The Story of the Century

NCR has staked a claim for a substantially larger share of the total computer market with the worldwide introduction of a major new family of data processing systems.

Robert S. Oelman, NCR Chairman, said the Company expects to install a minimum of 5,000 of its new Century Series computers. This initial sales target represents a total value of over a billion dollars worth of the new equipment.

"The introduction of this advanced new computer family is the third and by far the most significant step in the Company's long-term program to win a sizable share of the huge electronic data processing market, Mr. Oelman said.

The Company entered the electronic data processing field in 1959 with the introduction of its 304 computer series. The second step was the introduction of the NCR 315 computer series. To date, more than 700 of these systems have been installed worldwide.

These figures do not include more than 2,500 smaller computers — the 390 and 500 Series — which NCR has installed in the past several years.

The Century program represents an investment of $150 million in research, engineering, software, new production facilities and equipment, and in training of marketing and service personnel.

NCR's Chairman said the lower-priced members of the Century family have been oriented toward the "mass computer market, including first-time computer users.

"In addition to high-performance equipment at relatively low cost, this market also requires ready-to-use supporting software, beamed at the specific requirements of different lines of business," he said.

To this end NCR conducted in-depth systems studies in financial institutions, the retailing industry, industrial companies, insurance companies, government offices, hospitals, hotels, motels, schools, law

First Week — 250 Orders

Orders for more than 250 of NCR's new Century Series computer were received in the first week after the world-wide announcement of the new product on March 5th.

The sales value of the orders is approximately $35 million according to C. L. Keenoy, Vice President and Group Executive Domestic Marketing.

"The reception being given this new family of computers exceeds by several times any comparable announcement since the Company entered the computer field," Mr. Keenoy said.

Most of the orders reported in the first week are from the United States, Mr. Keenoy said. They include commercial banks, savings and loan associations, retail stores, manufacturing companies, municipal government, educational institutions, hospitals, hotels, distributors and construction companies.

However, a substantial number of orders have been reported from abroad, including Great Britain, Germany, Japan, Switzerland, Portugal, Denmark, The Netherlands, Argentina, The Philippines, and Hong Kong.

enforcement agencies and other fields. Mr. Oelman said these studies provided new guidelines for developing a wide range of standard application "packages" designed to simplify moving up to a computer system from punched-card or other mechanical business equipment.

Primary emphasis has been placed on insuring that the new computer family's basic software would be ready for customer use well in advance of first equipment deliveries, he added.

"The first models of the Century Series have been available for internal use for over a year now," he said. "As a result, the compiler and the operating software systems have for the most part already been checked out."

Customer debugging operations now are underway. The Company itself will be using 64 of the new systems, prior to customer deliveries next fall, for training of service and support personnel, further software checkout, and customer use at regional checkout centers.

Mr. Oelman described the educational program in preparation for the introduction of the new family of computers as the most extensive in the corporation's history. Among marketing personnel this in-depth program has included not only data processing specialists but hundreds of customer support personnel and technical service representatives.

"Comprehensive educational services will also be provided for all Century users, including their systems personnel, programmers and operators. NCR is also establishing new regional center facilities for checkout customer programs and for providing other on-going assistance," he said.

Nearing completion is a new 300,000-square-foot manufacturing plant at San Diego, Calif., to augment NCR's electronics production facilities at Hawthorne, Calif., and Dayton, Ohio. Manufacturing of the Century family also is being carried out at NCR factories in Dundee, Scotland, and Augsburg, Germany.

The versatile new computers are based on significant design advances in ultra-high-speed thin-film memories, monolithic integrated circuitry, disc memory innovations, and automated production techniques.

"These features will provide users with greater performance than ever before available in computer systems in their price range," Mr. Oelman stated. Rentals of the smaller members of the family, the Century 100, begin at $2,250 per month, or $1,910 with a five-year contract.

The Century Series is a full family of compatible systems designed

Press Conferences Around The World

Press conferences introducing the Century Series were held simultaneously in large cities throughout the United States and Canada and around the world on March 5th.

Among those attending in New York City were: R. S. Oelman, Chairman; C. L. Keenoy, Vice President and Group Executive Domestic Marketing and P. W. Lappetito, Assistant Vice President Century Computer Marketing.

Elsewhere in the U. S. were R. S. Laing, President, Chicago; O. B. Gardner, Vice President Industry Marketing, Washington, D. C.; R. G. Chollar, Vice President and Group Executive Research, Development and Manufacturing, along with D. E. Eckdahl, Vice President, Electronics Division, Los Angeles.

T. E. McCarthy, Vice President Product Marketing, Boston; B. L. Carter, Assistant Vice President Retail Marketing, Atlanta; J. M. Boyle, Vice President Domestic Sales, Philadelphia; A. H. Ecton, Assistant Vice President Retail Marketing, Pittsburgh; H. W. Frapwell, Assistant Vice President Domestic Marketing, Dallas; J. A. Hotchkiss, Director Product and Systems Planning, Houston; F. J. Clark, Director Financial Systems, Kansas City; W. J. Carroll, Vice President Product Planning, New Orleans.

Overseas, press conferences were held in 50 cities. George Haynes, Vice President and Group Executive International Operations, was in Buenos Aires, and H. R. Wise, Vice President International Marketing, was in London. Other conferences were held in Paris, Zurich, Frankfurt, Tokyo, Sydney, Johannesburg, Hong Kong and Mexico City.

Press conference scenes in New York City. Above, C. L. Keenoy, Vice President and Group Executive Domestic Marketing, answers questions. Below, R. S. Oelman, Chairman, opens the conference which drew an enthusiastic turnout from radio, television and newspapers.

Jack Hiett of Peripheral Equipment Engineering in Dayton examines hammer module that will enable Century Series printer to make sharp images on multiple copies.

Ron Ferguson, Group Leader on card-reader assembly for NCR's new Century computers, explains a delicate wiring procedure to Marian Mote. Both are Dayton employees.

to meet the data processing needs of a wide range of users. This includes the first-time computer user as well as the highly advanced user employing real-time and multi-programming concepts. The systems' capabilities cover all types of business data processing and also special scientific applications.

"This is by far the largest product development effort ever undertaken in NCR's 84-year history," Mr. Oelman said. "We believe it demonstrates dramatically our full-scale commitment to providing total systems for businesses throughout the world."

Initially, NCR is releasing two lines of the new computer family—the Century 100, and the larger Century 200 which has a minimum rental of $3,950 per month, or $3,355 with a five-year contract. Deliveries of the Century 100 are scheduled to begin next September. First customer deliveries of the Century 200 will be next February.

The new computer family also includes still more powerful multi-

processing and time-sharing models scheduled for future release. These will put NCR in a sector of the computer market it is not active in now.

All models in the entire Century Series have on-line, real-time capabilities.

A full line of peripheral equipment including disc units, card readers, printers, magnetic tape handlers, and a new high-capacity CRAM (Card Random Access Memory) was also introduced by the Company.

One of the most significant features of the Century Series is its great flexibility. This permits the user to modify and expand his system as his data processing needs change and grow.

The Century user can easily in-

Employee in Electronics Division at Hawthorne, Calif., operates machine that plates tiny rods with magnetic thin film material. Rods are key part of new Century Series memory developed by NCR.
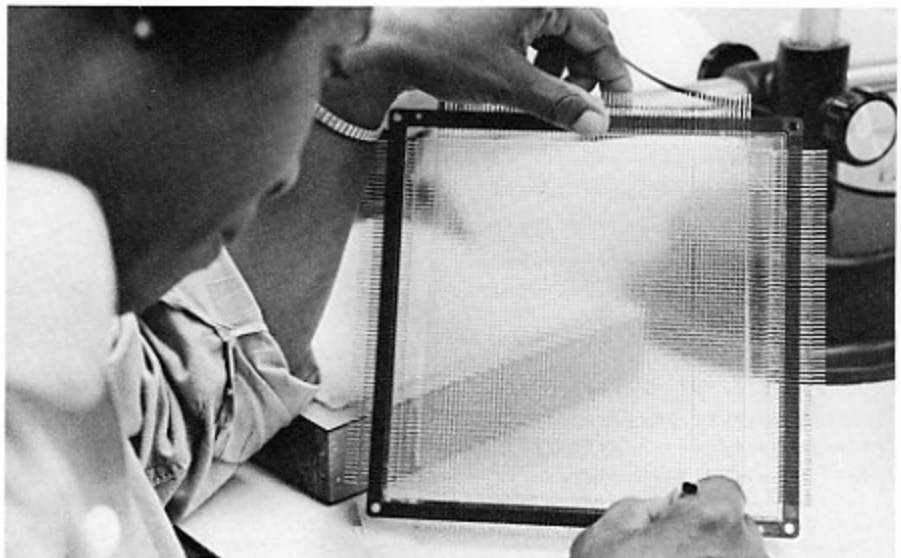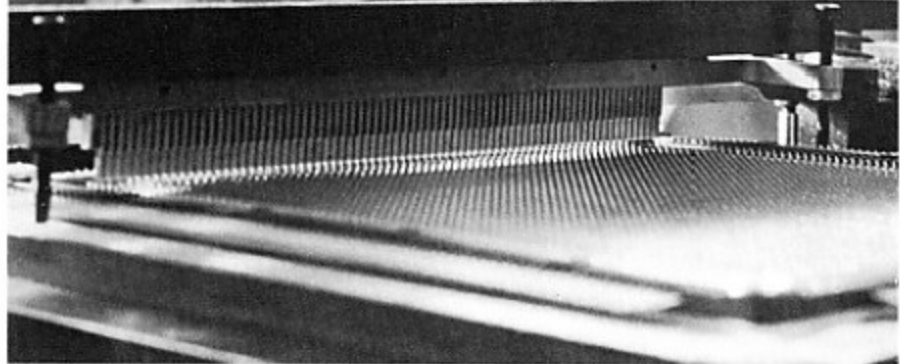
crease the capacity and power of the processor, add or combine a variety of peripheral devices, or move up to a larger basic system without costly reprogramming. Both software and hardware are compatible throughout the entire computer family.

The compatibility of the Century family is a result of a highly developed "systems architecture" under which NCR designers applied significant advances in technology to meet the demanding design objectives.

One of these technical breakthroughs was NCR's development of a unique thin-film "rod memory," the most advanced memory in use in any commercial computer in its price range. It employs thousands of tiny "whiskers" in place of the usual doughnut-shaped ferrite cores. Each of these hairlike rods is only 1/10 inch long and is coated with a thin film of magnetic material. The Company's proprietary methods of automatically fabricating and assembling the short rods into memories have contributed importantly to the Century Series' outstanding cost/performance ratio.

The same basic memory module is used throughout the entire com-

Memory plane of unique new Century Series computer holds 4608 bits of information on tiny rods. Rods are automatically placed in solenoids—coils of two interwoven wires—with inner diameter of only 10 mils. After assembly, planes are coated with plastic and stacked to form memory modules. Memory can be expanded from basic 16,000 characters to more than half-a-million characters.

Two magnetic discs are an integral part of every computer in the new Century Series. In addition to providing ultra-fast high-capacity data storage, disc is used to store software operating system information. Concept makes use of inexpensive disc storage in place of main memory for many computer functions. Each disc pack has three discs storing total of more than four million characters of information. At left is Robbie Zagarino and at right is Jenny Schrang.

puter family. It operates at 800 nanoseconds cycle time (800 billionths of a second) and is in the form of modules which can be expanded. The basic Century 100 has a memory of 16,000 characters which is expandable to 32,000. A Century 200 system can have a memory capacity of up to 524,000 characters.

Every Century system includes two discs which feature significant design improvements. In addition to providing ultra-fast, high-capacity data storage for even the lowest-cost member of the family, the Century disc is used as a reservoir for the storage of operating software. This concept makes use of inexpensive disc storage in place of relatively expensive main memory for interim storage in many computer functions. This frees the main memory and greatly extends program performance and compatibility throughout the family.

Each of the discs stores more than four million bytes of information.

Because of a breakthrough in the manufacture of low-cost read-write heads, coupled with a new type of head-positioning unit, access time to information is considerably faster than any other removable disc in its price range. Average access time is 42 milliseconds. Rate of data transfer is 108,000 bytes per second with a Century 100 and up to 180,000 with a Century 200.

The two removable disc packs are made up of three discs each. Seventy-two read-write heads serve each disc pack, providing 12 times as many heads per disc surface as other systems. The multiple-track heads provide immediate access to 1/16 of the total file (more than half-a-million bytes), compared with 1/200 on typical units available today.

The discs are unique in that they are metal-plated instead of oxide-coated, providing an exceptionally clean and long-wearing surface.

Another major area of advanced technology incorporated in the Cen-

tury Series is its use of monolithic integrated circuits throughout the system, including peripheral units as well as the central processor.

Only one type of integrated circuit is used throughout the new family of machines. The circuits are mounted in standardized cards, and only six different types of cards make up 80 percent of the logic circuitry. There are only 120 different card types in the entire system, a fraction of the number used in most computer systems today.

The simplicity of circuitry design and standardized mass fabrication are key factors in the outstanding cost/performance of the systems, NCR stated. In addition, this simplifies servicing of the computers and greatly reduces the spare parts inventory that must be kept in the field.

All Century computers use the international and American (ASCII) standard codes for information interchange.

With a sales volume last year of $955 million, all in business equipment and related services, NCR is the world's second largest supplier of business systems.

Circuit cards in Century Series contain monolithic integrated circuits. The Century uses only 120 cards, a fraction of the number used by other competing systems. Six different cards contain 80 per cent of the circuitry.

These tiny metal rods are the heart of sophisticated new Century memory developed by NCR. Rods, only a tenth of an inch long, replace conventional magnetic cores.

Tom Tag of Technical Services demonstrates how type roll of new Century Series printer can be conveniently removed by the user—and another typeface substituted.

Peripherals for NCR's new Century Series are already in production in Dayton factory's Assembly E area. Punched-card reader is being tested here by Walter Peffly.

Century's Unique "Packaging"

New approaches to electrical and mechanical packaging are features of the Century Series family of computers, according to Carl F. Rench, NCR Vice President of Engineering.

Computer designers apply many types of circuits, and circuit card assemblies, in designing a total system. Through standardization efforts, NCR has designed the entire Century Series with only one type of integrated circuit for all logic. Circuit cards used for logic are very limited in number, with only six types used throughout the entire system.

There are only a total of 120 circuit card types in the NCR Century system, as opposed to in excess of one thousand different types in some competitors' equipment. By concentrating on circuitry standardization, servicing and service parts inventory have been greatly simplified.

"Customers receive direct benefits from this concept," Mr. Rench said. "The discipline that requires a fewer number of different devices in a computing system results in higher reliability, better service, and lower costs."
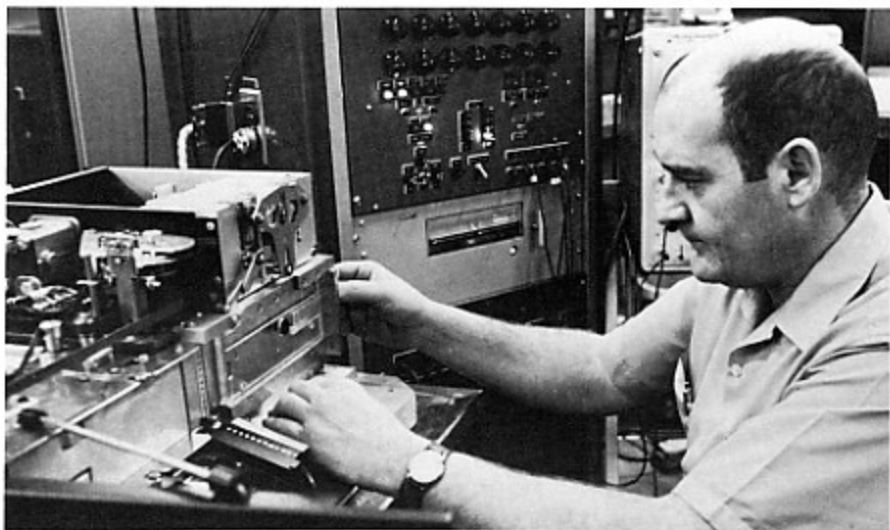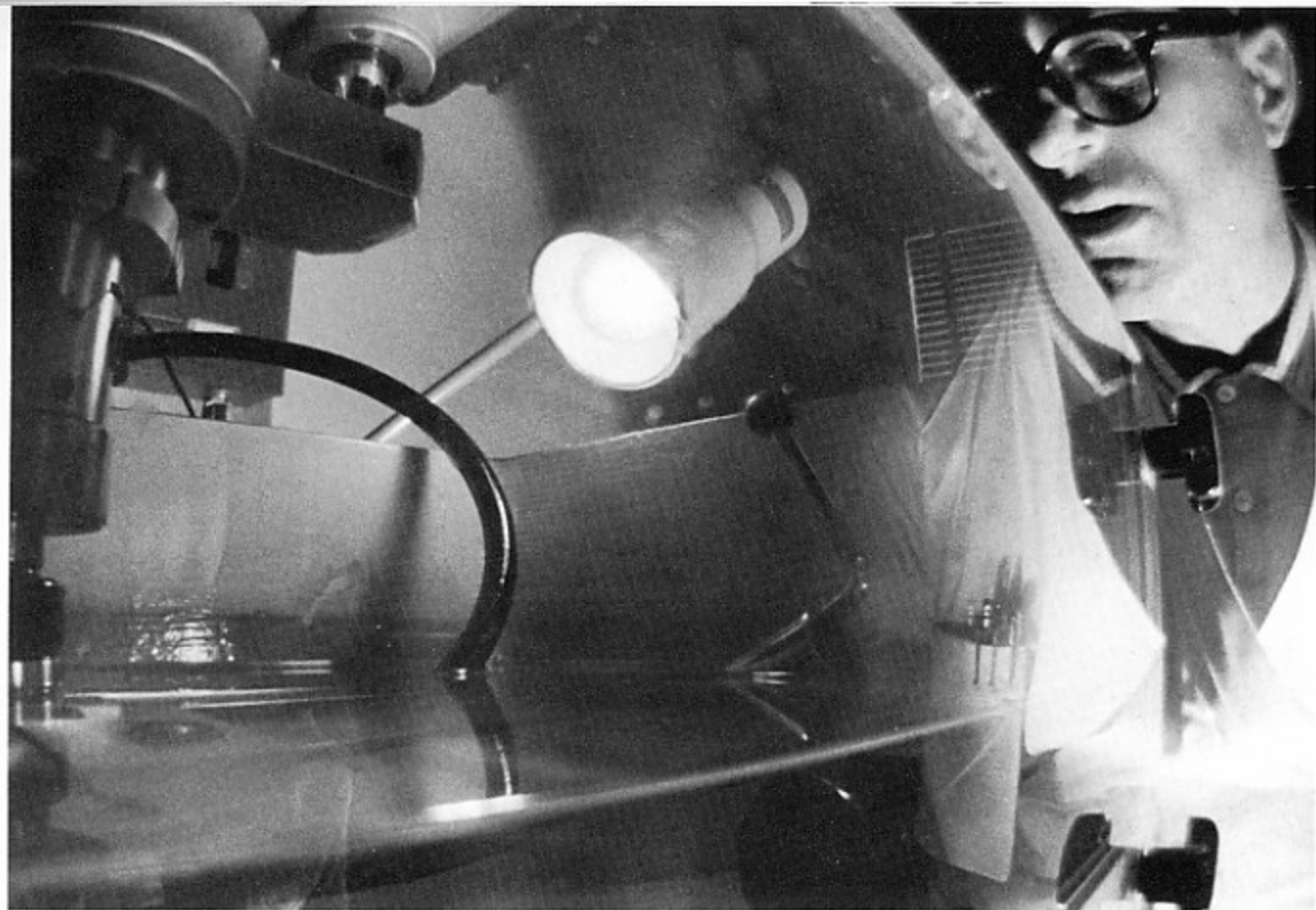
NCR's standardization efforts have also resulted in mechanical packaging advances. Cabinets and mounting hardware are standard throughout the entire system. The problem of interconnection between units has been solved by NCR. The design allows above-the-floor installation by virtue of a specially designed cable raceway which permits ease of installation without sacrificing esthetics.

NCR "Firsts" In EDP

Electronic discing machine process (above) is used in fabrication of Century's read-write heads for disc units. With new head-positioning unit, access time is considerably faster. Seventy-two read-write heads serve each of two integral disc packs, providing 12 times as many heads per disc surface (below) as other systems.

NCR's new Century Series computers continue a tradition of "firsts" in the business equipment industry.

... NCR introduced the first magnetic data storage on ledger cards. This technology became the basis for the first electronic accounting machine, the **POST-TRONIC***, introduced in 1956. The magnetic-ledger principle is also used with the NCR 390 and Series 500 computers. It has been adopted by a number of other business equipment manufacturers.

... NCR introduced the first fully transistorized business computer, the 304. First deliveries of the 304 were made in 1959.

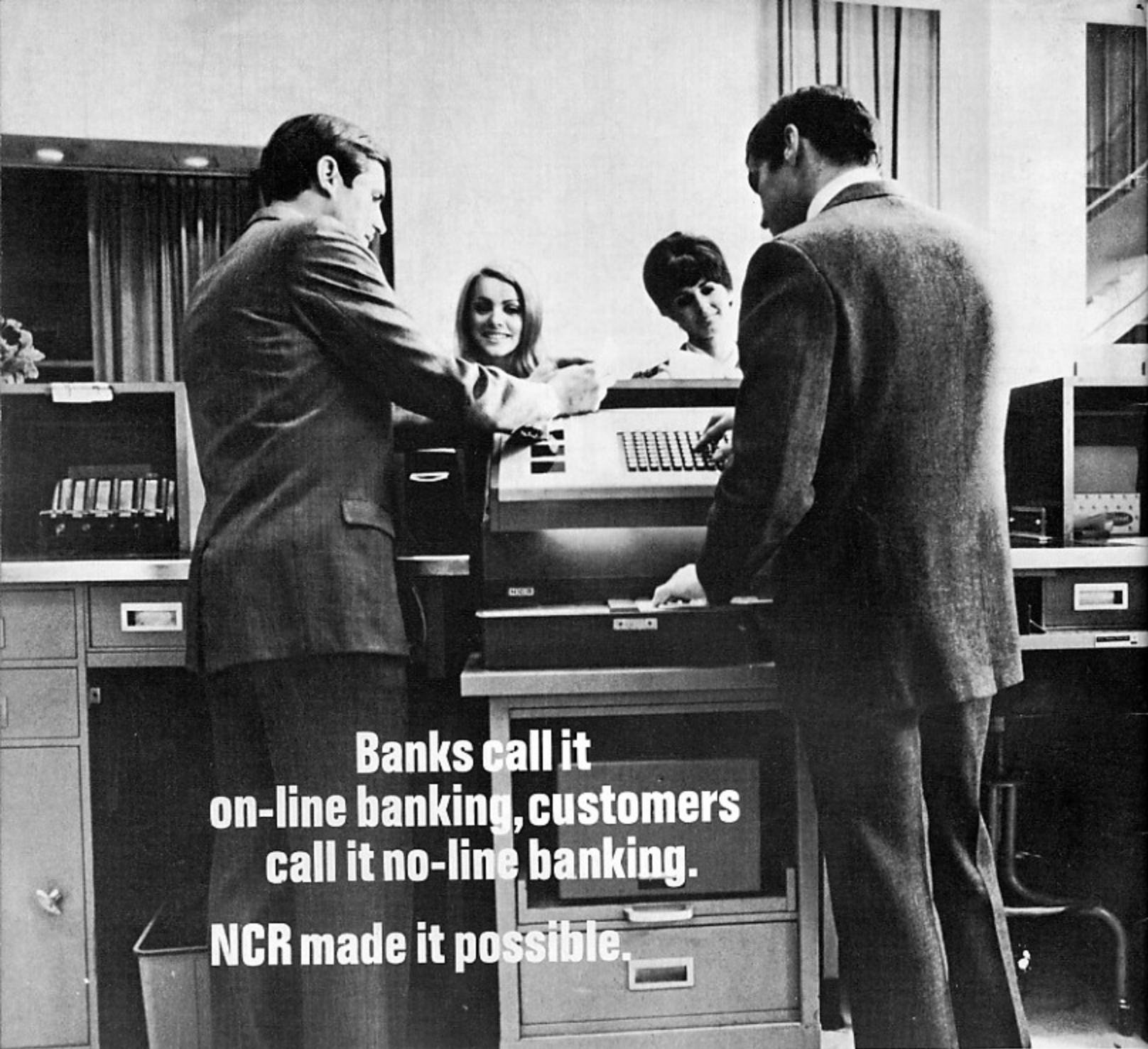... The development of the first cartridge-type, mass-storage, random-access memory (CRAM) also was accomplished by NCR. Other computer manufacturers subsequently introduced similar units.

... The first all-thin-film main memory to be offered in a business computer was a feature of the 315 RMC (Rod Memory Computer) system, the first of which was installed in 1965.

... NCR also pioneered in the linking of computers to basic business equipment — accounting machines, adding machines and cash registers — through such common machine languages as punched paper tape, magnetic characters, and machine-readable optical print. Some 50,000 of these NCR data input devices are now in use throughout the world.
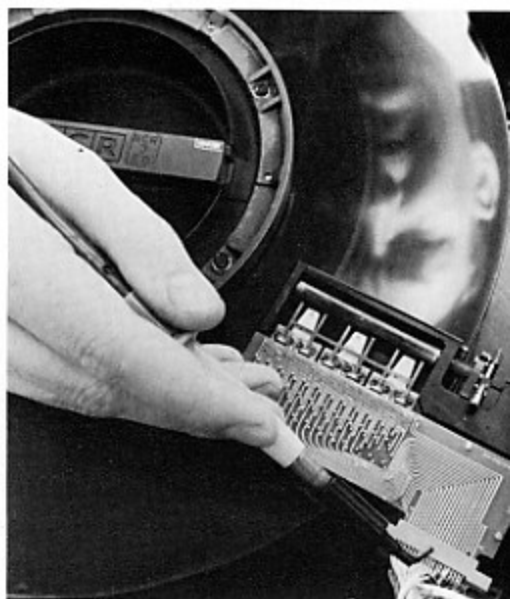
Trademark—Reg. U.S. Patent Office

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Banks call it
on-line banking, customers
call it no-line banking.

NCR made it possible.

Teller's machine is linked directly with our new Century Computer. Provides instantaneous records of financial transactions.

The same kind of ingenuity created the world-famous NCR computers, accounting machines, cash registers, and adding machines.

NCR

THE NATIONAL CASH REGISTER COMPANY, DAYTON, 45409