited by U. Adler published by Robert Bosch GmbH and distributed in the U.S.A. by Society of Automotive Engineers in 1993 that includes 852 pages ("Automotive 3rd Edition"). All statements made herein of my own knowledge are true, and all statements made herein based on information and belief are believed to be true.

I. INTRODUCTION

3. I am presently Dean of Libraries Emeritus and Esther Ellis Norton Professor Emeritus, Purdue University. My career as a professional and academic/research spanned more than 44 years including library positions at Indiana University, Villanova University, Massachusetts Institute of Technology, and Purdue University. Ex. 1038 is a true and correct copy of my curriculum vitae describing my background and experience.

4. In 2018, I founded the firm Prior Art Documentation Librarian Services, LLC, located at 106 Berrow, Williamsburg, VA 23188 after purchasing the intellectual property of and successor to Prior Art Documentation, LLC located at 711 South Race Street, Urbana, IL 61801. Further information about my firm, Prior Art Documentation Librarian Services, LLC (PADLS), is available at www.priorartdoclib.com.

5. I have been retained by Alston & Bird, LLP on behalf of Ford to offer my opinion on the authenticity and dates of public accessibility of (1) John A. Heywood, titled *Internal Combustion Engine Fundamentals* and published by McGraw-Hill in 1988 that includes 930 pages ("Heywood"), and (2) *Automotive Handbook*, 3rd Edition, edited by U. Adler published by Robert Bosch GmbH and distributed in the U.S.A. by Society of Automotive Engineers in 1993 that includes 852 pages ("Automotive 3rd Edition") for use in the above-captioned *inter partes* review proceeding. For this service, I am being paid my usual hourly fee. I have no stake in the outcome of this proceeding or any related litigation or administrative proceedings, and my compensation in no way depends on the substance of my testimony or the outcome of this proceeding.

II. QUALIFICATIONS

6. I received a Bachelor of Arts degree in History, Religion and Political Science in 1972 as well as a Master of Arts degree in Library Science in 1973 from

the University of Iowa. I received my Ph.D. in Academic Library Management in 1984 from Indiana University. Over the past forty-four years, I have held various positions in the field of library and information sciences.

7. I am presently Dean of Libraries Emeritus and Esther Ellis Norton Professor Emeritus at Purdue University, and have been since January 1, 2018. I have been previously employed as follows:

- Dean of Libraries and Professor and Esther Ellis Norton Professor, Purdue University, West Lafayette, IN (2004-2017)
- Assistant/Associate Director for Administration, Massachusetts Institute of Technology (MIT) Libraries, Cambridge, MA (2000-2004)
- University Librarian and Director, Falvey Memorial Library, Villanova University, Villanova, PA (1996-2000)
- Director of Library Services, Indiana University South Bend, South Bend, IN (1978-1996)
- Part-time instructor, School of Library and Information Science, Indiana University, Bloomington, IN (1979-1996)
- Associate Law Librarian, and associated titles, Indiana University School of Law, Bloomington, IN (1974-1978)
- Catalog Librarian, Assistant Professor, Georgia Southern College (now University), Statesboro, GA (1973-1974)

8. I am a member of the American Library Association ("ALA"), where I served as the chair of the Research Committee of the Association of College and Research Libraries ("ACRL"). My service to ALA included service on the editorial

board of the most prominent library journal, *College and Research Libraries*. I also served on the Standards Committee, College Section of the Association of College and Research Libraries, where I was instrumental in developing a re-issue of the *Standards for College Libraries* in 2000.

9. I am an author of numerous publications in the field of library science, and have given presentations in library sciences at national and international conferences. During more than 44 years as an academic librarian and library science scholar, I have gained extensive experience with catalog records and online library management systems (LMS) built using Machine-Readable Cataloging ("MARC") standards. As an academic library administrator, I have had responsibility to ensure that students were educated to identify, locate, assess, and integrate information garnered from research library resources. I have also facilitated the research of faculty colleagues either directly or through the provision of and access to the requisite print and/or digital materials and services at the universities where I worked.

10. Based on my experience identified above and detailed in my curriculum vitae(*see* Ex. 1038), I consider myself to be an expert in the field of library science and academic library administration.

III. BACKGROUND ON PUBLIC ACCESSIBILITY

A. Scope of This Declaration

11. I am not a lawyer, and I am not rendering an opinion on the legal question of whether a particular document is, or is not, a "printed publication" under the law. I am, however, rendering my expert opinion on the authenticity of the documents referenced herein and when and how this document was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, could have located the document.

12. I am informed by counsel that an item is considered authentic if there is sufficient evidence to support a finding that the item is what it is claimed to be. I am also informed that authenticity can be established based on the contents of the documents themselves, such as the appearance, content, substance, internal patterns, or other distinctive characteristics of the item.

13. I am informed by counsel that a given reference qualifies as "publicly accessible" if it was disseminated or otherwise made available such that a person interested in and ordinarily skilled in the relevant subject matter could locate it through the exercise of ordinary diligence.

14. While I understand that the determination of public accessibility under the foregoing standard rests on a case-by-case analysis of the facts particular to an

individual publication, I also understand that a printed publication is rendered "publicly accessible" if it is cataloged and indexed by a library such that a person interested in the relevant subject matter could locate it (*i.e.*, I understand that cataloging and indexing by a library is sufficient, though there are other ways that a printed publication may qualify as "publicly accessible"). One manner of sufficient indexing is indexing according to subject matter. I understand that it is not necessary to prove someone actually looked at the printed publication in order to show it was publicly accessible by virtue of a library's cataloging and indexing thereof. I understand that cataloging and indexing by a single library of a single instance of a particular printed publication is sufficient. I understand that, even if access to a library is restricted, a printed publication that has been cataloged and indexed therein is publicly accessible so long as a presumption is raised that the portion of the public concerned with the relevant subject matter would know of the printed publication. I also understand that the cataloging and indexing of information that would guide a person interested in the relevant subject matter to the printed publication, such as the cataloging and indexing of an abstract for the printed publication, is sufficient to render the printed publication publicly accessible.

15. I understand that evidence showing the specific date when a printed publication became publicly accessible is not necessary. Rather, routine business practices, such as general library cataloging and indexing practices, can be used to

establish an approximate date on which a printed publication became publicly accessible.

A. Library Catalog Records and Other Resources

16. Some background on MARC (Machine-Readable Cataloging) formatted records, OCLC, and WorldCat is helpful to understand the library catalog records discussed in this declaration. I am fully familiar with the library cataloging standard known as the MARC standard, which is an industry-wide standard method of storing and organizing library catalog information.[1] MARC practices have been consistent since the MARC format was developed by the Library of Congress in the 1960s, and by the early 1970s became the U.S. national standard for disseminating bibliographic data. By the mid-1970s, MARC format became the international standard, and persists through the present. A MARC-compatible library is one that has a catalog consisting of individual MARC records for each of its items. The underlying MARC format (computer program) underpins the online public access catalog (OPAC) that is available to library users to locate a particular holding of a library. Today, MARC is the primary communications protocol for the transfer and

[1] The full text of the standard is available from the Library of Congress at http://www.loc.gov/marc/bibliographic/.

storage of bibliographic metadata in libraries.[2] The MARC practices discussed below were in place during the late 1990s timeframe relevant to the documents referenced herein.

17. Online Computer Library Center (OCLC) is a not-for-profit world-wide consortium of libraries. Similar to MARC standards, OCLC's practices have been consistent since the 1970s through the present. Accordingly, the OCLC practices discussed below were in place during the timeframe discussed in my opinions section. OCLC was created "to establish, maintain and operate a computerized library network and to promote the evolution of library use, of libraries themselves, and of librarianship, and to provide processes and products for the benefit of library

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[2] Almost every major library in the world uses a catalog that is MARC-compatible. *See, e.g.*, *MARC Frequently Asked Questions (FAQ)*, LIBRARY OF CONGRESS, https://www.loc.gov/marc/faq.html (last visited Jan. 24, 2018) ("MARC is the acronym for MAchine-Readable Cataloging. It defines a data format that emerged from a Library of Congress-led initiative that began over fifty years ago. It provides the mechanism by which computers exchange, use, and interpret bibliographic information, and its data elements make up the foundation of most library catalogs used today."). MARC is the ANSI/NISO Z39.2-1994 (reaffirmed 2009) standard for Information Interchange Format.

users and libraries, including such objectives as increasing availability of library resources to individual library patrons and reducing the rate of rise of library per-unit costs, all for the fundamental public purpose of furthering ease of access to and use of the ever-expanding body of worldwide scientific, literary and educational knowledge and information."[3] Among other services, OCLC and its members are responsible for maintaining the WorldCat database (http://www.worldcat.org/), used by libraries throughout the world.

18. Libraries world-wide use the machine-readable MARC format for catalog records. MARC-formatted records include a variety of subject access points based on the content of the document being cataloged. A MARC record for a particular work comprises several fields, each of which contains specific data about the work. Each field is identified by a standardized, unique, three-digit code corresponding to the type of data that follows. For example, a work's title is recorded in field 245, the primary author of the work is recorded in field 100, a work's International Standard Book Number ("ISBN") is recorded in field 020, and the work's Library of Congress call number (assigned by Library of Congress) is

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[3] Third Article, Amended Articles of Incorporation of OCLC Online Computer Library Center, Incorporated (available at http://www.oclc.org/en-US/councils/documents/amended_articles.html).

recorded in field 050. Some fields can contain subfields, which are indicated by letters. For example, a work's publication date is recorded in field 260 under the subfield "c."

19. The MARC Field 040, subfield "a," identifies the library or other entity that created the catalog record in the MARC format. The MARC Field 008 identifies the date when this first MARC record was created.

20. The 9XX fields, which are not part of the standard MARC 21 format,[4] were defined by OCLC for use by the Library of Congress, for processing or holding notes for a local library, and for internal OCLC use. For example, the 955 field is reserved for use by the Library of Congress to track the progress of a new acquisition from the time it is submitted for Cataloging in Publication (CIP) review until it is published and fully cataloged and publicly available for use within the Library of Congress. Fields 901-907, 910, and 945-949 have been defined by OCLC for local use and will pass OCLC validation. Fields 905 or 910 are often used by an individual library for internal processing purposes, for example the date of cataloging and/or the initials of the cataloger.

[4] https://www.oclc.org/bibformats/en/9xx.html

21. MARC records also include several fields that include subject matter classification information. An overview of MARC record fields is available through the Library of Congress at http://www.loc.gov/marc/bibliographic/. For example, 6XX fields are termed "Subject Access Fields."[5] Among these, for example, is the 650 field; this is the "Subject Added Entry – Topical Term" field. *See* http://www.loc.gov/marc/bibliographic/bd650.html. The 650 field is a "[s]ubject added entry in which the entry element is a topical term." *Id.* The 650 field entries "are assigned to a bibliographic record to provide access according to generally accepted thesaurus-building rules (e.g., *Library of Congress Subject Headings* (LCSH), *Medical Subject Headings* (MeSH))." *Id.* Thus, a researcher can easily discover material relevant a topic of interest with a search using the terms employed in the MARC Fields 6XX.

22. Further, MARC records include call numbers, which themselves include a classification number. For example, the 050 field is dedicated as the "Library of Congress Call Number"[6] as assigned by the Library of Congress. A defined portion of the Library of Congress Call Number is the classification number, and "source of the classification number is *Library of Congress Classification* and

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[5] *See* http://www.loc.gov/marc/bibliographic/bd6xx.html.

[6] *See* http://www.loc.gov/marc/bibliographic/bd050.html.

the *LC Classification-Additions and Changes*." *Id.* Thus, included in the 050 field is a subject matter classification as an example: TK5105.59 indicates books on computer networks – security measures. When a local library assigns a classification number, most often a Library of Congress derived classification number created by a local library cataloger or it could it could be a Dewey Decimal classification number for example, 005.8, computer networks – security measures, it appears in the 090 field. In either scenario, the MARC record includes a classification number in the call number field that represents a subject matter classification.

23. WorldCat is the world's largest public online catalog, maintained by the OCLC, a not-for-profit international library consortium, and built with the records created by the thousands of libraries that are members of OCLC. OCLC provides bibliographic and abstract information to the public based on MARC-compliant records through its OCLC WorldCat database. WorldCat requires no knowledge of MARC tags and code and does not require a log-in or password. WorldCat is easily accessible through the World Wide Web to all who wish to search it; there are no restrictions to be a member of a particular community, etc. The date a given catalog record was created (corresponding to the MARC Field 008) appears in some detailed WorldCat records as the Date of Entry but not necessarily all. WorldCat does not provide a view of the underlying MARC format for a specific WorldCat record, in order to see the underlying MARC format searcher must locate

the book in a holding library listed among those shown in WorldCat, and search the online public catalog (OPAC) of a holding library. Whereas WorldCat records are widely available, the availability of library specific MARC formatted records varies from library to library. When a specific library wishes to make the underlying MARC format available there will be a link from the library's OPAC display, often identified as MARC record or librarian/staff view.

24. When a MARC record is created by the Library of Congress or an OCLC member institution, the date of creation for that record is automatically populated in the fixed field (008), characters 00 through 05 in year, month, day format (YYMMDD).[7] Therefore, the MARC record creation date reflects the date on which the publication associated with the record was first cataloged. Thereafter, the local library's computer system may automatically update the date in field 005 every time the library updates the MARC record (*e.g.*, to reflect that an item has been moved to a different shelving location within the library, or a reload of the bibliographic data with the introduction of a new library management system that creates and manages the OPAC).

[7] Some of the newer library catalog systems also include hour, minute, second (HHMMSS).

B. Monograph Publications

25. Monograph publications are written on a single topic, presented at length and distinguished from an article and include books, dissertations, and technical reports. A library typically creates a catalog record when the monograph is acquired by the library. First, it will search OCLC to determine if a record has already been created by the Library of Congress or another OCLC institution. If a record is found in OCLC, the record is downloaded into the library's LMS (Library Management System) that includes typically the OPAC (online public access catalog by which researchers locate a particular library holding in a user-friendly format), acquisitions, cataloging, and circulation integrated functions. Once the item is downloaded into the library's LMS, the library adds its identifier to the OCLC database so when a search is completed on WorldCat, the library will be indicated as an owner of the title. Once a record is created in a Library's LMS, it is searchable and viewable through the library's OPAC, typically by author, title, and subject heading, at that library and from anywhere in the world through the internet by accessing that library's OPAC. The OPAC also connects with the circulation function of the library, which typically indicates whether the record is available, in circulation, etc., with its call number and location in a specific departmental/disciplinary library, if applicable. The OPAC not only provides

immediate bibliographic access on site, it also facilitates the interlibrary loan process, which is when one publication is loaned from one library to another.

26. *Wisconsin TechSearch (WTS)* - WTS is a set of services offered by the University of Wisconsin Libraries. WTS offers an array of article delivery and research services to any individual or organization who requests the specialized skills of WTS staff in locating and retrieving information, regardless of whether the individual is affiliated with the University of Wisconsin.

IV. OPINION REGARDING AUTHENTICITY AND PUBLIC ACCESSIBILITY

Document 1: John B. Heywood. *Internal Combustion Engine Fundamentals.* New York: McGraw-Hill Publishing Company, 1988. 930 pages. ("Heywood")

A. Authentication

27. I have been asked to opine on *Internal Combustion Engine Fundamentals* ("Heywood"). Heywood is a book authored by John B. Heywood which was published by McGraw-Hill Publishing Company in 1988. It contains, in 930 pages, Contents; Preface; Commonly Used Symbols, Subscripts, and Abbreviations; 15 Chapters; Appendixes; and an Index.

28. I have evaluated the Heywood reference in two ways: (1) by assessing scans of a copy of Heywood (Attachment 1A) provided by Wisconsin TechSearch (WTS) at my request from the Massachusetts Institute of Technology (MIT) Libraries; and (2) by requesting scans of Heywood from the Library of Engineering and Science, Purdue University Libraries (Attachment 1B).

29. Exhibit 1A is a scan of Heywood that includes: title page; verso of title page (copyright page) with handwritten notation stating call number "TJ755.H45 1988" and stamp that states "MASS. INST. TECH. LIBRARIES AUG 26 1991 Barker Engineering Library".

30. All identifying characteristics, such as stamps and notations, on Attachment 1A are consistent with library practice and procedure that I have observed during my career as a professional librarian and specifically during my tenure as a librarian and administrator at MIT Libraries. I have no cause for concern about the authenticity or accuracy of these identifying attributes. In addition, Heywood was found within the custody of a library, the Barker Engineering Library, MIT Libraries, one of the most likely locations for an authentic publication to be located.

31. The publication included as Attachment 1B was provided to me, at my request, from the Engineering and Science Library, Purdue University Libraries on July 9, 2019. Exhibit B contains scans of Heywood owned by the Purdue University Libraries including: scans of Heywood's cover with Purdue University Libraries inventory bar code label and label with call number: "TJ755.H45 1988"; inside front cover flyleaf with stamp "ENGINEERING LIBRARY"; title page with handwritten Dewey Decimal call number: 621.43.H519i ; verso of the title page (copyright page); Table of Contents; back page flyleaf with book date due slip pocket with handwritten

Dewey Decimal call number "621.43.H519i c.1", stamp that reads "ENGINEERING LIBRARY' and a label that reads "Heckman Bindery, North Manchester, Indiana 46962 and the date AUG 00"; and back cover.

32. Nothing about the condition of Attachment 1B from my experience as Dean of Libraries of Purdue University suggests any uncertainty about its authenticity. For example, the cover, inside front cover flyleaf, title page, verso of the title page (copyright page), contents, inside back cover flyleaf and back cover show no visible alterations to the document. In addition, Heywood was found within the custody of a library, the Purdue University Libraries, one of the most likely locations for an authentic publication to be located. Please note, the fact that there is both a Library of Congress call number and a Dewy Decimal call number reflects the decision I made while Dean of Libraries to convert the collections from Dewey Decimal classification to Library of Congress; this book would be one of those re-classified. It would not have affected its accessibility or retrieval since this conversion took place between 2015-2017 to the best of my knowledge.

33. I compared and found no difference between Attachment 1A with Attachment 1B. Accordingly, I affirm that Attachment 1A and Attachment 1B are of the same edition. I conclude that Attachment 1A and Attachment 1B were taken from a true and accurate copy of Heywood.

34. I conclude and affirm that Heywood is an authentic document.

B. Public Accessibility

35. Attachment 1C is a true and correct copy of the WorldCat entry for Heywood for holdings in Massachusetts and Indiana. I obtained Attachment 1C by completing a search on WorldCat on July 4, 2019.

36. Attachment 1C shows that Heywood is the document associated with this WorldCat entry, as verified by the author: John B. Heywood; publisher and publication date: McGraw-Hill in 1988; title: *Internal Combustion Engine Fundamentals*; and ISBN: 00702863X. Heywood could have been located by searching for the author – John A. Heywood; title – Internal Combustion Engine Fundamentals; or by searching the subject headings: "Internal Combustion Engines; Moteurs a combustion interne; and/or Combustion – Interne – Moteur."

37. When I searched WorldCat for holdings of Heywood in Massachusetts, MIT Libraries was third, and when I searched for holdings in Indiana, Purdue University Library was third among the 628 libraries shown as owning Heywood worldwide.

38. The searches discussed above could have been performed anywhere in the world by anyone who accessed WorldCat and its predecessor database through an OCLC member library in the 1990s to the present.

39. Attachment 1D is a download I made from MIT Libraries OPAC (online catalog) on June 18, 2019. The document cataloged in this record is

Heywood as verified by the fields listing: author - John A. Heywood; title - Internal Combustion Engine Fundamentals; and ISBN - 007028637X. I also compared the LC Classification (call number): TJ755.H45 1988 with that shown on the title and copyright pages of Attachment 1A, and it is the same on both. Heywood could have been located by searching for the author – John A. Heywood; title – *Internal Combustion Engine Fundamentals*; and/or by subject – Internal combustion engine. The MIT Libraries OPAC record indicates that it is in the Barker Library – Stacks : TJ755.H45 1988.

40. Attachment 1E is a download I made from MIT Libraries OPAC (online catalog) on June 18, 2019 that provides the MARC record for Heywood. The MARC record indicates in Field 910, (see description of the 9XX MARC field above), a date shown as: MHE880504ML. "880504" indicate the date: May 4, 1988. From my experience as a librarian and administrator and my knowledge of processes at MIT Libraries, this date indicates when the record was created for Heywood by a MIT Libraries cataloger and entered into the MIT Libraries OPAC. After the date of cataloging it would take a week for labeling and transfer to the shelf, thus Heywood would have been publicly accessible no later than May 11, 1988. The stamped date of August 26, 1991 indicates the original copy purchased in 1988 was lost or damaged, and was replaced on August 26, 1991. This copy would have been accessible in a week to ten days after receipt, therefore, September 6, 1991.

41. Attachment 1F is the Purdue University Library OPAC record. It is a download I made from Purdue OPAC (online catalog) on July 4, 2019. The document cataloged in this record is Heywood as verified by the fields listing: author - John A. Heywood; title - Internal Combustion Engine Fundamentals; and ISBN - 007028637X. I also compared the LC Classification (call number): TJ755.H45 1988 with that shown on the cover of Attachment 1B, and it is the same on both. Heywood could have been located by searching for the author – John A. Heywood; title – *Internal Combustion Engine Fundamentals* and/or subject – Internal combustion engine. The Purdue Libraries OPAC record indicates that it is shelved in the Engineering and Science Library. 2nd Floor WALC: TJ755.H45 1988. On Attachment 1B, the scans from the Purdue University Libraries copy of Heywood, the Heckman Bindery label AUG 00 (August 2000) indicates that the Purdue University Libraries copy of Heywood was re-bound due to wear (the binding appearance indicates it is not the original published cover). Therefore, the Purdue University Libraries copy of Heywood was accessible no later than August 2000.

Conclusion

42. I conclude that Heywood is an authentic document and would have been publicly accessible through the Barker Engineering Library, MIT Libraries no later

than September 6, 1991 and at the Engineering Library, Purdue University no later than August 2000.

Document 2: *Automotive Handbook*. 3rd Edition. Editor-in-Chief: Ulrich Adler. Stuttgart : Robert Bosch. Warrendale, Pennsylvania. Distributed in the USA by Society of Automotive Engineers, 1993. 852 pages. ("Automotive Handbook 3rd Edition")

A. Authentication

43. I have been asked to opine on *Automotive Handbook*, 3rd Edition ("Automotive Handbook 3rd Edition"). Automotive Handbook 3rd Edition is a book edited by Ulrich Adler which was published by Robert Bosch and distributed in the United States of America by the Society of Automotive Engineers in 1993. It contains, in 852 pages, sections titled: Physics basics; Mathematics, methods; Materials science; Machine elements; Bonding and joining techniques; Sheet-metal processing; Motor-vehicle dynamics; Internal-combustion (IC) engines; Engine cooling; Intake air, exhaust systems; Engine management, spark-ignition (SI) engines; Fuel management; Further engine-management; Integrated engine-management systems, Motronic; Engine test technology; Exhaust emissions, spark-ignition (SI) engines; Internal-combustion (IC) engines for alternative fuels; Engine management (diesel engines); Exhaust emissions (diesel engines); Auxiliary starting devices for diesel engines; Starting systems; Alternative drive systems; Drivetrain; Chassis systems; Braking systems; Road-vehicle systematic; Vehicle bodies, passenger-car; Vehicle bodies, commercial-vehicle; Lighting; Signaling and alarm

systems; Windshield, rear-window and headlamp cleaning systems, windshield and window glass; Heating, ventilation, and air-conditioning (HVAC); Communication and information systems; Safety systems; Comfort and convenience systems; Automotive hydraulics; Automotive hydraulics; Automotive pneumatics; Electrical system and power supply; Passenger-car-specifications; Road traffic legislation; Miscellaneous; and Index of Headings.

44. I have evaluated the Automotive Handbook 3rd Edition reference in two ways: (1) by assessing scans of a copy of Automotive Handbook 3rd Edition (Attachment 2A) provided by Wisconsin TechSearch (WTS) at my request from the Massachusetts Institute of Technology (MIT) Libraries; and (2) by requesting scans of Automotive Handbook 3rd Edition from the Purdue University Libraries (Attachment 2B).

45. Attachment 2A is a scan of Automotive Handbook 3rd Edition that includes: cover with MIT Libraries inventory bar code attached; inside front cover with bookplate indicating Massachusetts Institute of Technology Libraries; title page; verso of title page (copyright page) with handwritten notation stating call number "TL157.R613 1993" and stamp that states "MIT LIBRARIES RECEIVED FEB 12, 1993"; Foreword and For Your Information; and Contents with sections titled as described above.

46. All identifying characteristics, such as stamps and notations, on Attachment 2A are consistent with library practice and procedure that I observed during my career as a professional librarian and specifically during my tenure as a librarian and administrator at MIT Libraries. I have no cause for concern about the authenticity or accuracy of these identifying attributes. In addition, Automotive Handbook 3rd Edition was found within the custody of a library, the MIT Libraries, one of the most likely locations for an authentic publication to be located.

47. Attachment 2B was provided to me, at my request, from the Purdue University Libraries on July 9, 2019. Exhibit 2B contains scans of Automotive Handbook 3rd Edition owned by the Purdue University Libraries including: scans of Automotive Handbook's 3rd Edition cover; title page with handwritten Dewey Decimal call number: 629.23.R54KE 1993; verso of the title page (copyright page); Foreword to the 3rd Edition; Contents; inside back cover with Purdue University Libraries inventory bar code; stamp that reads "REFERENCE"; DEMCO date due book pocket with handwritten "1-13-97 [January 13, 1997] 629.23.R54KE 1993", REFERENCE DESK crossed out; ENGINEERING LIBRARY; and back cover.

48. Nothing about the condition of Attachment 2B from my experience as Dean of Libraries at Purdue University suggests any uncertainty about its authenticity. For example, the cover, title page, verso of the title page (copyright page), Foreword to the 3rd Edition; Contents; inside back cover and back cover show

no visible alterations to the document and is consistent with Purdue University Libraries policy and practice. In addition, Automotive Handbook 3rd Edition was found within the custody of a library, the Purdue University Libraries, one of the most likely locations for an authentic publication to be located.

49. I compared and found no difference between Attachment 2A with Attachment 2B. Accordingly, I affirm that Attachment 2A and Attachment 2B are of the same edition. I conclude that Attachment 2A and Attachment 2B were taken from a true and accurate copy of Automotive Handbook 3rd Edition.

50. I conclude and affirm that Automotive Handbook 3rd Edition is an authentic document.

B. Public Accessibility

51. Attachment 2C is a true and correct copy of the WorldCat entry for Automotive Handbook 3rd Edition for holdings in Massachusetts and Indiana. I obtained Attachment 2C by completing a search on WorldCat on July 4, 2019.

52. Attachment 2C shows that Automotive Handbook 3rd Edition is the document associated with these WorldCat entries, as verified by the author (editor): U Adler; publisher and publication date: Bosch, distributed in the USA by Society of Automotive Engineers; title: Automotive Handbook, 3rd Edition; and ISBN: 156091372X; 9781560913726; 0837603307; 9780837603308. Automotive Handbook 3rd Edition could have been located by searching for the author – U. Adler; title – *Automotive Handbook,* 3rd Edition; or by searching the subject

headings: “Automobile – Design and construction; Automobile – Design and construction – Handbooks, manuals, etc.; Manuels; and/or Automobiles.”

53. When I searched WorldCat for holdings of Automotive Handbook 3rd Edition in Massachusetts, MIT Libraries was third, and when I searched for holdings in Indiana, Purdue University Library was third among the 304 libraries shown as owning Automotive Handbook 3rd Edition worldwide.

54. The searches discussed above could have been performed anywhere in the world by anyone who accessed WorldCat and its predecessor database through an OCLC member library in the 1990s to the present.

55. Attachment 2D is a download I made from MIT Libraries OPAC (online catalog) on June 24, 2019. The document cataloged in this record is Automotive Handbook 3rd Edition as verified by the fields listing: author – U. Adler; title: *Automotive Handbook*, 3rd Edition; publisher and publication date: Bosch, distributed in the USA by Society of Automotive Engineers. 1993; and ISBN: 156091372X.

56. Automotive Handbook 3rd Edition could have been located in the MIT Libraries OPAC by searching for the author – U. Adler; title – *Automotive Handbook*, 3rd Edition; or by searching the subject heading: “Automobile – Design and construction – Handbooks, manuals, etc.” I also compared the LC Classification (call number): TL151.R613 1993 with that shown on the copyright page of

Attachment 2A, and it is the same on both. The MIT Libraries OPAC record indicates that it is in the Barker Library – Stacks : TL151.R613 1993.

57. Attachment 2E is a download I made from MIT Libraries OPAC (online catalog) on June 24, 2019 that provides the MARC record for Automotive Handbook 3rd Edition. The MARC record indicates in Field 910, (see description of the 9XX MARC field above), a date shown as: hk960405 "960405" indicates the date: April 5, 1996 (letters are initials of cataloger). From my experience as a librarian and administrator and my knowledge of processes at MIT Libraries, this date indicates when the record was created for Automotive Handbook 3rd Edition by a MIT Libraries cataloger and entered into the MIT Libraries OPAC. After the date of cataloging it would take a week to ten days for labeling and transfer to the shelf, thus Automotive Handbook 3rd Edition would have been publicly accessible no later than April 15, 1996.

58. Attachment 2F is the Purdue University Library OPAC record. It is a download I made from Purdue OPAC (online catalog) on July 4, 2019. The document cataloged in this record is Automotive Handbook 3rd Edition as verified by the fields listing: author: U. Adler; publisher and publication date: Bosch, distributed in the USA by Society of Automotive Engineers, 1993; title: Automotive Handbook, 3rd Edition; and ISBN: 0837603307.

59. I compared the Dewey Decimal Classification (call number): 629.23.R54kE 1993 with that shown on the title and copyright pages of Attachment 2B, and it is the same on both. Automotive Handbook 3rd Edition could have been located by searching for the author – U. Adler; title – *Automotive Handbook,* 3rd Edition; or by searching the subject heading: "Automobile – Design and construction – Handbooks, manuals, etc."

60. The Purdue Libraries OPAC record indicates that it is shelved in "CLOSED Engineering. Closed Storage – Sign in to request 629.23.R54kE 1993". As indicated by the date written on the Demco date due slip pock, January 13, 1997, Automotive Handbook 3rd Edition would have been available as of January 13, 1997

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C. Conclusion

61. I conclude that Automotive Handbook 3rd Edition is an authentic document and would have been publicly accessible through the MIT Libraries no later than April 15, 1996 and Purdue University Libraries no later than January 13, 1997.

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INTERNAL COMBUSTION ENGINE FUNDAMENTALS

John B. Heywood

Professor of Mechanical Engineering
Director, Sloan Automotive Laboratory
Massachusetts Institute of Technology

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INTERNAL COMBUSTION ENGINE FUNDAMENTALS

This book was set in Times Roman.
The editors were Anne Duffy and John M. Morriss; the designer was Joan E. O'Connor; the production supervisor was Denise L. Puryear. New drawings were done by ANCO.
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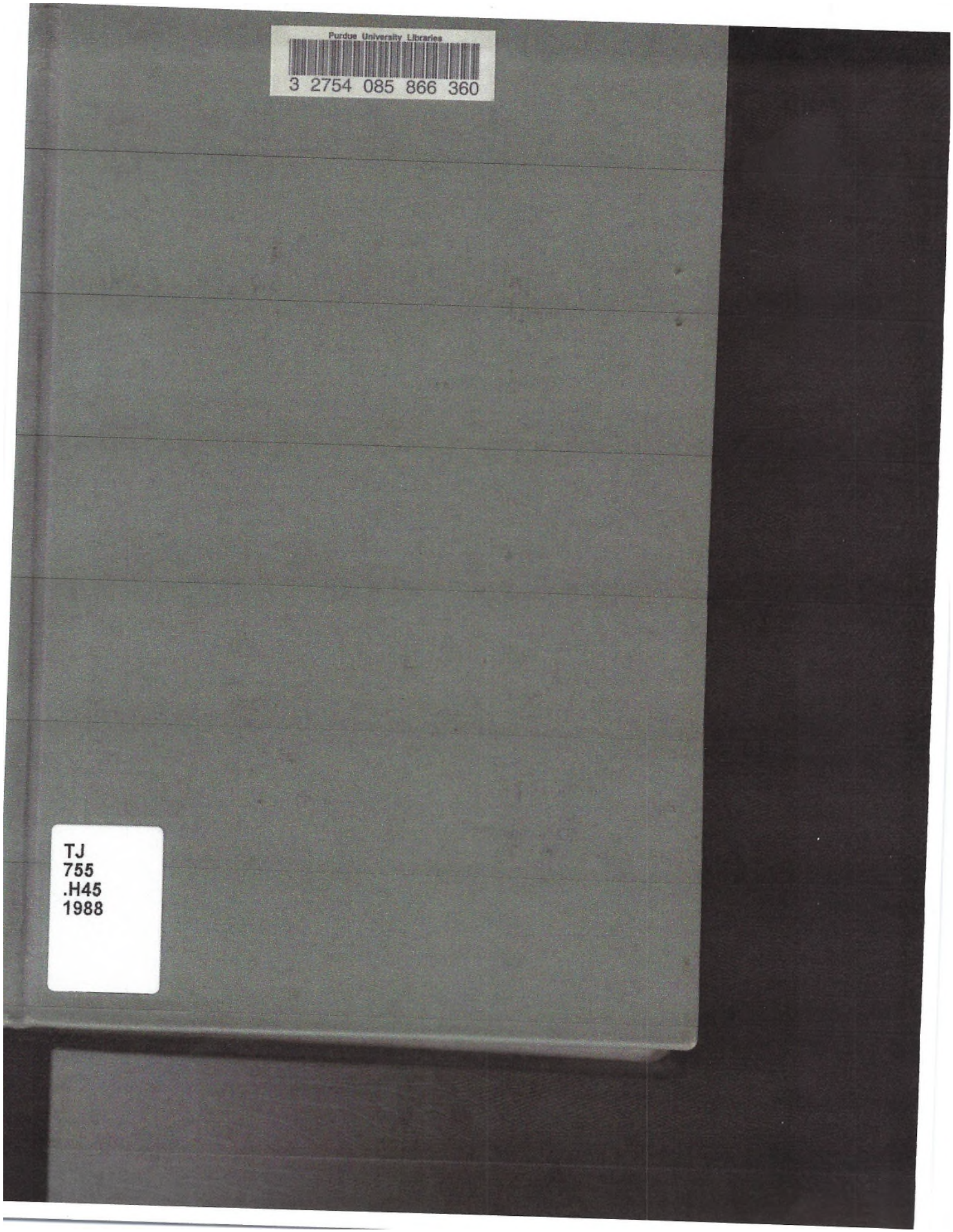
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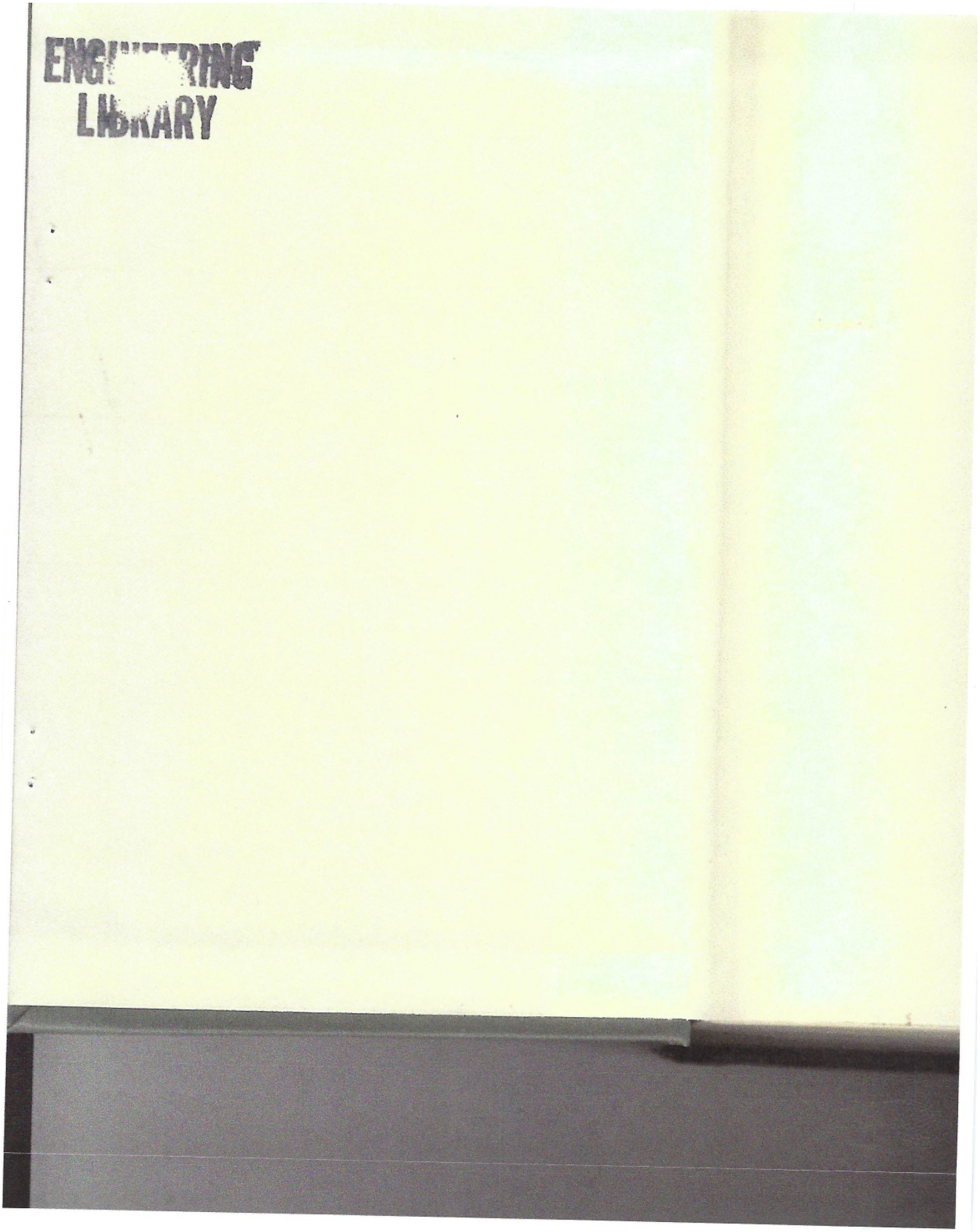

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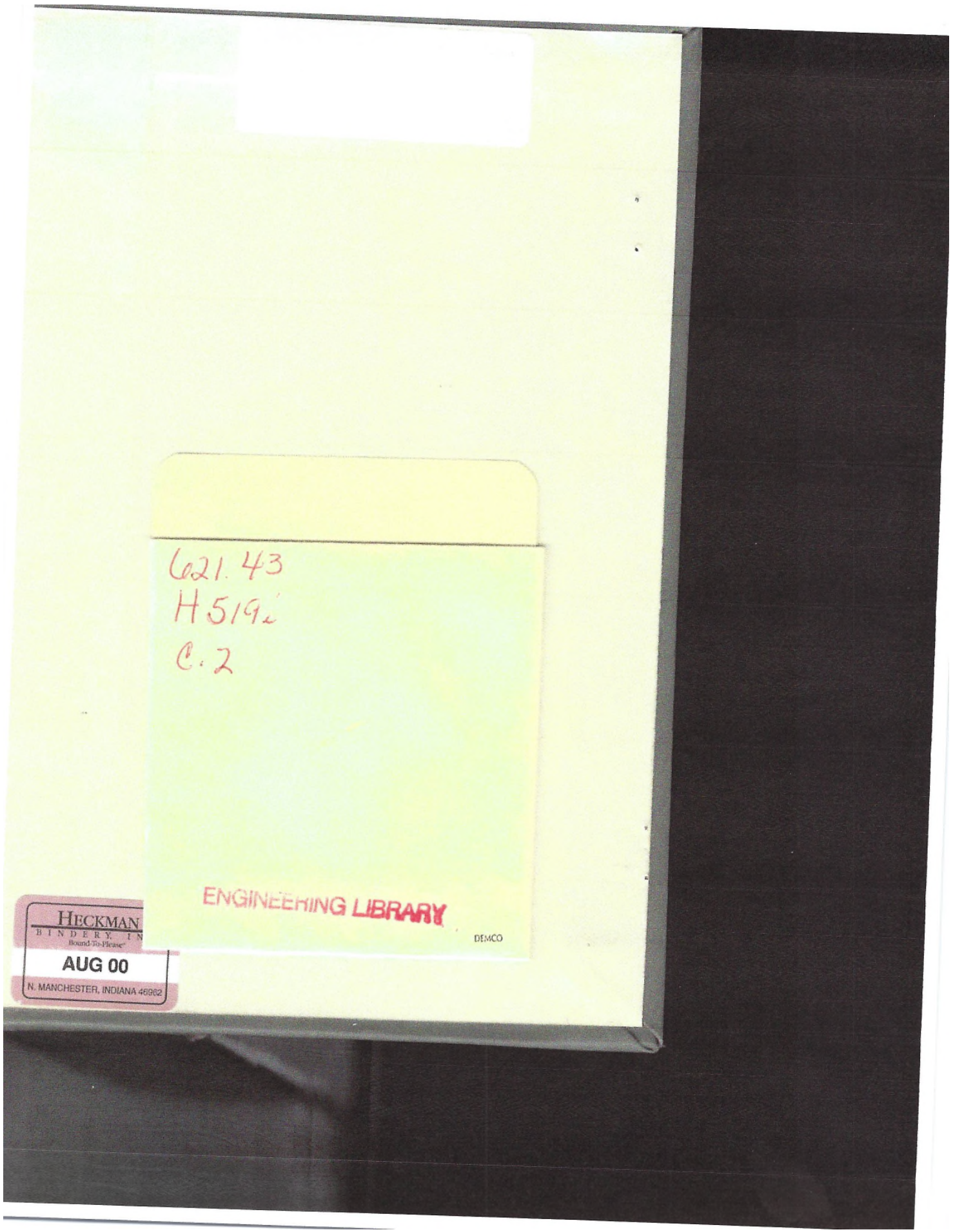
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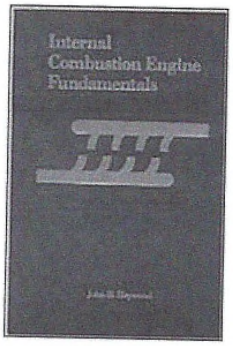

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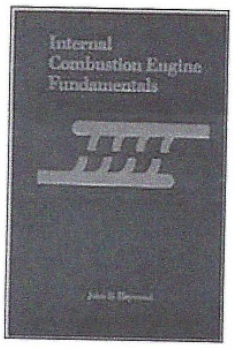

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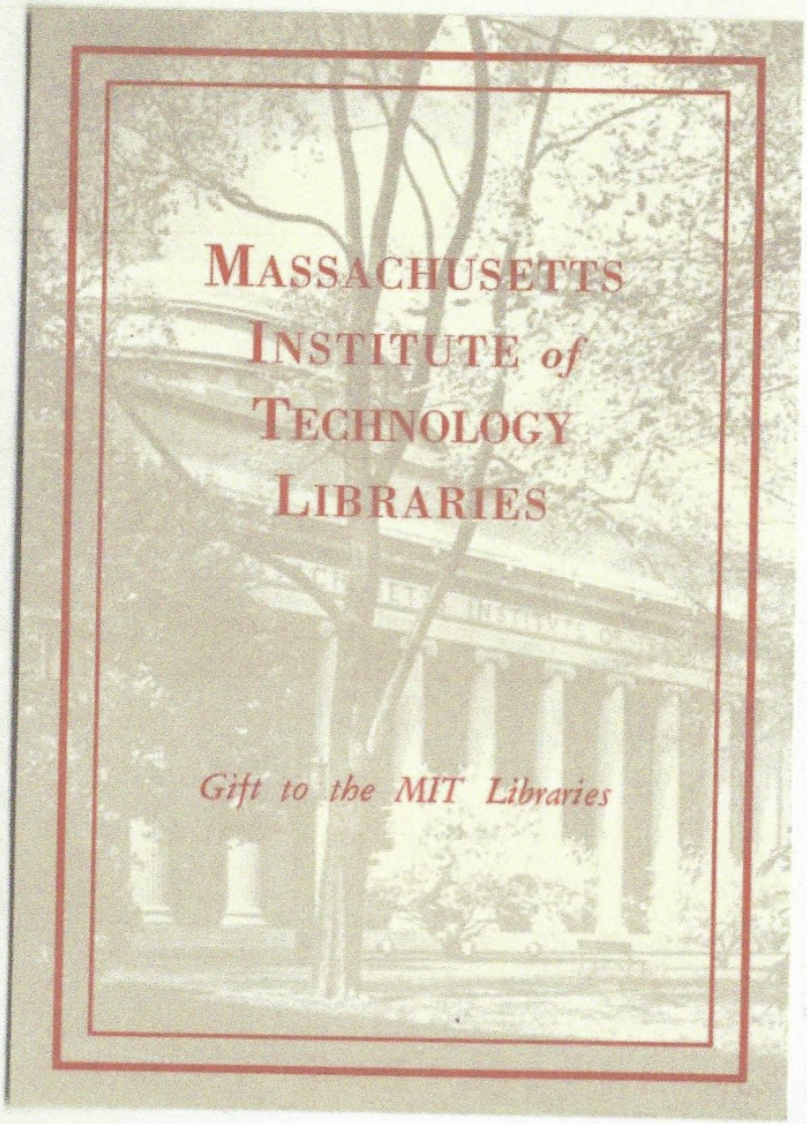

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Imprimé en Allemagne.

Editorial closing: 15.9.1993

Foreword to the 3rd Edition

The "Automotive Handbook" is a handy, concise, pocket-sized technical reference work. Its primary purpose is to provide the automotive engineer, the mechanic, the student, and all those interested in technical matters, with a wealth of reliable technical data as well as an insight into present-day state-of-the-art automotive technology in Germany. With this assignment in mind, the scope of the theoretical chapters dealing with **passenger cars and commercial vehicles**, as well as the remaining contents, has been kept to the practical and necessary level.

With the framework of a pocket-sized handbook, it is impossible to present a detailed coverage of individual technical subjects. On the other hand, with the very wide range of users in mind, we did not want to dispense with generally applicable topics and data.

We recommend their you leaf through this Automotive Handbook before attempting to use it, this will prove to be a valuable help when you actually want to refer to a particular point at a later date.

The addition of new technical subjects and the expansion and up-dating of existing material are reflected in the fact that this 3rd Edition is 140 pages longer than its predecessor.

This 3rd English Edition was revised and up-dated by specialists from the Bosch Group, as were the two previous editions. For certain chapters, other firms also made contributions. At this point, we would like to express our appreciation to all concerned.

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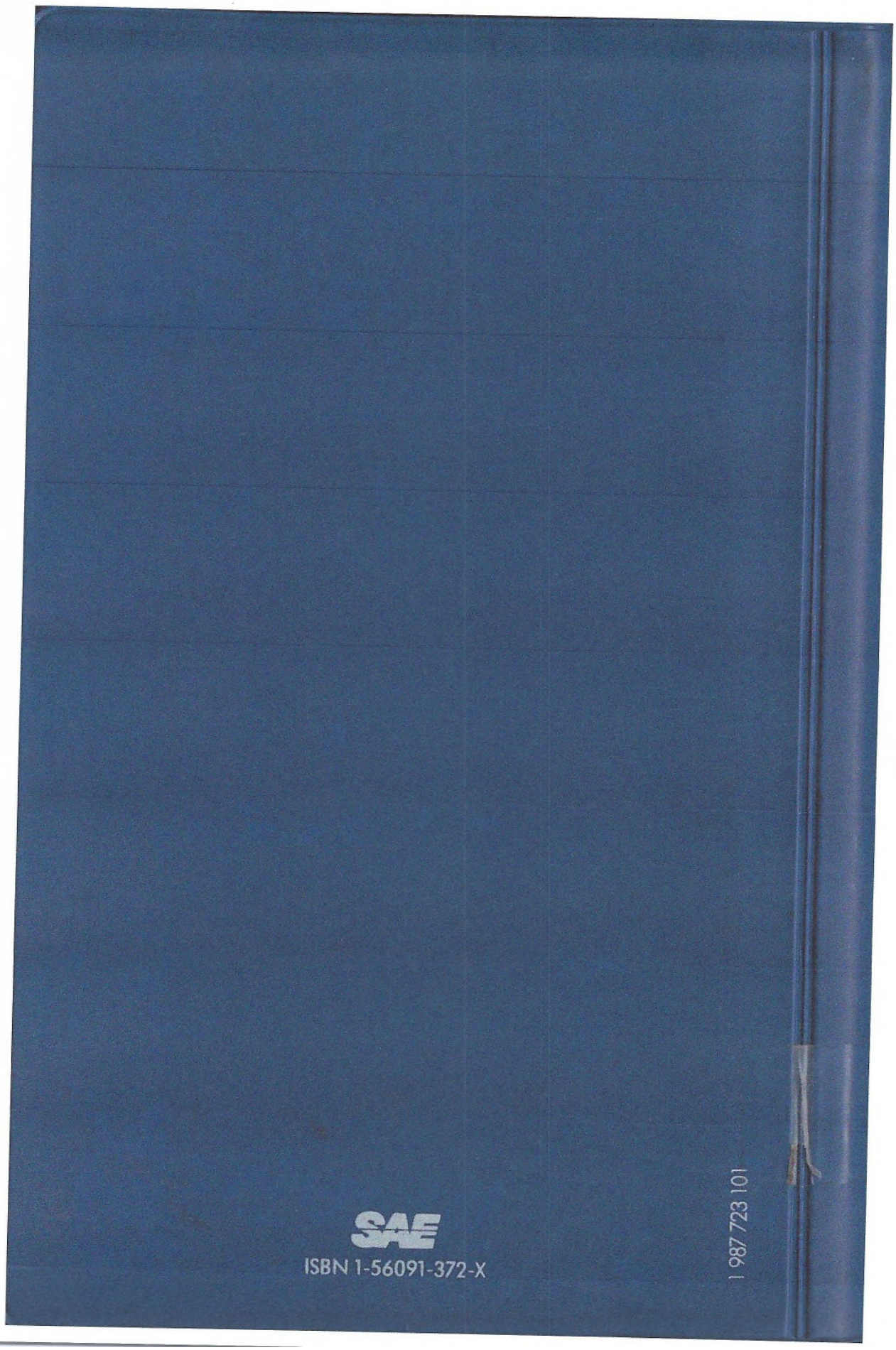
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Foreword to the 3rd Edition

The "Automotive Handbook" is a handy, concise, pocket-sized technical reference work. Its primary purpose is to provide the automotive engineer, the mechanic, the student, and all those interested in technical matters, with a wealth of reliable technical data as well as an insight into present-day state-of-the-art automotive technology in Germany. With this assignment in mind, the scope of the theoretical chapters dealing with **passenger cars and commercial vehicles**, as well as the remaining contents, has been kept to the practical and necessary level.

With the framework of a pocket-sized handbook, it is impossible to present a detailed coverage of individual technical subjects. On the other hand, with the very wide range of users in mind, we did not want to dispense with generally applicable topics and data.

We recommend their you leaf through this Automotive Handbook before attempting to use it, this will prove to be a valuable help when you actually want to refer to a particular point at a later date.

The addition of new technical subjects and the expansion and up-dating of existing material are reflected in the fact that this 3rd Edition is 140 pages longer than its predecessor.

This 3rd English Edition was revised and up-dated by specialists from the Bosch Group, as were the two previous editions. For certain chapters, other firms also made contributions. At this point, we would like to express our appreciation to all concerned.

The editors

For your information:

Compared to the 2nd Edition, we have up-dated the following subjects:

Oscillations: Modal analysis
Electronics: Solar cells, PC-board techniques, micromechanics, mechatronics, A/D conversion
Technical optics: Laser engineering, beam waveguides
Materials: Automotive paints
Motor-vehicle dynamics: Driving dynamics (as per ISO)
Exhaust systems: Catalytic converters, soot filters
Engine management (spark-ignition (SI) engines): Electronic engine-power control (EMS), electronic boost-pressure control, variable-length intake manifold, evaporative-emissions control, exhaust-gas recirculation (EGR), alcohol/hydrogen-powered engines
Engine management (diesel engines): In-line control-sleeve fuel-injection pump, unit injectors (PDE), exhaust-gas analyzers
Drivetrain: Traction control (ASR)
Suspension: Suspension systems, active suspensions
Tires: Traction
Steering: Power-assisted steering, rear-wheel steering
Braking systems: Antilock braking systems (ABS), Electronically controlled commercial-vehicle braking systems (ELB)
Lighting: PES headlamps, Litronic
Safety systems: Seat-belt tighteners, airbags, rollover protection, tire-pressure monitoring system
Comfort systems: Central locking systems
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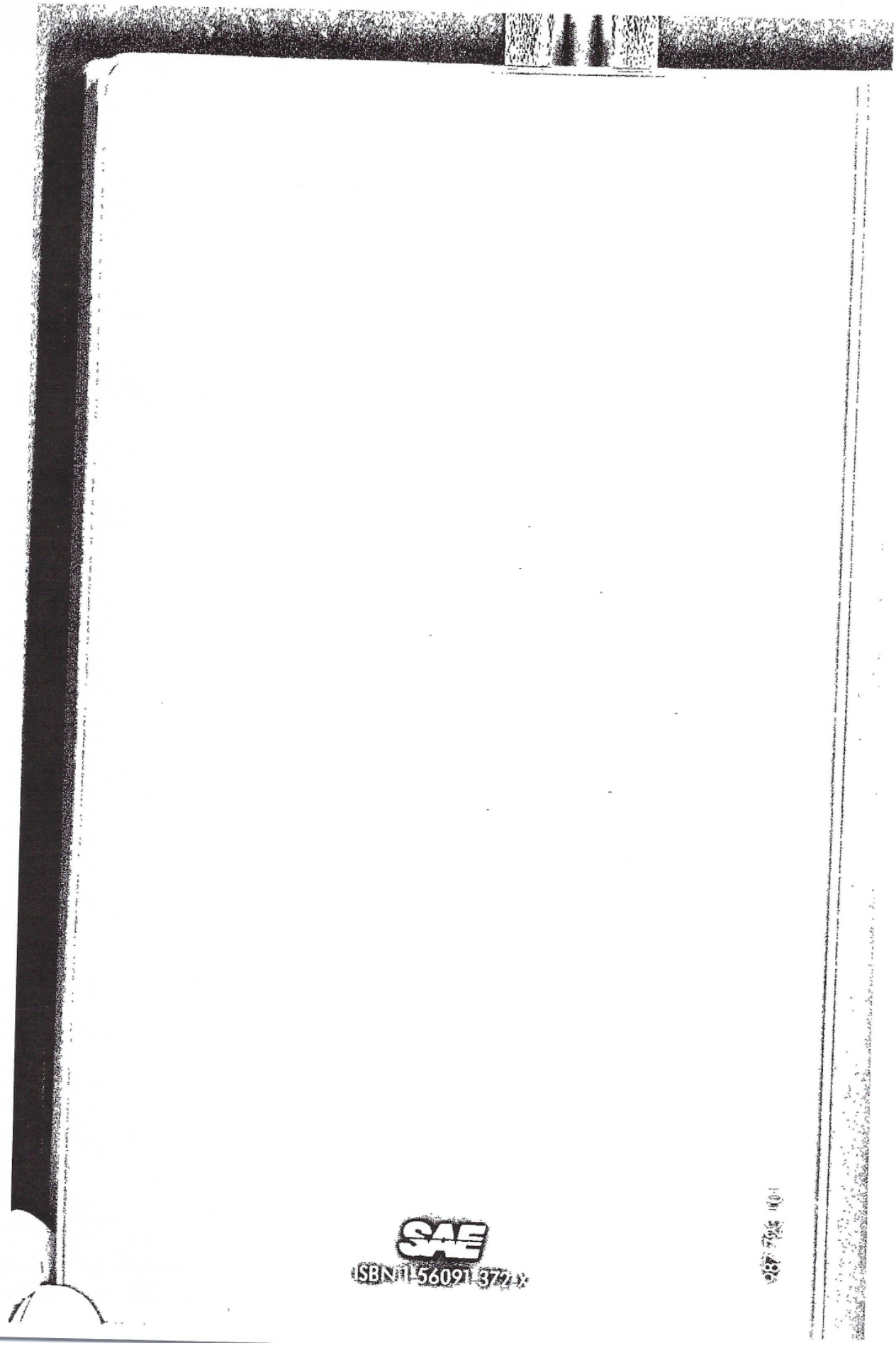

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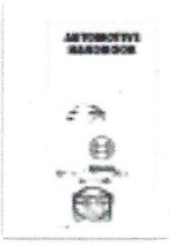

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